Health Promoting Secondary Schools – Implementation of a Self-Determination Framework

Project 1: The Experiences and Motivation of Key Stakeholders in the Development and Implementation of a Choice-Based Whole-School Health Model

Project 2: Effectiveness of a Choice-Based Whole-School Model to Increase Students' Motivation Towards Physical Activity and Healthy Eating

Project 3: Evaluation of a School-Based Intervention to Increase Students' Motivation and Enrolment in High School Physical Education

By

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B.Sc., University of Saskatchewan, 2003
B.Ed., University of Saskatchewan, 2003
M.Sc., University of Saskatchewan, 2008

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of

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in the School of Exercise Science, Physical and Health Education

Supervisory Committee

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Abstract

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The purpose of this research was to implement and evaluate a whole-school health model (Health Promoting Secondary Schools [HPSS]), grounded in self-determination theory (SDT). The approach used a "For Youth with Youth" planning strategy designed to change school environments (culture, policy and practices) in order to help high school students become more physically active and eat more healthful diets. Three interrelated research projects were conducted to address the purpose of this study. A concurrent mixed-methods design was used to: (a) gain an understanding of the experiences of teachers and the Action Team as they planned and implemented school-based healthy living strategies (Project 1); (b) evaluate the impact on and relationship between SDT constructs and students' motivation to engage in health-related behaviours (Project 2); and (c) evaluate the motivation of students in physical education classes grounded in SDT and its impact on their enrolment in grade 11 elective physical education (Project 3). In Project 1, 23 teachers and 37 Action Team members participated in focus group interviews. School observation field notes and Action Team meeting minutes were collected throughout the intervention process. Analysis of the data revealed that several factors were associated with participants' experiences and motivational processes. These factors included: (a) Competing Responsibilities, Technical Difficulties, and Lack of Computer Access (b) Resources, Reminders, Workshops, and Collaboration (c) Choice-Based Design Impacts Participants' Experiences; (d) Teacher Control Impacts Student Engagement (e) Teacher Job Action Inhibited Implementation of HPSS Action Plans. The findings from this study can facilitate future school-based projects by providing

insights into student and teacher perspectives on the planning and implementation of a whole-school health model.

In Project 2, 379 grade 10 students in ten participant schools (5 intervention schools; 5 control schools) completed self-report questionnaires pre and post intervention to evaluate the impact on students' motivation to engage in health-related behaviours. Results showed students attending HPSS intervention schools reported significantly lower amotivation scores for healthy eating compared to students in usual practice schools. No significant differences were found between conditions on motivation towards physical activity. The findings indicate that a choice-based whole-school health approach may be an effective approach for decreasing amotivation towards healthy eating behaviours.

In Project 3, a sample of 373 grade 10 students completed self-report questionnaires to assess their perceptions of autonomy, relatedness, and competence towards grade 10 Physical Education. Enrolment rates were collected from participant schools to determine the impact of the HPSS intervention on student enrolment in grade elective physical education. Multilevel analysis showed no significant differences between conditions post intervention on overall psychological need satisfaction or individual SDT constructs. For enrolment in elective physical education, chi-square analyses showed a significant difference in proportion of female students in HPSS intervention schools enrolled in grade 11 elective physical education. Findings show support for a whole-school health model to improve female student enrolment in elective physical education programs.

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Above all, I would like to thank my family for their personal support, patience, and unwavering belief. To my husband Jason, your calmness, encouragement, and love made this life journey achievable. This would have not been possible without the sacrifices you have made. I am forever grateful. To my parents, Dennis and Shiela, and my brother Tyler, I thank you for being my safe place to come during times of self-doubt and encouraging me when I needed it most. Your unconditional love is cherished.

Dedication

I dedicate this thesis to the one who inspires me most, my daughter Nora. You are my absolute inspiration, the drive behind this achievement, and the best part of my day. You have taught me more than the academic world ever could. I love you.

Chapter 1. Introduction

Adolescence is a period of life that is characterized by a decline in physical activity (Colley et al., 2011; Hallal et al., 2012; Tremblay et al., 2010). Recent national reports in Canada indicated that adolescents are not meeting the recommended physical activity guidelines and consequently not receiving the numerous benefits associated with an active lifestyle. National guidelines recommend that Canadian children age 5-17 years should participate in 60 minutes of moderate-to-vigorous physical activity each day (Janssen & LeBlanc, 2010; Tremblay, Kho, Tricco, & Duggan, 2010). The Active Healthy Kids Report Card (2014) published the results from the 2009-2011 Canadian Health Measures Survey, which showed only 4% of 12-17 year olds were accumulating at least 60 minutes of moderate-to-vigorous physical activity per day. As such, Canadian children and youth are falling well short of the Canadian guidelines.

Health promotion and education in the high school setting may be one effective vehicle to reverse these negative health behaviours. However, Deschesnes, Martin, and Hill (2003) and Begoray, Wharf Higgins, and MacDonald (2009) suggested that given the layered and connected influences within high schools, a health curriculum alone may be insufficient to facilitate healthy living among youth. Formal curriculum, school environments, and the school community form the school setting; therefore, a comprehensive school health approaches that addresses the many layers and multiple influences have gained increased attention. Cale and Harris (2006) and Lohrmann (2010) suggested that a “settings-based” ecological approach might be an effective way to improve people’s health behaviours, as these approaches emphasize changing settings (e.g., schools) rather than solely changing people’s behaviours.

Over the past decade a number of studies and several systematic reviews evaluated the effectiveness of school-based interventions to promote health in children and youth (e.g., Fairclough & Stratton, 2005; Kriemier et al., 2011; Pardo et al., 2013; Slingerton & Borghouts, 2011; van Sluijs, McMinn, & Griffin, 2008). Reviews conducted by Kriemer et al. (2011), Pardo et al. (2013) and van Sluijs et al. (2008) concluded that multi-component whole-school health approaches, which combined a number of key entry points (e.g., curriculum, school environment, community links, school policies and school culture) where opportunities for physical activity are maximized and reinforced, were most effective when targeting adolescent populations.

To date, whole-school health approaches have been conducted largely within elementary schools (e.g., Alberta Project Promoting Active Living and healthy eating [APPLES], Fung et al., 2012; Child and Adolescent Trial for Cardiovascular Health [CATCH], McKenzie et al., 1996; Action Schools! British Columbia [AS BC!], Naylor, Macdonald, Zebedee, Reed, & McKay, 2006; Sport, Play, and Active Recreation for Kids [SPARK], Sallis et al., 1997) and middle schools (e.g., Healthy Youth Places, Dzewaltowski et al., 2009; Haerens et al., 2006; Middle School Physical Activity and Nutrition [MSPAN], McKenzie et al., 2004; Intervention Centered on Adolescents Physical Activity and Sedentary Behavior [ICAPS], Simon et al., 2004; Physical Activity 4 Everyone, Sutherland et al., 2013; Trial of Activity for Adolescent Girls [TAAG], Webber et al., 2008). At the high school level, there are fewer examples of school programs that have adopted a whole-school health approach (Naylor & McKay, 2009). Two whole-school interventions, the Lifestyle Education Activity Program (conducted in the U.S.; [LEAP], Pate et al., 2005) and the Dutch Obesity Intervention in Teenagers

(conducted in Europe [DOiT], Singh, Chin A Paw, Brug, & van Mechelen, 2009), examined the effects of a comprehensive school-based intervention among grade 9 females and grade 9 female and male students, respectively. The results of these interventions showed promise; LEAP successfully increased the physical activity levels, physical activity enjoyment, and girls' enjoyment of physical education within intervention schools and DOiT improved the body composition of students in the intervention group (Singh, et al., 2009; Singh, Chin A Paw, Brug, & van Mechelen, 2007). Currently in Canada, a whole-school health approach, which targets the high school and addresses multiple components, has yet to be evaluated.

Within whole-school health approaches, a number of key components are utilized to promote positive health behaviours among students, such as the school environment, community, and health and physical education curricula. Of these components, physical education programs have been specifically recognized as an effective setting for the promotion of physical activity (Pate, O'Neill, & McIver, 2011; Slingerton & Borghouts, 2011; Veugelers & Schwartz, 2010). Professional organizations such as Physical and Health Education Canada (2010) have supported the role physical education can play in improving the physical activity levels, experiences, and behaviours of students. Researchers have reiterated this support and acknowledged that school-based physical education programs present a tremendous opportunity to positively influence the attitudes (Trudeau & Shephard, 2005) and patterns of physical activity participation among adolescents (Alderman, Benham-Deal, Beighl, & Erwin, 2012; Basset et al., 2013; Chen, Kim, & Gao, 2014). The primary objective of physical education programs is to help students develop the knowledge, movement skills, and positive attitudes and behaviours

that are needed to lead an active healthy lifestyle (British Columbia Ministry of Education, 2008; Cale, 2000; Gibbons & Gaul, 2004; Trudeau & Shephard, 2005). According to Shephard and Trudeau (2000), students' experiences in physical education are vital in the promotion of physical activity. Shephard and Trudeau (2000) stated that young people attaining positive experiences in physical education would more likely engage in physical activity outside of school and continue this involvement throughout life. However, it was reported that students are active less than 50% of physical education class time (Fairclough & Stratton, 2006; McKenzie et al., 2006; Sallis et al., 2012), and many youth have negative experiences in physical education (Sallis, Zakarian, Hovell, & Hofstetter, 1996; van Daalen, 2005). This coupled with students' lack of motivation to participate in physical education (Mowling, Brock, Eiler, & Rudisill, 2004; Ntoumanis, 2001; Ntoumanis, Pensgaard, Martin, & Pipe, 2004), and low enrolment rate in elective physical education programs (Gibbons, Wharf Higgins, Gaul, & Van Gyn, 1999; Grunbaum et al., 2004), suggest that physical education teachers might need assistance in attaining their primary objective. Given the important role physical education plays within the whole-school health approach, it is critical to identify effective strategies to achieve the goals of physical education programs.

One strategy gaining interest and attention among researchers are the motivational processes influencing the participation and experiences of students in physical education programs. Haerens, Kirk, Cardon, De Bourdeauduij, & Vansteenkiste (2010) argued that physical education teachers should focus on enhancing students' motivation during class time, as student motivation in physical education could influence the adoption of physically active lifestyles. The potential impact of motivation cannot be underestimated,

as students' motivation in physical education class has been connected to physical activity behaviours both in and out of class and to their overall physical education experiences. For example, students' motivation has been linked to effort (Ntoumanis, 2001; Ntoumanis et al., 2004; Taylor, Ntoumanis, Standage, & Spray, 2010), levels of physical activity during class time (Cox, Smith, & Williams, 2008; Lonsdale, Sabiston, Raedeke, Ha, & Sum, 2009), and the intensity of one's involvement (Biddle & Mutrie, 2008). Moreover, students' motivation in physical education has been connected to one's intention to engage in physical activity during their leisure time (Lim & Wang, 2008; Ntoumanis, 2001; Standage, Duda, & Ntoumanis, 2003) and one's participation in optional physical education (Ntoumanis et al., 2005). In addition, student motivation has been shown to be associated with increased enjoyment, interest (Zhang, 2009), and higher positive affective states during physical education class (Ntoumanis, 2005). A recent retrospective study conducted by Haerens et al. (2010) found that students with more optimal motivational profiles (i.e., more autonomous) reported being more physically active in high school and in early adulthood. On this basis, according to Ntoumanis (2001), it is imperative to understand the motivational processes that can influence whether students are motivated in physical education and will regard physical education as a valuable, enjoyable, and rewarding experience, or are unmotivated in physical education and will regard physical education as worthless and boring. Therefore, targeting student motivation in physical education may be a key component to the initiation and continuation of physical activity and healthy lifestyle behaviours within whole-school health approaches (Cale & Harris, 2006). Wallhead and Buckworth (2004) stated that the physical education interventions that were successful in increasing

students' out-of-school physical activity were embedded within pedagogical motivational theoretical frameworks. For example, Chatzisarantis and Hagger (2009) conducted an intervention in physical education classes, based on the self-determination theory (SDT) of human motivation (Deci & Ryan, 1985), to promote physical activity among adolescents. Results showed that the intervention increased the frequency that students engaged in physical activities during their leisure time. The authors concluded that SDT provided a useful framework for the development of school-based interventions that positively affect leisure time physical activity participation among youth.

Despite the potential for motivational frameworks for the promotion of physical activity, such as Deci and Ryan's (1985) SDT, most whole-school health approaches to date have been framed in social cognitive theories and/or socio-ecological models. Little attention has been given to SDT and the impact of motivation on physical and health behaviours within whole-school approaches. Wilson et al. (2005) suggested that studies focused on enhancing student motivation might lead to greater behavioural changes in adolescents. Self-determination theory has been used to examine motivation in educational settings and has shown to provide insight into the motivational processes of students (Deci & Ryan, 1991). Deci and Ryan's (1985) SDT emphasizes development and enhancement of motivation. Self-determination theory suggests that individuals are driven by three fundamental psychological needs: autonomy (a sense of choice), relatedness (a sense of social attachment) and competence (a sense of self-efficacy). Individuals who perceive that these three needs are met will be more intrinsically motivated to engage in certain behaviour. Deci and Ryan (1985) stated that intrinsic motivation refers to engagement in activities for their own sake, with feelings of pleasure

and satisfaction that derive directly from participation. When needs for autonomy, relatedness, and competence, are not met, an individual will experience a state of extrinsic motivation or amotivation. Extrinsic motivation refers to doing something for a reason outside the activity itself, a separable outcome, such as external rewards, pleasurable psychological states (e.g., pride, relief) or even avoidance of unpleasant psychological states (e.g., external punishment, shame, guilt) (Hagger & Chatzisarantis, 2007; Ryan & Deci, 2000). Amotivation is the complete lack of volition toward the target behaviour. An individual's state of motivation (intrinsic motivation, extrinsic motivation, or amotivation) influences behaviour, affect, and cognition. Deci and Ryan (1985) refer to these as the consequences of motivation and posit that as intrinsic motivation increases so will positive behaviour (e.g., participation in physical activity), attitude (e.g., enjoyment), and cognition (e.g., greater understanding of physical activity and health benefits). Self-determination theory has been applied in physical education settings and results have shown that a physical education environment that supports the fundamental needs for autonomy, relatedness, and competence resulted in greater motivation (Ntoumanis, 2005; Ntoumanis & Standage, 2009), higher physical activity levels during class time (Lonsdale et al., 2009; Lonsdale et al., 2013) and positively predicted leisure-time physical activity (Cox et al., 2008). Despite the effectiveness of SDT within physical education settings, SDT has yet to be used more broadly as a theoretical framework in whole-school health approaches.

A whole-school approach framed in SDT may not only be an effective strategy for the promotion of student health behaviours, but may also be valuable in the planning and implementation of the intervention strategies. It is essential that school-based

interventions be effectively implemented into the existing practices of schools. Enhancing the motivation of those involved in the planning and implementation of the intervention strategies may increase the likelihood that the program is delivered and received as intended. According to the IUHPE (2004), a whole-school approach requires full integration of health promotion into the functions of the school, through working with the curriculum that currently exists – emphasizing that programs that are compatible with the school's current practice are more likely to be incorporated into the school culture and therefore sustained. In order to successfully implement whole-school health approaches into existing school practices, researchers have identified the important roles that both teachers and students play in the development and implementation process. Ha Wong, Sum, & Chan, (2008) contended that teachers are essential in the educational change process and play a major role in implementing policy into practices. Gibbons and Gaul (2004) stress that teachers convey an important understanding of the everyday practicalities that occur within their schools. Gibbons, Humbert, and Temple (2010) argued that utilizing teachers' capacity to accomplish proposed changes is essential in the educational change process. To increase the potential for success and sustainability of whole-school health approaches, Naylor and McKay (2009) suggested that researchers incorporate teachers in the intervention process.

Involvement of students in the intervention process is also important for the success and sustainability of whole-school health approaches. Since adolescence marks the transition to adulthood and is characterized by the shift from relying on others for decision-making to making independent choices (Canadian Population Health Initiative, 2005; Gibbons & Naylor, 2007), interventions driven by youth are more likely to match

the needs of the students, as well as be sustained. Gibbons and Naylor (2007) recommend involving youth in the planning and implementation of school-based programs, as adolescents are developmentally ready to conduct accurate self-evaluations and can effectively select goals and implement behaviour changes independently. Gibbons and Naylor (2007) and Naylor and McKay (2009) suggested interventions that target the adolescent population might be more successful if adolescents are placed in a leadership role – empowering them to make positive decisions that affect their health. Despite the important roles that both teachers and students play in the potential for success of whole-school health approaches, Wilson et al. (2008) and St. Leger and Nutbeam (2000) stated that teachers and students have not, in most cases, been involved in the development or implementation of school health interventions.

In sum, multi-component whole-school health approaches have been effective in the promotion of health among youth. However, the whole-school health approach has been conducted largely within elementary and middle schools with few school programs adopting the whole-school health approach at the high school level. Furthermore, these approaches have put little focus on the motivational processes and experiences of the teachers and students involved. Given the potential for a whole-school health approach that is framed in SDT and involves teachers and students in the intervention process, a Canadian whole-school health approach aimed at high school students has the potential to be an effective health promotion strategy.

Purpose of the Study

The purpose of the current study was to: (a) gain an understanding of the experiences of teachers and the Action Team as they planned and implemented school-

based healthy living strategies (Project 1); (b) evaluate the impact on and relationship between SDT constructs and students' motivation to engage in health-related behaviours (Project 2); and (c) evaluate the motivation of students in physical education classes grounded in SDT and its influence on their enrolment in grade 11 elective physical education (Project 3). The current study was part of a larger study being conducted at the University of Victoria, entitled "Health Promoting Secondary Schools" (HPSS). Health Promoting Secondary Schools (Wharf-Higgins, Voss, Naylor, Gibbons, Rhodes, et al., 2013) was a choice-based, whole-school health approach that allowed teachers and students to create individualized action plans that facilitated change at the school and individual levels. The HPSS approach was driven by SDT, broadly structured in an ecological framework, was flexible, and could be tailored to meet the individual needs of schools. Through its four "Action Zones" - school environment/culture; community partnerships; students support; and teaching and learning - HPSS acknowledged, empowered, and encouraged youth to build on their strengths, improve their skills in a wide range of areas, and build their capacity to be agents of positive change. The purpose of the larger HPSS study was to evaluate whether a whole-school health approach was an effective vehicle to integrate healthy living into British Columbia secondary schools and intrinsically motivate students to make healthy food choices and participate in regular physical activity (see Appendix A for a comprehensive description of the larger HPSS project).

Overview of the Study

Three research projects were conducted to address the purpose of this study. Project 1 used qualitative methods to gain an understanding of the experiences of

teachers and the Action Team members (student members and teacher members) as they planned and implemented school-based healthy living strategies. Specifically, focus group interviews were conducted with teachers and members of the Action Teams. The purpose of Project 2 was to evaluate the impact on and the relationship between SDT constructs and students' motivation to engage in health-related behaviours. To achieve this purpose, a randomized comparison trial was used. Schools were randomized to intervention or usual practice/comparison schools. Questionnaires were administered prior to and following the intervention to determine the intervention effects on students' motivation to engage in health-related behaviours. The purpose of Project 3 was to evaluate the motivation of students in grade 10 Physical Education classes grounded in SDT and its impact on their enrolment in grade 11 Physical Education. To achieve the purpose of Project 3, quantitative methods were used to determine the effects of the intervention on students' state of motivation (intrinsic motivation, extrinsic motivation, and amotivation), students' perceived autonomy, relatedness, and competence, and to determine if the intervention had an effect on students' enrolment in grade 11 elective physical education.

Delimitations

1. Only grade 10 students were included in the study.
2. The participants (students, teachers, and Action Team members) were limited to residents of British Columbia, Canada in participating schools.
3. The sample was limited to five intervention schools and five control schools.

Assumptions

1. Self-report questionnaires were completed in full and with honesty and openness.

2. Participants answered the interview questions in an honest manner that accurately reflects their perceptions.

Limitations

1. School limitations, such as class schedule and unexpected circumstances that occur within a school, cannot be controlled for.
2. School initiatives and other school programming, both new and currently existing cannot be controlled for.
3. Population (i.e., grade 10 students) limits the generalizability of the study.

Operational Definitions

1. Comprehensive School Health – an intervention approach that moves beyond classroom-based health education models to an integrated comprehensive approach to health promotion. This approach encompasses the whole-school environment with actions addressing teaching and learning, physical and social environments, healthy school policy, and partnerships and services (Stewart-Brown, 2006).
2. Whole-School Approach – an intervention which combines a number of key entry points (e.g., curriculum, school environment, community links etc.) where opportunities for a healthy lifestyle are maximized and reinforced and where one or more related components are employed to achieve the desired outcome (Naylor & McKay, 2009).
3. Health Promotion – the process of enabling individuals to increase control over, and to improve, their personal health through an environment that encourages healthy behaviour and promotes healthy choices (WHO, 2006).
4. Action Team - a school committee (6 – 10 individuals) composed of youth (at least

50%) and teachers. Action Teams met regularly and with the help of the HPSS School Health Facilitator developed and implemented health policies and school-wide activities, of their choosing, which promote or encourage healthy living within their school.

5. School Health Facilitator – a member of the research team (myself) responsible for working with schools, teachers, and students to help plan and implement the HPSS program.
6. Autonomy- the need to experience a sense of choice (Ryan & Deci, 2000).
7. Relatedness- the need to seek and develop secure and connected relationships with others in one's social context (Deci & Ryan, 1991; Ryan & Deci, 2000).
8. Competence- the need to master challenging tasks and exercise personal capacities within a given domain (Deci & Ryan, 1991; Ryan & Deci, 2000).
9. Intrinsic Motivation- engaging in behaviour because it is inherently interesting or enjoyable (Ryan & Deci, 2000).
10. Extrinsic Motivation- occurs when an individual participates in behaviour because they value an associated outcome more than the behaviour itself (Deci & Ryan, 1895; Ryan & Deci, 2000).
11. Amotivation- the state of lacking an intention to engage in specific behaviour (Ryan & Deci, 2000).
12. Physical activity- any movement using energy above resting level (Vanden Auwelle et al., 1999).
13. Physical Education – A course in British Columbia from kindergarten through grade 12, that aims to enable students to develop the knowledge, movement skills, and

positive attitudes and behaviours that contribute to an active healthy lifestyle (British Columbia Ministry of Education, 2008).

14. Children – individuals 5 – 11 years of age (Tremblay et al., 2011).
15. Youth – individuals 12 – 17 years of age (Tremblay et al., 2011).

Chapter 2. Review Of Literature

The review of literature is divided into four sections. Section One presents a review of the current physical activity and eating behaviours of youth and the potential role schools can play in positively impacting adolescent health. Within this section, research on health promotion in schools and previous whole-school interventions conducted at the elementary, middle, and high school levels are discussed. Section Two examines current research regarding the role of physical education in whole-school health approaches aimed at youth. The third section provides an overview of motivation and SDT including previous studies that have employed a SDT framework in school physical education programs. The final section discusses some logistics associated with the implementation of whole-school interventions and the importance of involving teachers and youth in the implementation process.

Health Behaviours Among Youth

Researchers have provided evidence suggesting the current physical activity and eating behaviours of Canadian youth are less than optimal (Colley et al., 2011; Tremblay et al., 2010). Janssen and LeBlanc (2010) and Tremblay et al. (2010) recommend that Canadian children age 5-17 years of age participate in 60 minutes of moderate-to-vigorous physical activity each day. Colley and colleagues (2011) published the accelerometer results from the 2007-2009 Canadian Health Measures Survey and showed only 25% of females and 45% of males aged 15-19 years were accumulating at least 60 minutes of moderate-to-vigorous physical activity on at least 3 days per week. Consequently, Canadian youth are not meeting the recommended physical activity guidelines. Moreover, Tremblay et al. (2011) presented the Canadian sedentary behaviour

guidelines developed for youth aged 12-17 years. These guidelines state that youth should limit their recreational screen time (i.e., television watching, video game playing, using the computer, or use of other screens during non-school time) to no more than two hours per day and limit sedentary transport, extended sitting time, and time spent indoors throughout the day. However, Colley et al. (2011) found that Canadian youth engage in six hours of screen time per day outside of school hours on weekdays and 7 hours of screen time on weekend days. Further, the authors reported only 25% of students in grades 9 and 10 are spending less than 14 hours per week in screen-based sedentary behaviour, with computer usage being greater or equal to 23 hours per week.

Parallel with increases in inactivity and sedentary behaviours, many youth consume poor quality diets containing high amounts of fatty foods and sugar-sweetened beverages (Plotnikoff et al., 2009; Starkey, Johnson-Down, & Gray-Donald, 2001). Starkey et al. (2001) reported that Canadian youth aged 13-17 years of age consume more foods from the "Other" food category in Canada's Food Guide, which are typically higher in fat and calories, than any other age group. Tjepkema and Shields (2005) found 59% of Canadian youth consume less than the recommended five servings of fruits and vegetables per day. These researchers noted that this was troubling because data shows that youth who consume five or more servings of fruits and vegetables per day are less likely to become overweight or obese compared to youth whose intake is less frequent. In addition, Vanderlee, Manske, Murnaghan, Hanning, and Hammond (2014) found 80% of Canadian youth consumed sugar-sweetened beverages daily, with 44% consuming three or more sugar-sweetened beverages per day.

Inactivity, sedentary behaviours, and poor diets have been linked to unhealthy

body weights, resulting in the primacy of obesity in pubescent years (Kimm et al., 2005; Tremblay & Willms, 2000; Tremblay, Katzmarzyk, & Willms, 2002). Tremblay et al. (2009) reported that over the past three decades, the percentage of Canadian youth who are overweight or obese has significantly escalated. The rising rate of overweight and obese youth is a concern due to the related complications. These include type 2 diabetes, hypertension, increased blood pressure, impaired peer-relationships, weight stigmatization (Ludwig, 2007; Young-Hyman, et al. 2006), increased stress and anxiety (Booker, Gallaher, Unger, Ritt-Olson, & Johnson, 2004) and susceptibility to engaging in health risk behaviours (e.g., alcohol, tobacco, drug use) (Pasch, Nelson, Lytle, Moe, & Perry, 2008).

Hallal, Victora, Azevedo, and Wells (2006) and Herman, Craig, Gauvin, and Katzmarzyk (2009) reported that health behaviours established during adolescence carry over or 'track' into adult life and are the greatest predictors of health behaviours in adulthood. This is demonstrated by the relationship between adolescent obesity and adult obesity. Watts et al. (2005) found an estimated 80% of obese adolescents become obese adults. With this said, research has also shown that positive health behaviours follow a similar trend. For instance, Telama and colleagues (2005) reported that individuals who were physically active during adolescence, particularly from age 9 to 18 years, also continued this behaviour throughout later life. Thus, researchers have suggested that the lifestyle behaviours of adolescents' set the pattern for behaviour during adulthood, making adolescence a critical time period to develop lifelong health behaviours and health promotion initiatives aimed at youth a high priority (Hallal et al., 2006; Herman et al., 2009; Pietilanen et al., 2008).

Schools: A Potential Setting for Intervention

Researchers and policy makers have identified schools as one avenue to potentially impact the health of adolescents. The World Health Organization (WHO, 1997) has recognized that schools are uniquely positioned to promote health and impact short and long-term knowledge and behaviours of young people. Cale and Harris (2006, 2013) also recognized the important role of schools and school-based programming (i.e., physical education) on the health behaviours of young people. Students spend approximately half their waking hours in schools and no other institution has as much continuous and intensive contact with students during the first decades of life. Since school programs have near universal enrolment and are delivered at no or little cost to families, students from diverse ethnic and socioeconomic backgrounds can be reached (Cale & Harris, 2013; Peterson & Fox, 2007; Story, 1999; Story, Nanney, & Schwartz, 2009). In addition, Story (1999) stated that schools are equipped with the facilities (e.g., gymnasiums, playing fields), programs (e.g., physical education), and the necessary personnel (e.g., physical education teacher, school counselor) to effectively promote health and/or prevent health issues. The British Columbia Ministry of Education (2009) described the purpose of a school system is to enable learners to develop their individual potential and to acquire the knowledge, skills, and attitudes needed to contribute to a healthy society and a prosperous and sustainable economy. A school's core mission is to educate students both academically and socially. However, according to Story et al. (2009) it is understood that schools cannot achieve this if their students are not healthy. As a result, Cale and Harris (2013) and Story et al. (2009) stated that schools are a critical setting for health promotion.

Health Promotion in Schools

The World Health Organization (2006) described Health Promotion as the process of enabling individuals to increase control over, and to improve, their personal health through an environment that encourages healthy behaviour and promotes healthy choices. Over the past decade a number of studies and several systematic reviews evaluated the effectiveness of interventions in promoting health in children and youth within a school setting (Fairclough & Stratton, 2005; Kriemer et al., 2011; Pardo et al., 2013; Slingerton & Borghouts, 2011; van Sluijs et al., 2008). In general, interventions fall into one of three categories (a) educational strategies, which are classroom-based and are focused on changing knowledge and attitudes of students, (b) environmental strategies, which focus on the physical environment and policies and practices within a school in order to promote health (Cale & Harris, 2006; Naylor & McKay, 2009) and (c) whole-school health approaches, which combine a number of key entry points (e.g., curriculum, school environment, community links etc.) where opportunities for a healthy lifestyle are maximized and reinforced and where one or more related components are employed to achieve the desired outcome (Naylor & McKay, 2009). Of the three categories, whole-school health approaches have received the most support when targeting health behaviours of youth (Kriemer et al., 2011; Pardo et al., 2013; van Sluijs et al., 2008).

Whole-School Health Approaches

Cale and Harris (2006) and Naylor and McKay (2009) suggested a whole-school approach to health emerged in response to the recognition and understanding of the importance of multifaceted approaches to an active healthy lifestyle. Researchers suggest moving from practices that rely mainly on a singular approach (i.e., health class or

physical education) to a multi-pronged approach in order to improve the current health status of youth because multifaceted approaches not only affect individual behaviours but the environment in which students live and learn (Deschesnes et al., 2003; Kriemler, 2011; Story, 1999; van Sluijs et al., 2008). It is well understood that knowledge gained in the classroom can either be reinforced and supported or undermined by what happens outside the walls of the classroom. For example, students could learn about the benefits of engaging in physical activity but this may be counteracted by the lack of opportunities available to them within their school. As such, whole-school health approaches, according to van Sluijs et al. (2008) are an effective vehicle to target health behaviours of youth.

St. Leger, Young, Blanchard, and Perry (2009) defined the whole-school approach as one that "goes beyond the learning and teaching in the classroom to pervade all aspects of the life of a school" (p. 12). Whole-school health approaches are designed to affect both individual student health behaviours (e.g., physical activity levels, diet, sedentary behaviours) and the environments in which young people live and learn (e.g., school environment, school community). According to Cale and Harris (2006) and Deschesnes et al. (2003) this is accomplished through a number of domains within the entire school context rather than solely classroom-based.

Whole-school approaches to student health take several different forms and labels within the literature. Some of these forms/labels include: Health Promoting Schools; Comprehensive School Health Programs; Coordinated School Health; and Active School models. The Health Promoting Schools concept was proposed by the WHO in the early 1980's and has currently been adopted by other associations worldwide. According to the

WHO, a Health Promoting School aims to achieve healthy lifestyles for the total school population by developing supportive environments conducive to the promotion of health. Torabi and Yang (2001) stated the three domains that characterized the Health Promoting Schools model were: (a) health education, (b) health services, and (c) a healthy school environment.

In 1987, Allensworth and Kolbe expanded the traditional 'three-component' model and pioneered an eight component Comprehensive School Health Program. These eight components include: health education; physical education; school health services; school nutrition services; school counseling, psychological and social services; healthy school environment; health promotion for staff; and family/community involvement. Fetro (2010) reported that the framework then shifted from 'comprehensive' to 'coordinated' to accentuate the interrelationship among components. The Comprehensive School Health Model is used in Canada, United States, and around the world and embraced and recommended by the Canadian Association for School Health, the Centers for Disease Control and Prevention – Division of Adolescent and School Health, and the WHO (Fetro, 2010; Lohrmann, 2010). In addition, physical activity researchers have applied an Active School model, which Cale (2000) described as a model that strives to maximize opportunities for students by extending beyond the curriculum, by providing multiple avenues within a school to promote physical activity. Similar to the goal of a Health Promoting School to improve the health of students, the Active School model is committed to improving students' physical activity levels. An Active School approach, according to Cale (2000), is facilitated through five domains: curriculum; school environment; community links; school policies; and school culture.

Regardless of the model's designation or number of domains, Deschesnes et al. (2003) pointed out that each model or strategy relies on the multi-component whole-school approach to establish healthy lifestyle behaviours by bringing together a wide range of activities within the school environment to hopefully form an integrated whole. According to St. Leger et al. (2009), these strategies for health promotion "share the connection thread of a whole-school approach and recognition that all aspects of the life of the school community are potentially important in the promotion of health" (p.2).

Research on Whole-School Health Approaches

Review conducted by Kriemer et al. (2011), Pardo et al. (2013), and van Sluijs et al. (2008) support a whole-school health approach in addressing the obesity and physical inactivity epidemic in both children and youth. However, the vast majority of whole-school approaches have been conducted in elementary and middle school settings. There are fewer examples of whole-school health approaches designed to impact the health behaviours of high school students. This section includes an overview of 18 whole-school interventions conducted between 1996 and 2014. Specifically, eight whole-school interventions conducted in elementary schools, seven whole-school approaches conducted in middle schools, and three whole-school interventions conducted in high schools will be reviewed. A brief review is provided on the whole-school health approaches conducted in elementary schools and more in-depth reviews are provided for whole-school health approaches conducted in middle schools and high schools.

Whole-school health approaches in elementary schools. The majority of whole-school studies to date have been conducted with elementary-aged children (kindergarten – grade 5) and carried out in the United States (e.g., Pathways, Caballero et

al., 2003; (S) Partners for Heart Health, Carlson et al., 2008; Child and Adolescent Trial for Cardiovascular Health [CATCH], McKenzie et al., 1996; Active Winners, Pate et al., 2003; Sport, Play, and Active Recreation for Kids [SPARK], Sallis et al., 1997). For example, SPARK (Sallis et al., 1997) a two-year intervention, conducted in the United States, aimed to increase elementary students' (grade 4 and 5) physical activity levels during physical education class and outside school hours. The SPARK program utilized health related physical education activities (e.g., jump rope, aerobics) and sport skill related activities (e.g., soccer, basketball) within physical education lessons to increase moderate-to-vigorous physical activity during physical education class time. Behaviour-change skills and self-management skills were taught in classroom sessions to assist children in adopting regular physical activity outside of school. Parent-child interaction for physical activity was encouraged through homework and monthly newsletters. Sallis et al. (1997) reported that the intervention demonstrated effectiveness in increasing students' moderate-to-vigorous physical activity during physical education class time – 22 more minutes of moderate-to-vigorous physical activity compared to control school – but no change was observed in students' out-of-school physical activity. In a similar manner, CATCH was a multi-component school-based program conducted in the USA designed to improve the cardiovascular health of grade 3-5 students. The major intervention components included: providing students with healthy food at school, a physical education program that focused on promoting enjoyment of and participation in moderate-to-vigorous physical activity, classroom curricula promoting cardiovascular health, a tobacco curriculum and school policy, and a home/family component. Results revealed that students in intervention schools engaged in more moderate-vigorous

physical activity during physical education lessons and reported 12 more minutes of daily vigorous physical activity than students in control schools.

Other countries have also implemented successful whole-school health approaches at the elementary level, such as: JUMP-in (Netherlands - Jurg, Kremers, Candel, Van Der Wal, & De Meij, 2006) and Active Programme Promoting Lifestyle Education in Schools (APPLES) (New Zealand - Sahota et al., 2001). JUMP-in aimed to promote physical activity among elementary students in grades 4-6 students. The intervention targeted both individual and environmental changes including parental involvement and educational sessions for both parents and students regarding the importance of physical activity. Jurg et al. (2006) reported that the intervention was effective in maintaining students' level of physical activity, however no increases in physical activity were found. APPLES (Sahota et al., 2001) was a school-based health promotion program for students in grades 4 and 5, which aimed to reduce risk factors for obesity. This intervention targeted parents, teachers, catering staff, and the school environment. Students in APPLE intervention schools showed higher knowledge and attitudes towards physical activity and healthy eating as well as reported greater amounts of physical activity and healthy eating behaviours.

In 2004, a Canadian whole-school health approach, Action Schools! BC, was designed and implemented in British Columbia, to assist elementary schools with the design of individualized action plans to integrate physical activity and healthy eating into the school environment (Naylor et al., 2006; Day, Strange, McKay, & Naylor, 2008). Action Schools! BC targeted six domains within the whole-school approach: (a) school environment, which made healthy choices the easy choice by creating healthy living

policies in school environments; (b) scheduled physical education that provided an annual physical education calendar of ideas and best practice resources that support the prescribed learning outcomes for scheduled physical education; (c) extra-curricular, which supported a variety of opportunities for students, staff and families to engage in healthy living before and after school, and during lunch and recess; (d) school spirit, which promoted school spirit by encouraging physical activity, supporting healthy eating choices, and celebrating the benefits of healthy living for the whole-school; (e) family and community that fostered the development of partnerships with families and community practitioners; and (f) classroom action, which provided innovative daily physical activity and healthy eating activities for the classroom that complement physical education. Naylor, Macdonald, Warburton, Reed, and McKay, (2008) reported that the intervention was tailored to the perceived needs of each school and included activities across all domains. Results showed significant increases in physical activity levels among boys and significant increases for fruit consumption and variety of fruit and vegetable consumed in both genders. In addition, Reed, Warburton, Macdonald, Naylor, and McKay (2008) reported that students in the intervention schools showed greater increases in cardiovascular fitness (20%), reduced systolic blood pressure (5%), and increased bone strength and mass compared to students in control schools.

Most recently a whole-school health approach, Alberta Project Promoting Active Living and healthy eating (APPLES) was implemented in Alberta, Canada to improve diets, activity levels, and body weights in elementary students (Fung et al., 2012). A full-time School Health Facilitator was placed in each APPLE School to assist schools in the implementation of healthy eating and active living strategies. Moreover, School Health

Facilitators contributed to the school health curriculum, organized parent information nights, after school physical activity programs, circulated newsletters, and promoted community and parent involvement. Results showed that between 2008 and 2010, 8 of the 10 APPLE Schools implemented a nutrition policy and all 10 schools implemented policies ensuring all students received a minimum of 30 minutes of physical activity on each school day. Self-report questionnaires showed that after a two year period students attending APPLE Schools were eating more fruits and vegetables, consuming fewer calories, were more physically active, and were less likely obese when compared to a sub-set of non- APPLE school children that took part in a provincial survey using the same measure (Fung et al., 2012). Overall, whole-school health approaches have shown to be a promising strategy for helping improve the health behaviours of elementary aged children.

The high proportion of elementary whole-school interventions might be due to the structure of elementary schools. Naylor & McKay (2008) stated that the structure of elementary and high schools is distinctly different. Elementary schools are primarily organized around generalist teachers, where students are taught by one teacher for the majority of the school day, whereas high schools are typically organized by subject specialists and grade, resulting in students receiving instruction from multiple teachers throughout the school day. Further, many high schools operate on a semester system as opposed to the linear system commonly found in elementary schools (Gibbons & Naylor, 2007). The structural differences makes the implementation of a whole-school approach less complicated in an elementary structure (i.e., one teacher, same academic schedule all year) compared to a high school format where students have multiple teachers and

courses throughout the year. In a similar manner to the elementary school structure, middle schools often operate like that of an elementary school, making implementation of a whole-school health model at the middle school less challenging than a high school setting.

Whole-school health approaches in middle schools. This section includes a summary of seven whole-school intervention conducted in middle schools (grades 6 – 8). Of these seven interventions, four were conducted in the USA: Healthy Youth Places (Dzewaltowski et al., 2009); M-SPAN (Middle School Physical Activity and Nutrition, McKenzie et al., 2004); TAAG (Trial of Activity for Adolescent Girls, Webber et al., 2008); and IMPACT (Incorporating More Physical Activity and Calcium in Teens, Jones, Hoelscher, Kelder, Hergenroeder, & Sharma, 2008), one intervention was carried out in Australia: NEAT Girls (The Nutrition and Enjoyable Activity for Teen Girls, Lubans et al., 2010) and two were conducted in Europe: Haerens et al. (2006) and ICAPS (Intervention Centered on Adolescents Physical Activity and Sedentary Behaviour, Simon et al., 2004).

The following sub-sections provide an overview of the seven whole-school health approaches conducted in middle schools that are reviewed in this paper. The goals of the whole-school approaches and the intervention components will first be discussed, followed by an overview of the seven whole-school approaches, highlighting key features and key findings. The details of the physical education program component of the interventions are not described in this section and a description of the physical education component is discussed in separate sections.

Goals and intervention components of whole-school health approaches in

middle schools. The overall goal of the seven whole-school health approaches in middle schools was to improve the health of middle school students. More specifically, all of the interventions had the primary goal of increasing the physical activity behaviours of the participants. In addition to the goal of increasing overall physical activity, other goals of whole-school approaches in middle schools included: increasing moderate-to-vigorous physical activity during physical education classes; decreasing fat intake; increasing fruit and vegetable consumption; decreasing sugar sweetened beverage consumption; decreasing sedentary behaviours, decreasing screen time; improving body composition; improving psychosocial variables (e.g., self-efficacy and social support towards physical activity); enhancing behavioural skills (e.g., goal-setting and self-monitoring skills); and/or increasing bone accretion among students in intervention schools. Table 1 includes a summary of the goals of whole-school health approaches designed for middle school students.

To achieve the intervention objectives, several intervention components were integrated into the whole-school health approach. The intervention components included the school environment; physical education curricula; health curricula; cross-subject curricula; school nutrition services; school policies; social marketing; family; and community. Table 2 includes a summary of the intervention components of the whole-school health approaches designed for middle school students.

Table 1

Goals of Whole-School Health Approaches Designed for Middle School Students

	Intervention Goals										
Intervention	↑ Overall PA	↑ MVPA in PE	↓ Fat Intake	↑ FV Intake	↓ SSB Consump.	↓ Sedentary Behaviour	↓ Screen Time	Improve Body Comp.	Improve Psycho. Variables	Enhance Behav. Skills	↑ Bone Accretion
Healthy Youth Places	✓	×	×	✓	×	×	×	×	✓	×	×
M-SPAN	✓	✓	✓	×	×	✓	×	×	×	×	×
TAAG	✓	✓	✓	×	×	✓	×	✓	✓	✓	×
IMPACT	✓	×	×	×	×	✓	✓	×	✓	×	✓
NEAT Girls	✓	×	×	✓ & other food	×	✓	×	✓	✓	✓	×
Haerens et al. (2006)	✓	×	✓	✓ * Fruit Only	✓ & ↑ water intake	✓	×	×	✓	×	×
ICAPS	✓	×	×	×	×	×	✓	✓	✓	✓	×

Note. ↑ = increase; PA = physical activity; MVPA = moderate-to-vigorous physical activity; PE = physical education; ↓ = decrease; FV = fruit and vegetable; SSB = sugar sweetened beverages; consump. = consumption; comp. = composition; psycho. = psychosocial; behav. = behavioural

Table 2

Intervention Components of Whole-School Health Approaches Designed for Middle School Students

	Intervention Goals								
Intervention	School Environment	PE Curricula	Health Curricula	Cross Curricula*	School Nutrition Services	School Policies	Social Marketing	Family	Community
Healthy Youth Places	✓	×	×	✓	✓	×	✓	×	✓
M-SPAN	✓	✓	×	×	✓	✓	✓	✓	×
TAAG	✓	✓	✓	×	×	×	✓	✓	✓
IMPACT	×	✓	✓	✓	✓	×	×	×	×
NEAT Girls	✓	×	×	✓	×	×	×	✓	×
Haerens et al. (2006)	✓	×	×	✓	✓	×	×	✓	×
ICAPS	✓	×	×	✓	×	×	×	✓	✓

*****Lessons implemented across multiple subject areas.

Review of whole-school health approaches in middle schools. Healthy Youth Places (Dzewaltowski et al., 2009) was a randomized controlled trial designed to develop the skills and efficacy of youth to support and build middle school environments that promote physical activity and fruit and vegetable consumption. A nested cohort design with a priori stratification (i.e., socioeconomic status, ethnicity, and school size) and school as the unit of randomization was used to evaluate the intervention. Sixteen schools participated in the two-year study and were randomized to receive the Healthy Youth Places intervention (n = 8) or serve as the control/usual practice condition (n = 8) (Dzewaltowski et al., 2009). The intervention was framed in Bandura's (1986) social cognitive theory. Dzewaltowski et al. (2002) stated that social cognitive theory was chosen to help depict the environmental components of the intervention and adolescent psychosocial processes and health behaviour outcomes. Bandura's (1986) social cognitive theory is a comprehensive theoretical framework for analyzing and understanding human cognitions. An important principle of social cognitive theory is triadic reciprocal determination. This principle suggests that people are neither driven by individual influences (e.g., cognitive skills, attitudes) nor external influences (e.g., physical environment, social environment), rather by triadic reciprocality, in which personal factors, one's environment, and one's behaviour all operate as interacting determinants of one another (Bandura, 1986, 1997). Healthy Youth Places (Dzewaltowski, 2002) used social cognitive theory to inform the intervention to help build students' skills and efficacy as leaders that make school and environmental changes by implementing practices, programs, and policies that promote health within middle schools.

The goals of Healthy Youth Places were to increase overall physical activity levels, increase fruit and vegetable intake, and improve psychosocial variables related to physical activity among students in the intervention condition. These goals were achieved through five intervention components: school environment, cross curricula, school nutrition services, social marketing, and community. A key feature of the Healthy Youth Places intervention was that the students within intervention schools were placed in leadership roles. The intervention was designed to influence students' proxy efficacy by building youth's confidence that they could influence others, teachers and parents, to assist them in building healthy places (i.e., classroom, school lunch, after school program). Bandura (2006) described proxy efficacy as a socially medicated form of agency in which adolescents try to get other people to act on their behalf to attain their desired outcome. For the curricula component, the seventh and eighth grade curriculum was designed to help students acquire the knowledge and skills needed for implementing school environmental changes in order to help facilitate student leadership. After the second year of the study, students in Healthy Youth Places intervention schools showed significantly higher levels of moderate-to-vigorous physical activity and vigorous physical activity than students in the control schools. Students' proxy efficacy mediated the increases in physical activity found in the intervention group. Dzewaltowski et al. (2009) concluded that targeting the skills and efficacy for youth to influence others to create healthy school environments was an important strategy of improving the health behaviours of middle school students.

The Middle School Physical Activity and Nutrition (M-SPAN) (McKenzie et al., 2004) intervention was a randomized controlled trial that aimed to increase the total

energy expenditure from physical activity at school and decrease the grams of total and saturated dietary fat purchased at or brought to school by students in grades 6-8. Schools served as the unit of randomization and were randomized into one of two conditions: intervention (n = 12) or control (n = 12) conditions. Sallis et al. (2003) stated to help classify M-SPAN intervention components, Cohen, Scribner, and Thomas' (2000) structural ecological model was used to guide the study. The underlying premise of ecological models is that environmental factors are key determinants of human behaviour (Sallis & Owen, 2002). The ecological model proposed by Cohen et al. (2000) suggests that one's behaviour is affected by individual level attributes and conditions in which individuals live. The model posits that by manipulating policies, practices, and the conditions of life, an individual's health behaviour can be directly and indirectly influenced. Cohen et al. (2000) stated that four factors comprise a structural model for health behaviour: (a) availability/accessibility, which refers to the accessibility of consumer products associated to health outcomes; (b) physical structures/products that either decrease or increase opportunities for health behaviours; (c) social structures and policies, which refers to laws or policies that promote or prohibit health behaviour; and (d) media and cultural messaging that people see and hear frequently. Sallis and Owen (2002) stated that ecological models help researchers understand how individuals' interact with their environment by emphasizing the environmental and policy context of behaviour. The authors further noted that ecological models direct researchers to consider the multi-levels of influence, in turn resulting in the development of more comprehensive intervention strategies. Sallis et al. (2003) indicated that the four factors proposed by Cohen et al. (2000) structural ecological model were used to frame the intervention

components of M-SPAN.

The goal of M-SPAN was to change school policies and environments to provide more physical activity opportunities and healthier food options at school (McKenzie et al. (2004). These goals were attained by changing the school environment (increased supervision, equipment, and activities), increasing moderate-to-vigorous physical activity in physical education classes (changing lesson context, lesson structure, and teacher behaviour), providing more healthful food choices at school, implementing health policies (e.g., serve 1% or skim milk only), promoting physical activity and healthy eating through a social marketing campaign (e.g., advertising physical activity opportunities for students, signs promoting low-fat foods), and sending ideas for low-fat lunches home in school newsletters. The results of M-SPAN showed significant intervention effects for physical activity among male students only. No significant intervention effect was observed for total or saturated fat intake in female or male students. Sallis et al. (2003) also found that the M-SPAN intervention significantly reduced the reported body mass index for male students, however, no difference was observed among female students. The authors concluded that a school environment and policy intervention could be effective in improving the health behaviours of middle school students. However, as suggested by Sallis et al. (2003), more research is needed to improve the health behaviours of female students.

Three whole-school health approaches conducted in middle schools specifically targeted female adolescents: the Trial of Activity for Adolescent Girls (TAAG), the Incorporating More Physical Activity and Calcium in Teens (IMPACT) study, and the Nutrition and Enjoyable Activity for Teen Girls (NEAT Girls) intervention. The Trial of

Activity for Adolescent Girls (TAAG) (Webber et al., 2008) was a multi-center (six sites) group randomized controlled trial that aimed to reduce the age-related decrease in moderate-to-vigorous physical activity in middle school girls. Six middle schools located in each of the six sites (N = 36) were randomized into intervention (n = 18) or control (n= 18) conditions. The TAAG intervention was based on social ecological models of health behaviour (Cohen et al., 2000; McLeroy, Bibeau, Steckler, & Glanz, 1988). As stated earlier, Cohen and colleagues' (2000) ecological model proposes that both the individual and the environment affect an individual's behaviour. In a similar manner, the ecological model proposed by McLeroy et al. (1988) suggest that influences on health behaviour emanate from the interaction between the individual and elements of one's social and physical environments. More specifically, McLeroy et al. (1988) further stated that behaviour is influenced by five factors: intrapersonal (characteristics of the individual), interpersonal (social networks and support systems), institutional (social institutions, such as schools), community (organizations, institutions, and informal networks within a given boundary), and public policy (local, state and national policies). Within the social ecological framework, Elder et al. (2007) and Webber et al. (2008) stated that TAAG was designed to: (a) develop individual behavioural skills (e.g., setting activity goals, problem solving barriers to physical activity, monitoring activity); (b) create environmental and organizational changes that support physical activity (e.g., structured and unstructured activities in the school and community); (c) create social environment changes to encourage, model, and support girls' physical activity behaviours (e.g., cues and key messages for students, parents, and school staff); and (d) develop policy and organizational changes within the school (e.g., changes in physical education classes).

The specific goals of the TAAG intervention included: decreasing fat intake, decreasing sedentary behaviours, improving body composition, improving psychosocial variables, and enhancing behaviours skills. To achieve these goals TAAG targeted six intervention components: school environment, physical education curricula, health curricula, social marketing, family, and community. Results revealed that the physical activity behaviours of girls in TAAG intervention schools significantly increased by 1.6 minutes of daily moderate-to-vigorous physical activity or 80 kcal per week. For psychosocial variables, girls in intervention schools reported significantly lower levels of self-efficacy, friends' social support, and total social support than girls in the control schools. Lytle et al. (2009) stated that this pattern suggested that the girls exposed to the TAAG intervention became more aware of the issues related to their physical activity participation. For example, as explained by Lytle et al. (2009), girls in the intervention schools became aware that it was difficult to get to and from activities that they were interested in participating in, whereas the girls in the control schools may not have experienced that change in awareness. Webber et al. (2008) concluded that a whole-school health approach could positively impact the physical activity levels of middle school girls.

The Incorporating More Physical Activity and Calcium in Teens (IMPACT) (Jones et al., 2008) study was a randomized controlled trial that sought to increase bone accretion in middle school girls by changing the levels of weight bearing physical activity and promoting calcium rich foods. Twelve middle schools were stratified based on school characteristics at baseline (i.e., ethnicity, socioeconomic status, and percent of girls in athletics) and randomized into the IMPACT intervention condition (n = 6) or the control

condition (n = 6). Two theories guided the study: Bandura's (1986) social cognitive theory and Prochaska and Velicer's (1997) transtheoretical model. As discussed previously, Bandura's (1986) social cognitive theory suggests that behavioural change is dependent on the environment, the individual, and the behaviour and these three factors are continually influencing each other. The transtheoretical model (Prochaska & Velicer, 1997) is a model of behavioural change, which focuses on the decision making of the individual. The theory suggests that change is a process involving a progression through six stages: (a) precontemplation (people are not intending to take action); (b) contemplation (people are beginning to recognize that their behaviour is problematic); (c) preparation (people are intending to take action in the immediate future); (d) action (people have made specific modifications in their lifestyle within the past six months); (e) maintenance (people are working to prevent relapse); and (f) termination (individuals have zero temptation and are positive they will not return to their previous behaviours). Jones et al. (2008) stated that these theories were chosen as the theoretical framework for the IMPACT intervention as they incorporate determinants of behaviour (e.g., self-efficacy, outcome expectations, behavioural capacity, and environment) with methods of behavioural change. In line with these two theoretical frameworks, Jones et al. (2008) stated the IMPACT intervention aimed to influence behaviour change through the promotion of active learning in classrooms and environmental reinforcement. As such, the intervention had four intervention components: physical education curricula, health curricula, cross-subject curricula, and school nutrition services. The health curriculum (for the 6^{th} grade) consisted of 16 lessons focused on the promotion of calcium rich foods and physical activity. In seventh grade, students received the lessons in science class.

Nutritional changes involved changes to the school's food services to emphasize foods rich in calcium.

Jones et al. (2008) reported the intervention resulted in significantly greater vigorous physical activity (difference of 6.00 minutes) and daily after school activity (difference of 8.95 minutes) among girls in intervention schools relative to girls in control schools. Further, total minutes of sedentary behaviour were significantly lower among students in intervention schools compared to students in control schools (difference of 16.99 minutes). However, no significant differences were found in weight bearing physical activity between conditions. Jones et al. (2008) concluded that a whole-school intervention could result in increases in physical activity levels and decreases in sedentary behaviours; however, more research is needed to obtain significant changes in weight-bearing physical activity.

The Nutrition and Enjoyable Activity for Teen Girls (NEAT Girls) (Lubans et al., 2010) intervention was a randomized controlled trial that aimed to promote physical activity and healthy eating and prevent obesity among low-active adolescent girls from disadvantaged secondary schools in Australia. Twelve schools, which were identified as socioeconomically disadvantaged, were randomized into intervention (n = 6) or control (n = 6) conditions. The intervention was guided by the social cognitive theory (Bandura, 1986) with intervention strategies targeting the individual and the environment. These strategies include mediators of physical activity and healthy eating behaviour change and providing more opportunities for physical activity within the school and community environments. The intervention goals included: increasing overall physical activity, increasing fruit and vegetable consumption, decreasing sedentary behaviours, improving

body composition, improving psychosocial variables, and enhancing behavioural skills. To accomplish these goals, the targeted intervention components included: school environment, cross curricula, and family. Specifically, the intervention strategies included enhanced sport sessions, interactive seminars, nutrition workshops, lunchtime physical activity, physical activity and nutrition handbooks, parent newsletters, self-monitoring, and text messaging for social support. Lubans et al. (2010) have published the study protocol and baseline results and concluded that the NEAT Girls intervention has the potential to be a successful sustainable obesity prevention program for middle school girls. To date, the overall results for this study have not been published.

Two interventions conducted in Europe, Haerens et al. (2006) and ICAPS (Simon et al., 2004), also showed success in improving the health behaviours of middle school students. The purpose of Haerens et al. (2006) was to evaluate the effects of a two-year physical activity and healthy eating intervention, which combined an environmental and computer-tailored component. The intervention was a cluster randomized controlled trial in which 15 schools were randomized into one of three conditions: (a) intervention with parental involvement (n = 5); (b) intervention alone (n = 5); or (c) control group (n = 5). Two theories provided the theoretical frameworks for the intervention: the transtheoretical model (Prochaska &Velicer, 1997) and the theory of planned behaviour (Ajzen, 1985). As stated earlier, the transtheoretical model is a model of behavioural change that focuses on individual decision making processes involving a progression through six stages of change. According to Haerens et al. (2006), this model was used in the intervention to help identify the stage of change of each participating student and provide individual computer-based recommendations and suggestions to move students

through the stages toward behaviour change. Ajzen's (1985) theory of planned behaviour proposes that an individual's intention to engage in behaviour is a major determinant of that behaviour. The theory posits that an individual's intention is determined by three variables: (a) attitude, which is indicated by a positive or negative assessment of performing the behaviour; (b) subjective norm that represents the perceived social pressure that people may feel to perform or not to perform the behaviour; and (c) perceived behavioural control, which is the perceived level of difficulty of performing the behaviour. According to the theory, people who intend to perform a certain behaviour will evaluate the behaviour positively, will believe that others think they should perform the behaviour, and perceive the behaviour to be under their control (Ajzen, 1991). Moreover, Ajzen (1991) stated that one's intention is linked to motivational factors that influence behaviour, such as, how hard people try and how much effort people exert. Haerens et al. (2006) indicated that based on the theory of planned behaviour students received tailored computer-based feedback regarding their intentions, attitudes, self-efficacy, social support, knowledge, and the benefits and barriers related to their physical activity participation.

The specific objectives of the intervention included: increasing overall physical activity, decreasing fat intake, increasing fruit intake, decreasing consumption of sugar-sweetened beverages, increasing water intake, decreasing sedentary behaviours, and improving psychosocial variables. To achieve these objectives, the intervention included changes to the school environment by creating more opportunities to be physical activity (during breaks, at noon, or after school hours, extra sports, non-competitive activities), changes to the school food environment (e.g., lower price of water in canteen) and

involved students' families (i.e., parents received a compact disc and monthly newsletters). A unique feature of the intervention was the personalized computer-based feedback students received regarding their health behaviours. During grade 7 and 8 classes, students' completed questionnaires about their health behaviours. Once students completed the questionnaires, they were provided with personal computer-based feedback on their physical activity levels and determinants of physical activity behaviours (intentions, attitudes, self-efficacy, social support, knowledge, benefits and barriers related to physical activity), which were based on the theory of planned behaviour. The transtheoretical model was then used for matching this feedback to the stage of change specific to each individual student. Once the individual feedback was given, including recommendations and advice, students completed questions concerning the advice they were given to help improve their personal health.

Results of the intervention showed significant positive effects on physical activity in both genders. Specifically, Haerens et al. (2006) reported that the condition with parental support resulted in significant increases in self-report physical activity (6.4 minutes per day). Furthermore, accelerometer data revealed a significant increase in physical activity of light intensity (36 minutes per day) and physical activity of moderate-to-vigorous (4 minutes per day) with parental support, while moderate-to-vigorous physical activity decreased (7 minutes per day) in the control group. Haerens et al. (2006) suggested that the use of a personalized computer-tailored intervention might be a promising strategy for improving the health behaviours of middle school students.

The Intervention Centered on Adolescents Physical Activity and Sedentary Behaviour (ICAPS) (Simon et al., 2004) was a four-year clustered randomized controlled

trial that focused on improving students' attitude towards physical activity and implementing new opportunities for physical activity during school and after school. Simon et al. (2006, 2008) stated that ICAPS was developed and framed within the social ecological perspective described by Sallis and Owen (2002), due to the importance of taking into account the social, physical, and policy environment. The fundamental notion of an ecological model, as described by Sallis and Owen (2002), is that behaviour has multiple levels of influences. These influences include intrapersonal, interpersonal, organizational, community, physical environmental, and policy. On this basis ICAPS intervened in the following intervention components: school environment, cross-subject curricula, family, and community. Within intervention schools, new physical activity opportunities were created during school hours (i.e., lunch, breaks) and after school hours. The educational component of the intervention included teaching students the knowledge and skills necessary for the development of lifelong activity behaviours (e.g., health benefits, physical activity options, enjoyment of physical activity) (Simon et al., 2006).

The results of the ICAPS intervention showed effectiveness in reducing the number of students not engaged in organized physical activity within intervention schools. The portion of students in intervention schools not participating in out of school physical activity was significantly reduced in comparison to students in control schools (36% to 17% in intervention schools vs. 42% to 42% in control schools). Moreover, the proportion of students spending less than three hours a day in sedentary behaviours was also significantly reduced (34% to 28% in intervention schools vs. 27% to 36% in control schools). Simon et al. (2006) reported that more girls than boys participated in the

proposed activities and increases in self-efficacy and intention towards physical activity increased among girls in intervention schools. Moreover, the intervention resulted in significantly lower increases in body mass index of students over time than students in the control schools (Simon et al., 2008). Simon et al. (2006, 2008) concluded that implementing a whole-school approach into middle schools could positively impact the physical activity behaviours, sedentary behaviours, and weight gain in adolescents.

In sum, whole-school health approaches developed for middle school students were successful at improving one or more aspects of students' health and were shown to be a useful strategy in improving the physical activity behaviours of students in grades 6-8. Table 3 includes a summary of the seven whole-school health approaches conducted in middle school settings including theory, purpose, participants, intervention description, and results.

Table 3

Overview of Whole-School Health Approaches in Middle Schools

Healthy Youth Places (Dzewaltowski et al., 2009); USA				
Theory	Purpose	Participants	Intervention Description	Results
SCT	Evaluate a multilevel INT designed to develop skills and efficacy of adult leaders and youth to build middle school environments that promote FV and PA.	16 middle schools (8 CON; 8 INT); 2875 6th grade female and male students (baseline) 1582 8th grade students (follow-up).	Three tiers/levels of INT were used: (1) Project Level: expert staff delivered group staff workshops to paid school site coordinators from INT schools. (2) School Level: The school change teams (youth & adult leaders) created awareness within their schools on the importance of PA and HE. (3) Place Level: Places targeted - classroom, school lunch, and after-school program. 7th grade curriculum: 8 lessons on the planning process and steps to environmental changes. Taught students environmental change skills (team work, PA & FV information, marketing). 8th grade curriculum: reinforced planning process and environmental changes. Students learnt how to promote their environmental change efforts.	Student in INT schools sig. ↑ PA compared to CON. During the after school hours (3:00 – 11:00pm) students in INT ↑ VPA by 3.7% and students in CON ↑ 2.26%. This is approximately 7.5 min. per day. NS results for FV. Proxy efficacy was the mediating variable for the INT group and suppressor variable for the CON group.
Middle School Physical Activity and Nutrition (M-SPAN) (McKenzie et al., 2004); USA				
Theory	Purpose	Participants	Intervention Description	Results
SEM	Evaluate the effects of environment and policy INT on PA and HE of students at school. ↑ the total energy expenditure from PA at school and ↓ grams of total and saturated fat consumed by students at school.	48 middle schools (24 INT, 24 CON); 1578 grade 6-8 female and male students.	PA component: ↑ PA in PE classes; ↑ choice for PA during leisure time; and school environmental changes (↑ supervision, equipment, and activities). HE component: providing and marketing low-fat foods at all school food sources, assisting students in bringing lower-fat lunches, sending ideas for low-fat lunches home in newsletters.	Sig. INT effects for PA among boys but not girls. Out of PE PA for boys in INT was 22.31 of MVPA kcal/day/child, compared to 11.47 for CONT. For girls out of PE PA in INT schools was 6.52 MPVA kcal/day/child, compared to 4.69 kcal/day/child in CON. INT not effective for total fat or saturated fat intake or sedentary behaviour. BMI was sig. reduced in boys, NS in girls.

Trial of Activity for Adolescent Girls (TAAG) (Webber et al., 2008); USA				
Theory	Purpose	Participants	Intervention Description	Results
SEM	To determine if an INT that links schools to community organizations reduces the age-related ↓ in MVPA in middle school girls.	36 schools (18 INT; 18 CON); 1566 grade 6-8 female students.	Four major components: (1) PE curricula; (2) health curricula: a series of six lessons promoted development of behavioural skills associated with PA; (3) PA programs: collaborations between schools, community agencies and TAAG university staff to ↑ girl-focused PA programs outside of PE classes; (4) TAAG promotions: social marketing efforts included posters, flyers and special activities were launched to encourage overall PA.	Girls in INT schools were more physically active than girls in CON (1.6 min. of daily MVPA or 80 kcal per week). There was no difference in fitness or percent body fat. After 3 years of INT. girls in CON schools had 8.2 more min. of sedentary behaviours. Girls in INT schools reported lower levels of SE, friends' SS, and total SS.

Incorporating More Physical Activity and Calcium in Teens (IMPACT) (Jones et al., 2008); USA				
Theory	Purpose	Participants	Intervention Description	Results
SCT; TTM	To ↑ bone accretion in middle school girls by changing the levels of weight bearing PA, MVPA, VPA, sedentary behaviours, before/after-school activities, and weekend activities.	12 schools (6 INT, 6 CON); 606 female students (mean age = 11.6 years).	Three major components: (1) health curricula of 16 lessons (3 days/week) focused on promotion of calcium-rich foods and ↑ PA; (2) PE.	Follow-up measures were higher for students in INT compared to CON but only sig. for VPA. Girls in INT showed higher daily min. of VPA (6.00 min.), daily after school activity min. (8.95 min.), and daily weekend activity min. (19.00 min.) compared to CON. INT sig. ↓ in students' daily TV/video watching (6.32 min.), and total daily sedentary activity min. (16.99 min.).

Nutrition and Enjoyable Activity for Teen Girls (NEAT Girls) (Lubans et al., 2010); Australia				
Theory	Purpose	Participants	Intervention Description	Results
SCT	Evaluate a school-based obesity prevention program for low-active adolescent girls from disadvantaged secondary schools.	12 schools (6 INT, 6 CON); 356 grade 8 girls.	INT components included: enhanced teacher directed PA sessions (Zumba, dance, circuit training, yoga, skipping); interactive seminars – delivered by research team, focused on PA and HE recommendations and behavioural strategies, nutrition workshops on HE strategies, lunch-time PA sessions involving lifelong activities, PA and nutrition handbooks, parent newsletter, pedometers for self-monitoring, and text messaging for SS.	*results not published yet.
Haerens et al. (2006) Belgium				
TBP; TTM	To evaluate the effects of a 2-year PA and HE INT, combining an environmental and computer-tailored component; and to evaluate the effects of parental involvement.	15 schools; 2991 grade 7 and 8 female and male students. Schools were randomly assigned to one of: (1) 5 INT with parental involvement; (2) 5 INT alone; (3) 5 CON.	Adapted physical environmental by creating more opportunities to be PA during breaks, at noon, or after school hours - extra sports and non-competitive activities. Students received 2 class hours spent on the promotion of health behaviours at the personal level. During classes students' received a computer-tailored INT – feedback on PA levels and determinants. Five schools added supportive social environmental through parental involvement - parents received CD, similar to the students' computer INT and regular newsletters.	Results showed sig. positive INT effects on PA in both genders and on fat intake in girls. INT ↑ students' time in school-related PA by an average of 6.4 min./day with parental involvement. Accelerometer data revealed sig. ↑ in light PA (36 min.) and MVPA (4 min.) in parental involvement condition, CON schools ↓ MVPA by 7 min. BMI and BMI z-score ↑ less in the INT with parental support compared to CON among girls only.

Intervention Centered on Adolescents Physical Activity and Sedentary Behaviour (ICAPS) (Simon et al., 2004); France				
Theory	Purpose	Participants	Intervention Description	Results
SEM	To evaluate the impact of a PA multilevel INT on activity patterns and psychological predictors of PA among adolescents.	8 schools (4 INT, 4 CON); 954 6th grade middle school female and male students.	Three principal targets: (1) increasing knowledge, attitudes, beliefs and motivation towards PA by means of information and debates; (2) SS by parents, peers, teachers and PA instructors; and (3) changing environmental conditions (physical, structural and institutional) for PA. New opportunities for PA during school hours (lunch break, recess periods) and after-school hours.	Students in INT schools not engaged in organized PA ↓ by approx. 50% (36% to 17% vs. 42% in CON). INT had higher leisure organized PA than CON. Proportion of student spending greater than 3 hours/day in sedentary occupations ↓ (34% to 28% vs. 27% to 36%). More girls than boys participated in the proposed activities (57% vs. 43%). INT lowered BMI over time and ↓ screen time. ↑ SE and intention towards PA in girls (leisure organized PA was associated with SE) but not in boys. Anthropometric measurements were NS.

Note. SCT = social cognitive theory; INT = intervention; FV = fruit and vegetable; PA = physical activity; CON = control; HE = healthy eating; ↑ = increase; ↓ = decrease; VPA = vigorous physical activity; NS = non-significant; SEM = social ecological model; PE = physical education; sig. = significant; BMI = body mass index; OLT = operant learning theory; Diff. Inn. Model = diffusion innovation model; MVPA = moderate-to-vigorous physical activity; SE = self-efficacy; SS = social support; TTM = transtheoretical model; TV = television; min. = minutes; TPB = theory of planned behaviour;

Whole-school health approaches in high schools. Despite the promising results at the elementary and middle school levels, there are fewer examples of interventions that have used a whole-school approach to promote health among high school students (grades 9 -12). The following sections present an overview of three whole-school health approaches conducted in high schools: LEAP (Lifestyle Education Activity Program; Pate et al., 2005), DOiT (Dutch Obesity Intervention in Teenagers; Singh et al., 2009) and It's Your Move (Mathews, Moodle, Simmons, & Swinburn, 2010). The goals of the whole-school approaches and the intervention components will be discussed, followed by an overview of three whole-school approaches highlighting key features and key findings. The details of the physical education program component of the interventions are not described in this section. A description of the physical education component of each intervention will be discussed in separate sections (page 61).

Goals and intervention components of whole-school health approaches in high schools. Similar to the whole-school health approaches in middle schools, the primary goal of the whole-school interventions conducted in high schools was to increase the physical activity behaviours of students. Other intervention goals included: increasing moderate-to-vigorous physical activity of students during physical education class time; decreasing students' fat intake; increasing students' fruit and vegetable consumption; decreasing sugar-sweetened beverage consumption; decreasing sedentary behaviours, decreasing screen time; improving body composition; improving psychosocial variables; and enhancing behavioural skills associated with students' health behaviour. Table 4 includes a summary of the goals of the three whole-school health approaches designed for high school students. To achieve these goals several components within the whole-school

approach were targeted. The intervention components included: school environment; physical education curricula; health curricula; cross curricula; school nutrition services; school policies; social marketing; family; and community. Table 5 includes a summary of the intervention components of the whole-school health approaches designed for high school students.

Table 4

Goals of Whole-School Health Approaches Designed for High School Students

	Intervention Goals									
Intervention	↑ Overall PA	↑ MVPA in PE	↓ Fat Intake	↑ FV Intake	↓ SSB Consump.	↓ Sedentary Behaviour	↓ Screen Time	Improve Body Comp.	Improve Psycho. Variables	Enhance Behav. Skills
LEAP	✓	✓	×	×	×	×	×	✓	✓	✓
DOiT	✓	×	✓	×	✓	✓	✓	✓	✓	✓
It's Your Move	✓	×	×	✓ & ↑ breakfast consump.	✓ & ↑ water intake	×	×	✓	×	×

Note. ↑ = increase; PA = physical activity; MVPA = moderate-to-vigorous physical activity; PE = physical education; ↓ = decrease; FV = fruit and vegetable; consump. = consumption; SSB = sugar sweetened beverages; comp. = composition; psycho. = psychosocial; behav. = behavioural.

Table 5

Intervention Components of Whole-School Health Approaches Designed for High School Students

	Intervention Components								
Intervention	School Environment	PE Curricula	Health Curricula	Cross Curricula*	School Nutrition Services	School Policies	Social Marketing	Family	Community
LEAP	✓	✓	✓	×	×	✓	×	✓	✓
DOiT	✓	✓	×	✓	×	×	×	×	×
It's Your Move	✓	×	×	×	✓	✓	✓	✓	✓

*****Lessons implemented across multiple subject areas.

Review of whole-school health approaches in high schools. The Lifestyle Education Activity Program (LEAP) (Pate et al., 2005) was a group-randomized controlled trial conducted in 24 high schools in the United States. Schools were matched based on school size, percent of girls who were African American, location of school (i.e., urban/rural) and class structure (i.e., 60 minute/90 minute classes) and randomized into intervention condition (n = 12) or control condition (n = 12). The intervention was developed to examine the effects of a comprehensive school-based program designed to change both the instructional practices and the school environment to increase support for physical activity among female students. The theoretical framework used to guide the study was Bandura's (1986) social cognitive theory. The specific intervention goals included: increasing overall physical activity, increasing moderate-to-vigorous physical activity in physical education classes, improving body composition, improving psychosocial variables, and enhancing behavioural skills. The intervention was designed to target six intervention components: school environment, physical education curricula, health curricula, school policies, family, and community. Intervention schools created a school environment that supported physical activity among girls through role modeling by staff, increased communication about physical activity, school policies regarding physical activity, and family/community based activities. Moreover, LEAP implemented a health curriculum that focused on the benefits of physical activity and the behavioural skills that would enable girls to initiate and maintain a physically active lifestyle. Results of LEAP showed girls in LEAP schools were significantly more likely to report engaging in regular vigorous physical activity during an average of one or more 30 minute time blocks per day over a 3-day period compared to girls attending control schools (45% vs.

36%). Pate et al. (2005) concluded that LEAP was an effective whole-school approach for increasing high school girls' participation in vigorous physical activity.

The Dutch Obesity Intervention in Teenagers (DOiT) (Singh et al., 2009) was a randomized controlled trial designed to improve adolescents' body composition, energy balance-related behaviours, and determinants of these behaviours. The study was conducted in 18 prevocational high schools (e.g., schools with the low education level). Participating schools were randomized into intervention (n = 10) or control (n = 8) conditions. Singh et al. (2006) stated that the DOiT intervention was guided by relevant theories identified through a literature review, an investigation of theoretical programs, and in-depth interviews with participating teachers. Although Singh et al. (2006) did not describe specific theoretical frameworks used, the authors identified theoretical constructs implemented into the intervention. These included self-monitoring, self-evaluation, reward, increasing skill, goal setting, environmental changes, social encouragement, social support, information regarding behaviour, and personalized messages.

The specific goals of DOiT were to increase overall physical activity, decrease fat intake, decrease sugar-sweetened beverage consumption, decrease sedentary behaviours, decrease screen time, improve body composition, improve psychosocial variables, and enhance behavioural skills. To achieve these goals the following intervention components were targeted: school environment, physical education programs, and cross-subject curricula. Changes to the school environment included additional physical activity opportunities during the school day and the addition of healthier options to the school canteen. The Dutch Obesity Intervention in Teenagers adapted the curriculum in physical

education and biology 11 lessons. The lessons focused on raising awareness regarding energy balance related behaviours and improving the screen time, consumption of sugar-sweetened beverages, active transportation, and fat intake (Singh, Chin A Paw, Brug, & van Mechelen, 2009a). The results of DOiT showed significant intervention effects for girls in sum of skinfolds, waist circumference, and waist-hip ratio. For boys, results showed significant differences with regard to waist circumference and waist-hip ratio. Further, Singh et al. (2009) reported that DOiT significantly reduced the consumption of sugar-sweetened beverages in female and male students and significantly decreased screen time for boys. Singh et al. (2007, 2009) concluded that DOiT showed that school curriculum changes might contribute to the prevention of excessive weight gain among youth.

The It's Your Move (Mathews et al., 2010) intervention was a multisite program (Fiji, Tonga, New Zealand, Australia) that focused on capacity building of schools, communities, and organizations to promote physical activity and healthy eating among youth. The intervention used a capacity building approach to inform the study's design and evaluation (Mathews et al., 2010). Mathews et al. (2010) defined capacity building as "an approach to the development of sustainable skills, structures, resources and commitment to health improvement in health and other sectors to prolong and multiply health gains many times over" (p. 2). The intervention integrated capacity building through the enhancement of the capacity of families, schools, and community organization to improve the health behaviours of adolescents.

The specific goals of the It's Your Move intervention included: increasing overall physical activity, increasing fruit and vegetable consumption, increasing breakfast

consumption, decreasing sugar sweetened beverages, increasing water intake, and improving body composition. To achieve these goals, intervention components included the school environment, school nutrition services, school policies, a social marketing campaign, family, and the school community. Students, teachers, and other stakeholders formulated a 10-point action plan that was translated into strategies and initiatives specific to each school. Action plan objectives included nutrition (i.e., increase healthy food available at school), physical activity (i.e., increase participation in organized sports) and body image goals (create acceptance of all body sizes). Specific actions involved building new bicycle storage unit, integrating pedometers into classroom activities, implementing a food and water policy, and implementing a breakfast program. The result of the It's Your Move intervention have yet to be published.

Based on the results of the interventions reviewed, whole-school health approaches conducted in high school appeared to be a potential strategy for improving health behaviours of high school students. Despite holding such promise, whole-school health approaches developed for adolescents are limited within the high school setting and predominantly focused on younger adolescents during middle school years. Cale and Harris (2006) suggested developing programs at all school levels in order to reach younger and older students in efforts to reduce the rapid decline in physical activity during adolescent years. Table 6 includes a summary of the three whole-school health approaches conducted in high schools including theory, purpose, participants, intervention description, and results.

Table 6

Overview of Whole-School Health Approaches in High Schools

Lifestyle Education Activity Program (LEAP) (Pate et al., 2005); USA				
Theory	Purpose	Participants	Intervention Description	Results
SCT; SEM	To examine the effects of a comprehensive school-based INT on PA among high school girls, designed to change both the instructional practices and the school environment to ↑ support for PA among girls.	2,744 grade 9 female students from 24 high schools (CON & INT).	Two primary channels: (1) Instruction: changes in the content and delivery of PE and health curricula. Health curricula component: skills necessary for a physically active lifestyle (goal setting, barriers, PA decision making, time management, and using PA behavioural skills outside of class); (2) Environment: create a school environment that supports PA - staff role modeling, ↑ communication about PA, promotion of PA by school nurse, and family/community activities.	LEAP students sig. more likely to report engaging in regular VPA during an average of one or more 30 minute time blocks per day over a 3-day period than students in CON schools (45% vs. 36%). LEAP did not serve to lower the percentage of overweight girls in INT schools.
Dutch Obesity Intervention in Teenagers (DOiT) (Singh et al., 2009); Netherlands				
Theory	Purpose	Participants	Intervention Description	Results
Various theoretical constructs	Evaluate a multi-component health promotion INT for adolescents targeting body composition, energy balance-related behaviours, determinants of these behaviours and aerobic fitness.	18 prevocational secondary schools 978 grade 9 female and male students.	Adapted curriculum for 11 biology and PE lessons and environment change options. 6 lessons aimed to ↑ awareness and behavioural change in energy intake and energy output. 5 lessons aimed to improve screen time, active transportation, SSB consumption, and fat intake. Students monitored their behaviour for 3 days and reported it back in the classroom and received teacher feedback. INT guided the students in their choice of which of the risk behaviours they were going to change.	In girls, sig. INT effects were found for sum of skinfolds, waist circumference, and waist-hip ratio. In boys, sig. differences were found for waist circumference and waist-hip ratio. All changes in anthropometric outcome measures and aerobic fitness consistently favored students in INT schools. ↓ SSB consumption for girls and boys. For boys, screen time behaviours were sig. lower in INT schools.

It's Your Move (Mathews, et al., 2010); Fiji, Tonga, New Zealand, Australia				
Theory	Purpose	Participants	Intervention Description	Results
CCB	Aimed to reduce unhealthy weight gain by promoting HE patterns, regular PA, healthy body weight and body size perceptions among youth and improve capacities of families, schools, and community organizations to sustain the promotion of HE and PA.	INT conducted in 4 countries – Fiji, Tonga, New Zealand, Australia. Female & male students 13-17 years of age.	Students, teachers, and other stakeholders formulated a 10-point action plan that was translated into strategies and initiatives specific to each school. Action plan objectives included: social marketing messaging, decrease SSB, ↑ health of school food, ↑ active transportation, ↑ participation in organized sports and recreation, create acceptance of all body sizes.	* Results not published.

Note. SCT = social cognitive theory; SEM = social ecological model; INT = intervention; PA = physical activity; sig. = significant; ↑ = increase; CON = control; PE = physical education; VPA = vigorous physical activity; TPB = theory of planned behaviour; MVPA = moderate-vigorous physical activity; CCB = community capacity building; HE = healthy eating; SSB = sugar-sweetened beverages.

Support for Physical Education in Whole-School Health Approaches

Researchers have identified physical education programs as one essential component of whole-school health approaches, at all school levels, designed to promote physical activity among students (Slingerland & Borghouts, 2011; Veugelers & Schwartz, 2010). Trudeau and Shephard (2005) argued that because Canadian students are required to complete a physical education course for at least 9 of 12 years of schooling, school-based physical education programs present a tremendous opportunity to positively influence the physical activity patterns of adolescents. The purpose of physical education is to enable students to develop knowledge, movement skills, and positive attitudes and behaviours that contribute to a healthy, active lifestyle (British Columbia Ministry of Education, 2008; Cale, 2000; Gibbons & Gaul, 2004). Specifically, the British Columbia Ministry of Education (2008) stated the goals for students in physical education (grades 8-10) include: (a) participation in daily physical activity; (b) development of the knowledge and skills needed to participate actively, effectively, safely, and responsibly in a wide range of activities (individual and dual activities, games, rhythmic movement); and (c) development of the knowledge, skills, and attitudes that enable students to value, attain, and maintain a healthy active lifestyle.

Researchers support and highlight the impact of physical education on the development and health of young people. McKenzie (2001) found that students who attend physical education class engage more frequently in moderate-to-vigorous physical activity than on days they do not receive physical education. Dale, Corbin, and Dale (2000) reported that students are more active outside of class on the days they have physical education class than on the days they do not have physical education class.

Trudeau and Shephard (2008) expressed that physical education includes the only form of physical activity provided to almost all students (K-12) that can be controlled in terms of its quality and quantity. Tassitano and colleagues (2010) found that students participating in high school physical education classes reported higher levels of physical activity, greater consumption of fruit and vegetables, and lower time spent watching television during school days. The authors concluded that participation in physical education class is positively associated with health-related behaviours among adolescents. Moreover, Wallhead and Buckworth (2004) proposed that the effective and successful multi-component school-based interventions in children and youth included physical education curricular programs.

Research on the Role of Physical Education in Whole-School Health Approaches Aimed at Youth

Providing students with greater amounts of physical activity is one of the major goals of all whole-school interventions aimed at youth. To achieve this goal, several of the interventions utilized physical education programs to assist in increasing the physical activity levels of the target population. Physical education was a targeted component in five of the 10 whole-school health interventions aimed at youth (seven middle school, three high school): M-SPAN (McKenzie et al., 2004), TAAG (Webber et al., 2008), IMPACT (Jones et al., 2008), LEAP (Pate et al., 2005), and DOiT (Singh et al., 2009). These studies intervened within existing school physical education programs to help achieve intervention goals (i.e., increase physical activity levels of participants).

Physical education programs in whole-school health approaches aimed at youth have included one or more of the following components: (a) increasing moderate-to-

vigorous physical activity of students during physical education class, (b) promoting physical activity out-of-physical education class time, and/or (c) targeting psychosocial variables that influence physical activity levels. Table 7 includes a summary of the components of physical education in whole-school health approaches aimed at youth.

Table 7
*Components of Physical Education in Whole-School Health Approaches Aimed at Youth**

	M-SPAN	TAAG	IMPACT	LEAP	DOiT
Increase MVPA	✓	✓	✓	✓	✗
Promotion of PA Outside of PE Class	✓	✓	✗	✓	✓
Behavioural Skills	✗	✗	✗	✓	✓
Community Link	✗	✓	✗	✓	✗
Verbal Promotion	✓	✗	✗	✗	✗
Psychosocial Variables	✓	✓	✗	✓	✓
Self-Efficacy	✗	✓	✗	✓	✓
PE Enjoyment	✓	✓	✗	✓	✗
Social Support	✗	✓	✗	✓	✓

Note. PE = physical education
* PE was not a targeted intervention component in Healthy Youth Places, Haerens et al. (2006), ICAPS, NEAT Girls, It's Your Move

In the subsequent sections, the role of physical education within the five whole-school health interventions that included a targeted physical education component is described. The physical education program and its role within whole-school health approaches is explained in as much detail as possible given the published information provided by the researchers. Table 8 includes a summary of the physical education component in these five interventions including the purpose and goals, a description and results.

Increase moderate-to-vigorous physical activity of students during physical education class. Current research findings and recommendations for Canadian physical education programs, including Physical and Health Education Canada (2009) and the Pan-Canadian Healthy Living Strategy (Public Health Agency of Canada, 2005) highlight

the important influence of regular quality physical education programs on students' physical activity levels. However, according to Fairclough and Stratton (2005) students in middle and high school classes engaged in moderate-to-vigorous physical activity for 27% - 47% of the class time. As such, four whole-school interventions (M-SPAN, TAAG, IMPACT, LEAP) designed the physical education component to increase students' moderate-to-vigorous physical activity during physical education class time.

Physical education teachers in intervention schools participated in professional development sessions to increase moderate-to-vigorous physical activity of the students during class time. Physical education teachers trained by the researchers or intervention staff members presented the professional development sessions. These professional development sessions included strategies designed to increase the moderate-to-vigorous physical activity levels of students in physical education classes, decrease instructional time, increase managerial efficiency time, and employ a physical education curriculum that was as active as possible. For example, McKenzie et al. (2004) reported that M-SPAN intervention staff provided teachers with five 3-hour workshops, which had three main goals: (a) create awareness of the need for active health related physical education; (b) assist teachers in the design and implementation of active physical education curriculum (e.g., engaging students in physical activity rather than discussing the history of sport); and (c) increase student physical activity through improvements in class management (e.g., having students warm-up while taking attendance) and instruction (e.g., small group sizes). Webber et al. (2008) and Young, Phillips, Yu, and Haythornthwaite (2006) stated that TAAG physical education teachers participated in professional development workshops that included class management strategies, skill-

building activities, strategies for engaging girls in moderate-to-vigorous physical activity during class, and appropriate choices of equipment and activities. The Incorporating More Physical Activity and Calcium in Teens study (Jones et al., 2008) focused on increasing the levels of students' moderate-to-vigorous physical activity by implementing a 10-minute warm-up, which consisted of high impact activities such as rope jumping, circuit training, and box-step activities. Ward et al. (2006) reported LEAP PE teachers received professional development workshop on appropriate instructional methods (e.g., small group sizes) to promote lessons that were as active as possible.

Measures and results of moderate-to-vigorous physical activity. Students' moderate-to-vigorous physical activity during physical education class time was assessed by one of the following measures: System for Observing Fitness Instruction Time (SOFIT; McKenzie, Sallis, & Nader, 1991), the Self-Administered Physical Activity Checklist (Sallis et al., 1996) or through direct observation. The Middle School Physical Activity and Nutrition intervention (M-SPAN) (McKenzie et al., 2004) and TAAG (Webber et al., 2008) measured in-class physical activity using SOFIT to evaluate the amount of time students spent in moderate-to-vigorous physical activity while simultaneously assessing the lesson context of the physical education class. McKenzie et al. (1991) stated that SOFIT is an objective tool for assessing the quality of physical education instruction and is a comprehensive system that provides a measure of student activity, lesson context, and teacher behaviour during class time. The Middle School Physical Activity and Nutrition intervention results showed an increase of approximately 3 minutes per lesson of moderate-to-vigorous physical activity in the intervention schools. At the end of the second intervention year, students were active about 52% of

physical education class time. McKenzie et al. (2004) reported that these increases in moderate-to-vigorous physical activity within physical education classes were significant among male students; however results were not significant among females. Results from TAAG physical education revealed that moderate-to-vigorous physical activity time during physical education class was significantly higher in the intervention schools (40.4%) than the control schools (36.3%) (Webber et al., 2008).

The Incorporating More Physical Activity and Calcium in Teens (IMPACT) intervention (Jones et al., 2008) measured student physical activity during physical education class using multiple administrations of the Self-Administered Physical Activity Checklist (Sallis et al., 1996). This instrument assessed intensity, duration, and type of activity. Jones et al. (2008) reported significant increases in moderate-to-vigorous physical activity among students in the intervention schools compared to control schools (mean difference between intervention and control = 7.05 minutes).

Saunders et al. (2006) stated that in LEAP intervention schools a direct observation checklist, which addressed the statement ‘most girls appear to be physically active for at least 50% of class time’ on a 4-point rating scale of ‘no or none’ to ‘all of the time’, was designed specifically to observe physical education class. Results showed that 10 of the 12 intervention schools successfully reached the LEAP objective of being physically active 50% of class time (Saunders et al., 2006). Overall, these findings demonstrated that the physical education component of whole-school interventions that included a focus on increasing students’ level of moderate-to-vigorous physical activity during physical education classes found significant differences between treatment and control conditions.

The promotion of physical activity outside of physical education class. Whole-school health approaches aimed at youth all shared the common goal to increase participants' overall physical activity, but only M-SPAN, TAAG, LEAP, and DOiT utilized physical education programs in attempt to promote physical activity throughout the school day and outside of school hours. The aim of M-SPAN was to increase physical activity involvement on school campus throughout the school day (e.g., before school, during lunch, and after school). The aim of TAAG, LEAP, and DOiT was to increase involvement in physical activity outside of school hours. Within the physical education component of these four interventions, one or more of the following strategies were used to increase students' physical activity outside of physical education class time: (a) enhancing physical activity behavioural skills; (b) establishing a link between the schools' community; and (c) verbal promotion of physical activity opportunities by physical education teachers.

Enhancement of physical activity behavioural skills. Physical activity behavioural skills, such as goal-setting, time management, decision-making, and self-monitoring were taught to students during physical education class time in LEAP and DOiT intervention schools to encourage physical activity outside of physical education (Felton et al., 2005; Singh et al., 2006). For example, in LEAP as part of physical education class, each student set goals, developed individualized physical activity programs, and assessed their progress throughout the intervention. Singh et al. (2006) reported that as part of physical education in DOiT intervention schools, participants monitored their own behaviours in personal worksheets and received individualized feedback from their teacher.

Establishing a link between students in physical education and the community. Physical education teachers in TAAG and LEAP intervention schools established links between students in physical education classes and the surrounding community by connecting the students to the people and places that provided physical activity opportunities within their community (e.g., recreation centers). The Trial of Activity for Adolescent Girls (TAAG) and LEAP physical education programs were specifically designed to link the physical activities done during physical education class to physical activity opportunities available in the community. For instance, LEAP included girl-friendly activities such as aerobics during physical education class, and then had a community agency teach aerobics classes in an afterschool aerobics program, with the intent of increasing the physical activity participation of girls in the intervention schools. By establishing this connection, students were exposed to the physical activity opportunities available outside of school hours (Felton et al., 2005).

Verbal promotion of physical activity opportunities within the school environment. Sallis et al. (2003) reported that M-SPAN specifically designed the 'school environment' component of the intervention to increase opportunities to be physically active during school leisure periods (i.e., before school, lunch, and after school). This was accomplished by increasing organized activities during school hours, increasing teacher-student supervision, and increasing equipment sources and availability. During physical education class time, M-SPAN physical education teachers verbally encouraged students to participate in these activities. This verbal promotion of physical activity opportunities on school campus was intended to increase overall physical activity levels of students in the intervention schools.

Measures and results of the promotion of physical activity outside of physical education class. Several measures were used to assess students' physical activity level beyond physical education class time. These included the System for Observing Play and Leisure Activities for Youth (SOPLAY; McKenzie et al. 2002) (M-SPAN), physical activity assessed by accelerometry (TAAG), the 3-Day Physical Activity Recall (3DPAR) (LEAP), and a shuttle run test to assess aerobic fitness (Leger, Mercier, Gadoury, & Lambert, 1988) (DOiT). The results of the interventions that promoted physical activity outside of physical education class time showed varying results. The results of the M-SPAN intervention, as reported by Sallis et al. (2003), showed effectiveness in significantly increasing physical activity during school hours among boys in the intervention schools compared to boys in the control schools. For girls in the intervention schools there were positive changes in the amount of physical activity but these small increases were attributed to their increased activity during M-SPAN physical education classes. Webber et al. (2008) stated that girls in TAAG intervention schools had significantly more MET-weighted minutes (13.5 minutes) of weekday moderate-to-vigorous physical activity in comparison to girls in the control schools. Felton et al. (2005) reported that girls in LEAP schools were significantly more likely to report participating in moderate-to-vigorous physical activity and vigorous physical activity after one year of intervention exposure than girls in the control schools. The DOiT study (Singh et al., 2006) resulted in no significant differences in aerobic fitness between intervention and control schools.

Psychosocial variables that influence students' physical activity levels. According to Buckworth and Dishman (2002) and Nahas, Goldfine, and Collins (2003)

physical activity is a complex behaviour and is influenced by a large number of psychosocial variables that affect an individual's decision to engage in and maintain an active lifestyle. In light of this, four whole-school approaches, M-SPAN, TAAG, LEAP, DOiT utilized the physical education program to target psychosocial variables to help increase youth physical activity engagement. The targeted variables included: physical activity self-efficacy (TAAG, LEAP, DOiT), physical education enjoyment (M-SPAN, TAAG, LEAP), and social support for physical activity (TAAG, LEAP, DOiT). The physical education component in M-SPAN, TAAG, LEAP, and DOiT aimed to enhance at least one of these variables through several strategies. For example, according to McKenzie et al., (2004) the M-SPAN physical education component targeted the physical education enjoyment variable with the implementation of active classes that enhanced student learning. Results showed no significant increases in physical activity enjoyment among students in M-SPAN intervention schools compared to students in the control schools. In the TAAG intervention, physical education teachers provided choices during activities to accommodate students with varying levels of skills, in attempt to gradually enhance self-efficacy toward physical activity (Webber et al, 2008). The Lifestyle Education Activity Program (LEAP) aimed to enhance physical activity self-efficacy and physical education enjoyment by offering gender-segregated classes, providing a choice-based girl-friendly instructional program, offering activities that girls typically enjoy (e.g., aerobics, dance, weight training), and facilitating positive interactions with their physical education teacher and classmates (Pate et al., 205; Ward et al., 2006). In addition, Felton et al. (2005) reported that LEAP physical education teachers also increased social support by involving family members in the promotion of girls' physical

activity through a participation contract. Parents/siblings were asked to write and sign a contract in which they agreed to perform selected physical activity with their daughter/sisters and help with the formulation of short-term and long-term physical activity goals.

Measures and results of psychosocial variables that influence students' physical activity levels. Psychosocial variables were measured by self-report questionnaires in M-SPAN, TAAG, and LEAP interventions. The Dutch Obesity Intervention in Teenagers (DOiT) (Singh et al., 2009) did not measure the psychosocial variables targeted in the intervention. These variables were used to help achieve the intervention outcomes (i.e., body composition and dietary and physical activity behaviour) and were not independently assessed. McKenzie et al. (2004) found that M-SPAN showed no significant increases in enjoyment of physical education class, however, physical education class enjoyment in both TAAG and LEAP interventions were significantly associated with physical activity (Barr-Anderson et al., 2008; Dishman, Molt, Saunders, Felton, & Ward, 2005). Lytle et al. (2009) reported that TAAG results also revealed physical activity self-efficacy and perceived social support for physical activity mediated the participants' level of out-of-school moderate-to-vigorous physical activity. Further, LEAP showed that girls' with strong social support for physical activity had less of a decline in physical activity levels, but only if they also possessed high self-efficacy. Dishman, Saunders, Motl, Dowda, and Pate (2009) stated that these results suggest female students' perceptions of social support for their participation in physical activity may differ according to their efficacious beliefs. Based on the results of whole-school health approaches that utilized physical education programs to enhance students'

perceived self-efficacy, physical education enjoyment, and perceived social support, targeting the psychosocial variables associated with physical activity behaviours may result in greater physical activity participation among youth, especially among females.

Summary of the effectiveness of the physical education component within whole-school health approaches. The physical education component of whole-school health approaches achieved a range of positive results. For moderate-to-vigorous physical activity during physical education class time, interventions demonstrated significant improvements. All interventions seeking to increase participants' activity levels during physical education class time were successful. However, intervention outcomes varied and were less effective for female participants. The variability of moderate-to-vigorous physical activity levels may suggest that students were very active in some classes and displayed low levels of moderate-to-vigorous physical activity in others. According to Fairclough and Stratton (2005) this may be a reflection of the diverse subject goals of the physical education curriculum. The authors stated that the varying activity levels during physical education lessons emphasizes the pedagogical nature of physical education activity, which is underpinned by educational principles and values, as well as differing instructional approaches. In other words, physical education programs have several objectives other than solely increasing students' physical activity levels during class time. Fairclough and Stratton (2005) stated the variation in physical activity participation during physical education lessons might be due to the fact that teachers must meet and teach other curricula requirements.

The results for out-of-physical education physical activity also varied and were less effective for females. The role of physical education in increasing physical activity

outside of class time, by methods used in whole-school health approaches (i.e., behavioural skills, establishing a community link, and verbal promotion of physical activity), might not be effective. However, targeting psychosocial variables seemed to show effectiveness, especially among female students (Dishman et al., 2009; Lytle et al., 2009). Fairclough and Stratton (2005) argued that for physical education teachers to effectively deliver active physical education lessons, an understanding of the psychosocial factors of youth physical activity in physical education settings is necessary. On this basis, as stated by Barr-Anderson et al. (2008), it is important to understand and target the factors associated with physical activity participation, especially if targeting the physical activity behaviours of female youth.

Table 8

Overview of Whole-School Health Approaches in Middle and High Schools That Included Physical Education Programs as a Targeted Intervention Component

Middle School Physical Activity and Nutrition (M-SPAN) (Pate et al., 2005); Middle Schools		
Purpose/Goals	PE Component Description	Results
(1) To ↑ student MVPA during class time; and (2) improve teacher instructional skills and create action plans for promoting PA beyond class time.	Designed to ↑ PA in PE classes through changing lesson context, lesson structure, and teacher behaviour. PE program consisted of curricular materials and staff development for teachers. Staff development program had four main goals: (1) ↑ teacher awareness of the need for active, health related PE; (2) assist teachers to design and implement active PE curricula; (3) develop teachers' class management and instructional skills to enhance PA and student learning; (4) provide on-going support for change. Teachers set goals for modifying PE. PE class gave credit for out of school PA. PE teachers verbally promoted PA out of PE class time.	M-SPAN PE ↑ MVPA of students by approximately 3 min./lesson. Effects were cumulative – by year 2 INT schools ↑ MVPA by 18%, compared to 3% in CON. Effects size was greater in boys than girls. Student PE enjoyment and student PE attendance did not change.
Trial of Activity for Adolescent Girls (TAAG) (Webber et al., 2008); Middle Schools		
Purpose/Goals	PE Component Description	Results
(1) Promote MVPA for at least 50% of class time; (2) ↑ girls PA enjoyment during PE class time; and (3) encourage girls to participate in PA outside of PE class, including after school programming.	TAAG PE altered the format of lessons, class management strategies, and instructional strategies to ↑ MVPA and enjoyment of PA. Enjoyment of PE class was enhanced by providing choice to students, including choice of activities, choice of competitive levels, and choice of gender-segregated activities. PE teachers provided choices during activities to accommodate students with varying levels of skills, in attempt to gradually enhance SE toward PA. PE teachers were used as links to the wider school and community PA opportunities that are being offered as part of the INT.	MVPA during PE class was 4% greater in INT than CON. PA SE and SS for PA mediated the participants' level of out-of-school MVPA. SE was the strongest predictor of PE class enjoyment.

Incorporating More Physical Activity and Calcium in Teens (IMPACT) (Jones et al., 2008); Middle Schools		
Purpose/Goals	PE Component Description	Results
To improve bone health of students by ↑ weight bearing PA and MVPA of students in INT schools.	Emphasis was on ↑ duration of weight-bearing PA and ↑ levels of MVPA by implementing an activity based program with high impact activities. 10-minute warm-up (range 5-15 min.), which consisted of high impact activities such as rope jumping, circuit training, and box-step activities.	Girls in INT showed higher total daily min. of activity (6.15 min.), higher MVPA min. (7.05), higher daily min. of VPA (6.00 min.), and higher number of daily weight-bearing activities (0.25 min.). Only VPA was sig.
Lifestyle Education Activity Program (LEAP) (Pate et al., 2005); High Schools		
Purpose/Goals	PE Component Description	Results of PE Component
(1) Engage girls in MVPA for 50% of class time; (2) enhance PA SE and enjoyment; and (3) teach the physical and behavioural skills needed to adopt and maintain a healthy active lifestyle.	Girl-friendly, choice-based instructional program. Enhanced PA SE and PE enjoyment by offering gender-segregated classes, activities that girls typically enjoy (e.g., aerobics, dance, weight training), and facilitating positive interactions with PE teacher/classmates. LEAP PE ↑ SS by involving family members in the promotion of girls' PA through a participation contract. Connected students to community by having a community agency teach PE classes and in afterschool PA program.	10 of the 12 INT schools achieved 50% MVPA during PE class time. Girls' with strong SS for PA had less of a decline in PA levels, but only if they also possessed high SE. 90% of girls indicated they liked PE and believed themselves to be more active.
Dutch Obesity Intervention in Teenagers (DOiT) (Singh et al., 2009); High Schools		
Purpose/Goals	PE Component Description	Results of PE Component
Raise awareness and information processing of energy balance-related behaviours and facilitate student choice to improve one of the following risk factors: SSB, high fat snacks, sedentary behaviours, active transportation, sports participation.	Adapted curriculum for 11 biology and PE lessons and environ. change options. 6 lessons aimed to ↑ awareness and behavioural change in energy intake and energy output. 5 lessons aimed to improve screen time, active transportation, sugar-sweetened beverage consumption, and fat intake. Students monitored their own behaviours in personal worksheets and a diary and received individualized feedback from their teacher. *The literature on the DOiT INT did not distinguish which INT strategies were implemented in biology and which strategies were implemented in PE. Therefore, specific description of the PE component is not possible.	The INT did not assess the PE component of the INT separately. Therefore, the specific contribution of the PE component on the results of the DOiT INT is unknown.

Note. ↑ = increase; MVPA = moderate-vigorous physical activity; PA = physical activity; PE = physical education; min. = minutes; INT = intervention; SE = self-efficacy; CON = control; SS = social support; VPA = vigorous physical activity; sig. = significant; SSB = sugar-sweetened beverages.

Research on Whole-School Health Approaches: Physical Education Programs Not a Targeted Intervention Component

The contribution of physical education in some of the interventions has had more than one purpose; whereas in others, physical education was not one of the targeted intervention components. In five whole-school studies reviewed physical education was not a targeted component of the whole-school approach (i.e., interventions did not intervene in physical education classes, however the regular physical education program offered within schools continued). Healthy Youth Places (Dzewaltowski et al., 2009), Haerens et al. (2006), ICAPS (Simon et al., 2004), NEAT Girls (Lubans et al., 2010) and It's Your Move (Mathews et al., 2010) did not intervene into physical education classes. These whole-school approaches displayed several similar intervention goals as the other interventions (e.g., increase physical behaviours of youth); however, did not target or alter existing school physical education programs. These interventions achieved the goals of the program through other components. For example, a central aspect of Healthy Youth Places, according to Dzewaltowski et al. (2009), was to emphasize placing adolescents in a leadership role to facilitate environmental change rather than on the implementation of specific curricula or programs (i.e., physical education). In a similar manner, the physical activity portion of Haerens et al. (2006) focused on increasing moderate-to-vigorous physical activity levels of students in intervention schools. This was carried out by creating more physical activity opportunities during school breaks, at noon, and/or after school and providing activities enjoyed by all students. Simon et al. (2004) stated that goals of ICAPS were to positively affect the intrapersonal, social, and certain environmental determinants of physical activity with the goal of promoting

physical activity inside and outside of school. The intervention had three principal targets: (a) students' knowledge, attitudes, beliefs, and motivation towards physical activity; (b) student' perceived social support by parents, peers, teachers, and physical activity instructors; and (c) environmental conditions for physical activity that encouraged the students to use the knowledge and skills they were taught (Simon et al., 2004). These goals were accomplished through four intervention components: school environment, cross curricula, family, and community. The goal of the NEAT Girls intervention (Lubans et al., 2010) was to prevent obesity through improving students' physical activity and healthy eating behaviours. Although NEAT Girls did not intervene into existing physical education curricula, the intervention made changes to the school environment (e.g., lunch time physical activity opportunities) and cross-subject curricula (e.g. provided information to promote physical activity) in order to increase physical activity levels of students. Likewise, It's Your Move (Mathews et al., 2010) did not intervene in physical education programs to increase participants physical activity behaviours, however utilized five intervention components (i.e., school environment, school policies, social marketing, family, and community) to target the physical activity of students in intervention schools.

Although these whole-school health approaches did not change existing physical education curricula within the multi-component approach, the interventions showed positive outcomes. Healthy Youth Places intervention observed significant increases in physical activity (approximately 7.5 minutes per day) during after school hours (i.e., 3:00 – 11:30 p.m.). The results of the Haerens et al. (2006) intervention revealed significant increases in physical activity of light intensity and physical activity of moderate intensity

measured with accelerometers 2-years post intervention (Haerens, Bourdeaudhuij, Maes, Cardon, & Deforche, 2007; Haerens et al., 2006). Simon et al. (2004) found that students not engaged in organized physical activity were reduced by 50% in ICAPS intervention schools, whereas engagement in organized physical activity did not change among students in control schools. Results of the NEAT Girls (Lubans et al., 2010) and It's Your Move (Mathews et al., 2010) interventions are not currently published.

In conclusion, five of the 10 whole-school interventions aimed at youth did not intervene into the school's existing physical education programs to achieve intervention goals. Nonetheless, positive outcomes were observed. However, Cale and Harris (2006) and Deschesnes et al. (2003) argued that whole-school health approaches should include all physical activity opportunities that students engage in within the school setting. Just as a singular classroom approach to health promotion can be contradicted by what happens outside the walls of the classroom, the physical education program, if not part of the whole-school intervention, can also contradict what the intervention is trying to accomplish.

Motivation and Self-Determination Theory

One of the major goals of the whole-school health approaches aimed at youth was to increase the physical activity behaviours among students. An area of study that has become of increasing interest among researchers due to its connection to student physical activity behaviours is the enhancement of motivation. According to Hagger and Chatzisarantis (2007) motivation refers to the process of initiating, directing, and sustaining behaviour. Wallhead and Buckworth (2004) suggested that school-based interventions embedded within motivational theoretical frameworks might be a valuable

approach to improve health among youth. In a similar manner, Cale and Harris (2006) attested that motivation might be the key to both the initiation and continuation of physical activity and healthy lifestyle behaviours. As such, targeting students' motivation towards health behaviours may serve as a promising strategy in the promotion of health among adolescents. The majority of whole-school health approaches aimed at youth have yet to focus on the motivational process of students and to date most whole-school health approaches have used social cognitive theory and/or socio-ecological models as the theoretical framework.

A theoretical framework used to study motivation among youth, given that its major propositions and constructs are pertinent to the adolescent developmental period, is Deci and Ryan's (1985) Self-Determination Theory. According to SDT, student behaviours can be broadly categorized as intrinsically motivated, extrinsically motivated or amotivated based on the different reasons or goals that accompany an action (Deci & Ryan, 2000). Each level of motivation is projected to have a variety of consequences for learning, performance, development, and personal experience. Self-determination theory proposes that an individual's level of motivation lies along a continuum of motivation from amotivated to intrinsically motivated. Ryan and Deci (2000) stated that the different motivations reflect differing degrees to which the values and regulations of the requested behaviour have been internalized and integrated. The authors further explain that internalization refers to the process of taking in a value or regulation, and integration is the process by which individuals transform the regulation into their own so that it will originate from their sense of self.

Hagger and Chatzisarantis (2007) and Ryan and Deci (2000) define intrinsic motivation as doing something because it is inherently interesting or enjoyable and for rewards innate in the activity (e.g., feelings of accomplishment, learning, interest). For example, an intrinsically motivated individual would participate in physical activity because of feelings of pleasure, enjoyment, and satisfaction that stem directly from the activities being taught and the environment in which one participates. Whereas, extrinsic motivation refers to doing something for a reason outside the activity itself, a separable outcome, such as external rewards, pleasurable psychological states (e.g., pride, relief) or even avoidance of unpleasant psychological states (e.g., external punishment, shame, quilt) (Hagger & Chatzisarantis, 2007; Ryan & Deci, 2000). Self-determination theory proposes that extrinsic motivation can vary greatly in the degree to which it is autonomous. The least autonomous form of extrinsic motivation is external regulation. Ryan and Deci (2000) suggested an individual who is experiencing external regulation is engaging in behaviour to satisfy an external demand or obtain an external reward (e.g., grades). Introjected regulation reflects engaging in behaviour due to feelings of pressure in order to avoid guilt or anxiety or to attain ego-enhancement or pride. In other words, an individual engages in behaviour to enhance self-esteem or self-worth (Ryan & Deci, 2000). A more self-determined or autonomous form of extrinsic motivation, according to Ryan and Deci (2000a), is identified regulation. An individual experiencing identified regulation, has identified personal significance to the behaviour or has accepted it as personally important. For example, an individual who participates in physical activity because he/she sees it as relevant to one's health, which he/she values as an important aspect of one's life, has identified with the value of the behaviour. The most autonomous

form of extrinsic motivation is integrated regulation, which occurs when identified regulations have been brought together with one's other values and needs. Deci and Ryan (2000a) stated that integrated forms of regulation share many qualities with intrinsic motivation – both being autonomous – however still considered extrinsic as behaviours are done to attain an outcome separate from the behaviour rather than for inherent pleasure and enjoyment.

Amotivation is defined as relatively aimless or purposeless behaviour or simply the absence of motivation. Ntoumanis et al. (2004) suggested an amotivated student perceives no contingencies between their actions and outcomes, in turn; they lack willingness to participate and contribute passively or not at all. According to SDT, motivation lies on a continuum and as one's motivational state moves toward intrinsic motivation, increases in cognition (e.g., efficacy), behaviour (e.g., physical activity level) and affect (e.g., enjoyment) will result (Deci & Ryan, 1985; Deci & Ryan, 2000). Further, Deci & Ryan (2000) proposed that behaviour, which is motivated by inherent factors, such as novel, pleasurable, ambitious, and gratifying experiences, will produce more sustainable behaviours than those behaviours produced by outside factors such as external rewards or pressure.

Research has shown that one's level of motivation and the constructs of SDT influence one's health-related behaviours. Yli-Piipari, Watt, Jaakkola, Liukkonen & Nurmi (2009) showed students with 'high motivational profiles' (i.e., high levels of intrinsic motivation) reported moderate levels of engagement in physical activity, whereas students will 'low motivational profiles' (i.e., low levels of intrinsic motivation) demonstrated low levels of engagement in physical activity. Therefore, by fostering the

needs posited by SDT positive outcomes such as increased behaviour sustainment, optimal levels of motivation, and greater levels of physical activity will result.

According to Deci and Ryan (2000) in order to attain intrinsic motivation, an individual's innate psychological needs must be fulfilled. Self-determination theory posits that three psychological needs – autonomy (i.e., a sense of choice), relatedness (i.e., a sense of social connection), and competence (i.e., a sense of efficacy), determine the state of an individual's motivation to engage in a specific behaviour. Specifically, Deci and Ryan (2000) stated if students' need for autonomy, relatedness, and competence were met they would experience elevated levels of intrinsic motivation. In contrast, when these basic psychological needs are thwarted, the associated benefits are diminished and low motivation or avoidance will result (see Figure 1).

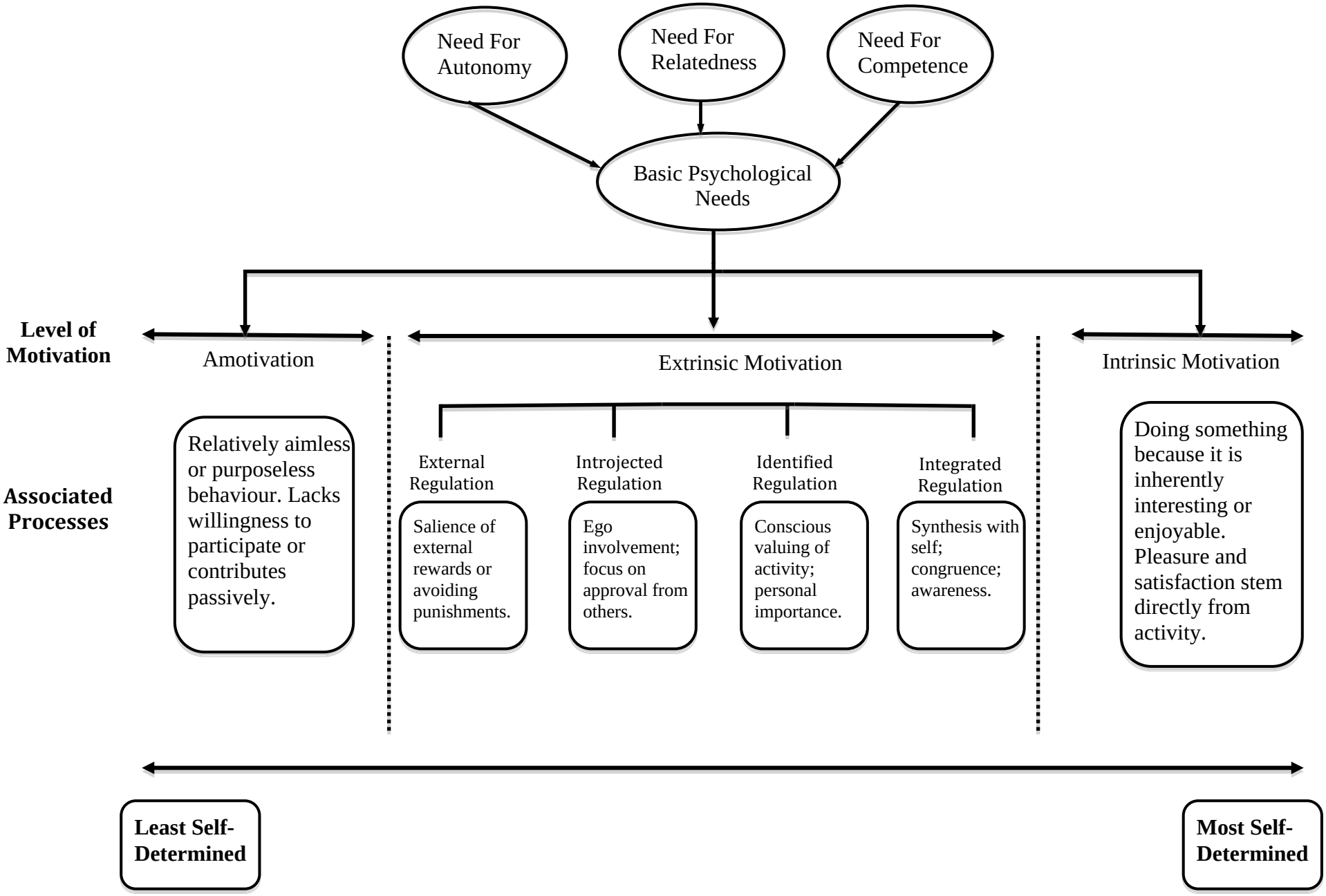


Figure 1. Self-Determination Theory.

Self-determination theory and physical education. In relation to physical education programs, it is essential that students are sufficiently and appropriately motivated to participate in physical education classes as intrinsic motivation is linked to greater effort (Ntoumanis, 2001; Taylor et al., 2010), higher levels of physical activity during class time (Cox et al., 2008; Lonsdale et al., 2009; Lonsdale et al., 2013), the intensity of one's involvement (Biddle & Mutrie, 2008) and one's intention to engage in physical activity during their leisure time (Ntoumanis, 2001; Standage et al., 2003). In regards to student experiences in physical education, Zhang (2009) found a positive association between student motivation and increased enjoyment and interest. Further, Moreno, Gonzalez-Cutre, & Ruiz (2009) reported students who possessed self-determined motivation had more positive attitudes towards physical education. Standage et al. (2003) found amotivation in physical education to be negatively associated to students' intention to partake in physical activity during leisure time. On this basis, according to Ntoumanis (2001), it is imperative to understand the motivational processes that can influence whether students are motivated in physical education and will regard physical education as a valuable, enjoyable, and rewarding experience, or are unmotivated in physical education and will regard physical education as worthless and boring. Therefore, intrinsic motivation is the desired motivational state for students in physical education classes.

In physical education settings, an extensive body of literature grounded in SDT supports the role of autonomy, relatedness, and competence on students' intrinsic motivation. Providing students with an autonomy-supportive environment in physical education (i.e., a physical education context which allows students choice) has been

shown to increase physical activity levels during class (Lonsdale et al., 2009; Lonsdale et al., 2013) and increase motivation to be active outside of class (Gibbons & Gaul, 2004; McBride, Xiang, & Bruene, 2007). Further, providing students with choice in physical education has shown to increase their motivation to attend, and enhance their class enjoyment (Gibbons & Gaul, 2004; McBride et al., 2007). Canadian Population Health Initiative (2005) stated that adolescence is a time when youth are moving from relying on others for decision-making to making independent choices. More important, choice increases the motivation of adolescents to engage in physical activity. For example, Wilson et al. (2005) implemented a four-week student-centered afterschool intervention aimed to increase physical activity in adolescence framed in SDT. Students were able to select a variety of the physical activities offered weekly, develop a program name and motto, and develop ideas for promoting physical activity to peers. Results of the intervention revealed participants had significantly greater levels of physical activity than the comparison group. The authors concluded that the intervention provided support for the importance of allowing youth to have input and choices in developing and selecting physical activities as part of the intervention program.

A recent study conducted by Cox, Duncheon, and McDavid (2009) found students who felt accepted by their classmates and supported by their teacher in physical education experienced a sense of relatedness, which was indirectly associated to motivational consequences such as enjoyment. Moreover, Cox and Williams (2008), Shen, McCaughtry, Martin, and Fahlman (2009) and Standage, Duda, and Ntoumanis (2005) reported that physical education teachers' relatedness support was directly associated to students state of motivation. Further, students who perceive themselves as more

competent or capable during physical education class participated in greater amounts of physical activity at a higher intensity outside of physical education than those who perceive themselves as less able (Dishman et al., 2004; Ntoumanis, 2001). In a similar manner, students with higher levels of perceived competence were more physically active during physical education class (Bryan & Solmon, 2007; Fairclough & Stratton, 2005). Fairclough and Stratton (2005) reviewed 40 studies examining students' physical activity during middle and high school physical education classes and the authors argued that the ability level of a student might have an effect on their moderate-to-vigorous physical activity during physical education. Fairclough and Stratton (2005) compared the moderate-to-vigorous physical activity of students of differing abilities and found the most highly skilled students engaged in moderate-to-vigorous physical activity approximately 5% more during class time than their less skilled classmates. These results suggest that higher skilled students are more active than their less skilled peers and imply that increasing students' perceived competence might increase their moderate-to-vigorous physical activity during physical education lessons. Concluding that students' need for autonomy, relatedness, and competence must be fostered within physical education settings in order to generate intrinsic motivation and help physical education programs better attain their primary objective (Fairclough & Stratton, 2005).

Cox et al. (2008) suggested that since motivation-related experiences have shown to be linked to both physical activity levels during leisure-time and during physical education class time, the effectiveness of school-based physical activity interventions may be connected to the level of support for students' self-determined motivation. Therefore, according to Cale and Harris (2006), motivation may be both the key to the

initiation and continuation of physical activity and healthy lifestyle behaviours.

Support Strategies for Intervention Implementation

Implementing a SDT framework within whole-school health approaches may not only be an effective strategy for the promotion of student health behaviours, but may be valuable in the implementation of the intervention components. The Centers for Disease Control and Prevention – Division of Adolescent and School Health (1997) and van Sluijs et al. (2008) stated that school-based interventions must be well implemented into the existing practices of schools to enhance the likelihood of success. The IUHPE (2004) suggested a whole-school approach requires full integration of health promotion into the functions of the school, through working with the curriculum that currently exists. St. Leger and Nutbeam (2000) have proposed that the purpose of health promotion in schools is to address health issues within an educational framework. The extent to which a program achieves its potential is largely reliant on the willingness of teachers to embrace the interventions underlying philosophies. On this basis, as described by St. Leger and Nutbeam (1999, 2000), the most successful interventions have been seen by educators as relevant, necessary, and closely matched to the current programs being offered. The Pan Canadian Joint Consortium of School Health (2010) suggested that in order implement health promotion strategies into existing school practices and to attain successful school-based health interventions key stakeholders should to be involved in the development and implementation process. As such, enhancing the motivation of teachers and students to be involved in the planning and implementation of the intervention strategies may increase the likelihood that the program is delivered and received as intended.

The strategies that whole-school health approaches have used to implement their

intervention programs and help ensure the intervention is delivered and received into schools as intended include: creating a school committee, establishing a school coordinator/champion, providing teachers with intervention workshops, providing teachers and schools with resources and support materials, providing financial support and incentives, and conducting healthy policy meetings (see Table 9 [middle schools] and Table 10 [high schools] for intervention implementation strategies of whole-school health approaches). For example, school committees have been formed in order to carry out the intervention components, such as the development of new school policies and school events. In M-SPAN (Sallis et al., 2003), a school committee was formed with members that included school administrators, school faculty and staff, parents, and students. The M-SPAN project staff requested that each year of the intervention, the committee selected two to four policies to be implemented in intervention schools. Sallis et al. (2003) reported that M-SPAN school committees were in charge of planning and implementing monthly activities and advertising school events (e.g., healthy food taste tests; creating posters promoting healthful lunch options), and implementing school policies (e.g., serve 1% or skim milk only, provide supervision and transportation for students physical activity after school). In LEAP (Ward et al., 2006), a 'LEAP Champion' was identified in each intervention school to act as the primary contact for the school. Champions worked with LEAP project staff to develop an intervention that met the LEAP objectives. In a similar manner, Webber et al. (2008) described that the TAAG project staff recruited and trained school champions to promote and maintain the intervention in their schools.

In addition to school committees and school champions, the majority of the previously described whole-school health approaches provided teachers with workshops

to implement the intervention. St. Leger (2004) stated that it is critical that teachers receive professional development for the implementation of health promotion in school environments, as implementing intervention components or actions into their classrooms and schools is a challenge unless workshop opportunities are provided. Ward et al. (2006) reported that LEAP personnel provided formal workshops to communicate the objectives of LEAP intervention. Specifically, LEAP staff provided the 12 intervention schools with 15 centralized workshops over two years (mean number of schools represented at each workshop = 9.6, ranging from 6 - 12 schools). Workshops included topics such as working effectively as a team for environmental change, changing physical education classes to integrate LEAP physical education instructional strategies, and the teaching of behavioural concepts to be used to help students become more physically active (Saunders et al., 2006; Ward et al., 2006). In a similar manner, Young et al. (2006) reported TAAG provided teachers with full day workshops for both physical education and health curricula and regular on-site support.

Intervention schools also received support materials such as documents that explain the components of the interventions and educational resources containing classroom lessons. For example, DOiT provided teachers with six lessons aimed at raising the awareness and information processing with regard to energy balance-related behaviours and five lessons aimed at improving the following risk behaviours: screen-time, consumption of sugar-sweetened beverages, reduction in sedentary behaviours, maintenance of level of sports participation, and consumption of high-sugar/high-fat content snacks (Singh et al., 2007). Teachers in the DOiT intervention schools also received a manual describing the structure and the goal of each lesson (Singh et al.,

2009). Healthy Youth Places, M-SPAN, TAAG, Haerens et al. (2006), NEAT Girls, and LEAP interventions schools received instructional materials to conduct lessons that encouraged physical activity behaviours.

Lastly, several whole-school health approaches provided schools with financial support and incentives to carry out the intervention. For example, M-SPAN schools received an incentive to participate including $1000 for physical education equipment, $500 for kitchen equipment, and $2000 for physical activity programs or equipment. Sallis et al. (2003) reported that prior to intervention schools receiving the funds, schools submitted their plans regarding how the money would be used to provide a more healthful environment for their students. The Trial of Activity for Adolescent Girls (TAAG), NEAT Girls, and DOiT intervention schools also received funding to encourage and assist schools in implementation intervention strategies.

Table 9

Intervention Implementation Strategies of Whole-School Health Approaches in Middle Schools

	Intervention Implementation Strategies						
Intervention	School Committee	School Site Coordinator/ Champion	Teachers Workshops conducted by Intervention Staff	Teachers Workshops conducted by Expert School Staff	Support Materials	School Incentives	Health Policy Meetings
Healthy Youth Places	✓ * included students	✓	✓	✓	✓	✗	✗
M-SPAN	✓ * included students	✗	✓	✗	✓	✓	✓
TAAG	✗	✓	✓	✗	✗	✓	✗
IMPACT	–	–	–	–	–	–	–
Haerens et al. (2006)	✗	✗	✓	✗	✓	✗	✗
ICAPS	✓	✗	✓	✗	✗	✗	✗
NEAT Girls	✗	✗	✓	✗	✓	✓	✗

Note. – = no published data on implementation strategies.

Table 10.
Intervention Implementation Strategies of Whole-School Health Approaches in High Schools

Intervention	Intervention Implementation Strategies				
	School Committee	School Site Coordinator/ Champion	Teachers Workshops conducted by Intervention Staff	School Incentives	Support Materials
LEAP	✓ * included students	✓	✓	×	✓
DOiT	×	×	×	✓	✓
It's Your Move	✓ * included students	✓	✓	×	×

Involving school stakeholders in the development and implementation process. According to St. Leger (2000) the school stakeholders (i.e., teachers and students) have not, in most cases, been involved in the development or implementation of school health interventions. Naylor et al. (2008) stated researchers must recognize that in order for their initiatives to be adopted and sustained it is essential to engage school stakeholders in decision-making and to be flexible and adaptable to school practices. Dzewaltowski et al. (2009) pointed out that traditionally, whole-school interventions have attempted to promote health behaviour change through a top-down approach where the expertise and control of the implementation lies in the investigative team and dissemination flows in a top-down fashion. As such, whole-school health approaches tend to take a prescriptive 'one size-fits all' approach, which does not meet the activity needs, interests and preferences of individual schools (Cale & Harris, 2006; Naylor & McKay, 2009). That is, as stated by Gibbons and Naylor (2007), prescriptive programs that serve one school may not be appropriate for another. MacDonald and Green (2001) suggested

that implementation of school programs are less influenced by program design and more influenced by the interaction between its organizational context and the individuals within the context. Research has shown interventions that involve people who are connected to the program and assist in the designing and delivery strategies are more likely to result in improved health behaviours (e.g., Dzewaltowski et al., 2009; Pate et al., 2005). To address this issue, researchers have suggested teachers' expertise should be utilized throughout the intervention process (Dzewaltowski et al., 2009; Dzewaltowski et al., 2002).

Involving teachers in the development and implementation process. Ha and colleagues (2008) and Gibbons, Humbert, and Temple (2010) contend that teachers are essential in the educational change process and play a major role in implementing policy into practice. Fullan and Hargreaves (1996) stressed the importance of teachers' roles in intervention execution must be understood and researchers must acknowledge that teachers are professionals who are trained and educated in their field. Therefore, to address this issue, Naylor and McKay (2009) suggested researchers should incorporate teachers in the intervention process. The authors recommended moving away from solely focusing on the child and suggested creating a school culture that is supportive of teachers and other key stakeholders being involved in the change process.

A few of the whole-school interventions have used a formative or facilitative research process to engage teachers in the intervention process. For example, Moe et al. (2006) described the formative research process that TAAG completed to generate information in order to design an intervention that was both feasible and effective for all intervention schools. The researchers conducted interviews with physical education

teachers, principals and other school staff to gather information for the development of the specific components of the TAAG intervention. Physical education teachers were asked questions regarding health education and physical education requirements, curriculum resources and materials, barriers to teaching quality physical education, and activity units offered. Results from this process allowed researchers to become familiar with issues they would likely encounter in implementing the program and assisted in further refining the intervention program to accommodate the needs of the specific participating schools. In addition, this process allowed researchers to address potential challenges and tailor workshops to meet the needs of individual teachers and schools. Moe et al. (2006) stated that the formative data was used to develop an intervention that was flexible to be implemented in all of the intervention sites and adapted to varying school needs.

This formative research process has also been shown to be success in developing teachers' support for physical education curricula. For example, Gibbons et al. (2010) discussed the phases of a formative research process used to develop a resource manual to support teachers in the development of more meaningful physical education programs for their female students. The process involved the implementation of a school-based initiative developed through an active collaboration between researchers and teachers. The authors describe that they, the researchers, brought the theoretical expertise into the study, while the teachers encompass the practical knowledge needed to integrate theory into practice within their schools. Gibbons et al. (2010) reported that this formative process reduces the possibility for disconnection between theory and practice and allows for adaptation across different circumstances. As such, to achieve effective

implementation of whole-school health approaches, teachers need to be involved in the development and implementation of whole-school health interventions.

Involving youth in the development and implementation process. Gibbons and Naylor (2007) discussed considerations for adapting whole-school health approaches for youth and proposed "the involvement of youth in the planning and implementation of activities is a cornerstone principle" (p. 12). The authors further argued that programs designed "for youth with youth" were more likely to succeed, as it has been demonstrated that students who believe their preferences are considered in the program design, development, and execution demonstrate significantly higher attendance in the physical activity program (Gibbons & Naylor, 2007). Wilson et al. (2008) stated that little attention has been given to how best to involve youth in the development and execution of interventions and whether this may enhance intrinsic motivation and long-term physical and health behaviours. Gibbons and Naylor (2007) noted that most youth are developmentally ready to conduct accurate self-evaluations and can effectively select goals and implement behaviour changes independently. Moreover, adolescence marks the beginning of the transition to adulthood and is characterized by the shift from relying on others for decision-making to making independent choices (Canadian Population Health Initiative, 2005; Gibbons & Naylor, 2007). Bandura (1997) stated that youth seek environments where they have control over their actions and opportunities for autonomy and independent thinking are maximized. Green (2004) argued that if programs are to appeal to youth, they must allow choice regarding what they do and when they do it. Thus, Gibbons and Naylor (2007) and Naylor and McKay (2009) suggested interventions that target the adolescent population might be more successful if adolescents are placed in

a leadership role – empowering them to make positive decisions that affect their health.

With this said, as pointed out by Wilson et al. (2008), little attention has been given to strategies for involving students in the intervention design. Of the whole-school health approaches targeting youth only a few incorporated students' input, allowing adolescents in the intervention schools to take ownership in program development and implementation. Healthy Youth Places, M-SPAN, LEAP, and It's Your Move had students as members of the school committee, which was in charge of the implementation of the intervention. Details on the role of the students on the school committee, such as how much input students gave and/or how much control over the interventions student had, was not described in detail within the literature for M-SPAN, LEAP, and It's Your Move. However, a major intervention strategy of Healthy Youth Places was to place youth in leadership roles and was well described by the authors. The Healthy Youth Places project (Dzewaltowski et al., 2009) was designed around the premise that middle school years are a developmental period in which adolescents are seeking autonomy. To this end, the intervention placed youth in leadership roles to assist in the development of school environmental change for physical activity and healthy eating. Researchers used an alternative to the top-down approach and implemented a "decentralized diffusion system." Dzewaltowski et al. (2009) attested this system assured that individuals connected to the intervention were involved in the process. Specifically, school site coordinators (i.e., school teachers) formed a 'healthy places change team,' which was composed of 'place leaders' at their school (i.e., youth and adults) and key stakeholders. The place leaders were people with a high degree of responsibility and involvement in the places where the students spend their time at school (e.g., classroom, lunch room, after

school program). The teams made changes to the physical and social environments of the school through group goal-setting and planning, group monitoring, and group feedback. Students were taught skills for environmental planning and followed a step-by-step process to implement their change efforts. Dzewaltowski et al. (2009) and Dzewaltowski et al. (2002) proposed that this allowed for the activities developed in each school to widely vary and to be matched to specific individual needs. Further, this intervention approach empowered youth and established a connection between the participants and the intervention. Notably, Dzewaltowski et al. (2009) reported that Healthy Youth Places observed a significant increase in out-of-school physical activity (7.5 minutes/day), thus, the whole-school intervention provided support for placing youth in leadership roles to facilitate a healthy school environment.

Mathews, Moodle, Simmons, and Swinburn (2010) stated that collaborating with youth in the development and implementation of health promotion interventions is a promising way to incorporate physical activity and healthy eating into the ethos of a school. The authors further stated that student involvement in the decision making processes helps to ensure that promotional strategies are closely matched to the needs of the students and reduces students' resistance to change. Thus, whole-school health approaches aimed at adolescent students may empower youth through the allowance of input and choices within the development and implementation of the intervention.

Conclusion

Health promotion in the school setting has been shown to be an effective vehicle to reverse the negative health trends experienced during the adolescent period. Given the layered and connected influences within schools, multi-component whole-school health

approaches have been a successful method for health promotion strategies. The whole-school health approach has been conducted largely within elementary and middle schools with few school programs adopting the whole-school health approach at the high school level. Most of the whole-school health approaches have been framed in social cognitive or socio-ecological theories and have been implemented through a top-down approach. As such, there is a need for a whole-school health approach that: (a) targets high school students; (b) focuses on enhancing the intrinsic motivation of the teachers and students involved both at the whole-school level and within physical education classes; (c) allows teachers and youth to be involved with the development and implementation of the intervention; and (d) accounts for the unique individual school needs – is flexible enough to provide schools, teachers, and students with choices regarding the specific intervention components.

Chapter 3. Overarching Methodology

Study Overview

The purpose of the current study was to: (a) gain an understanding of the experiences of teachers (Planning 10 and Physical Education 10) and the Action Team (i.e., school committee) as they plan and implement school-based healthy living strategies; (b) evaluate the impact on and relationship between SDT constructs and students' motivation to engage in health-related behaviours; and (c) evaluate the motivation of students in physical education classes grounded in SDT and its influence on students' enrolment in grade 11 elective physical education.

The current study, which is composed of three interrelated projects, was part of a larger study being conducted at the University of Victoria, entitled "Health Promoting Secondary Schools" (HPSS). Health Promoting Secondary Schools (Wharf-Higgins, Voss, Naylor, Gibbons, Rhodes, et al., 2013) was a choice-based, whole-school health approach shaped 'For Youth with Youth' that allowed schools and students to create individualized action plans that facilitated change at the school and individual levels. The approach was framed within Deci and Ryan's (1985) SDT, was flexible, and could be tailored to meet the individual needs of schools. Motivation concepts drawn from SDT provided the theoretical basis for the intervention, and as such, the study adhered to SDT's three-part model to describe how motivation develops and its influence on behaviour. As described earlier, SDT posits that students who perceive they are autonomous (have a sense of choice), related (sense of social attachment), and competent (a sense of efficacy) will be more intrinsically motivated to engage in certain behaviour. The HPSS intervention, and the three projects within this study, focused on the

implementation of all three SDT concepts within each of the targeted HPSS 'Action Zones' to provide a supportive and meaningful school environment and enhance the intrinsic motivation of individual students. The four Action Zones of HPSS were: (a) School Environment/Culture; (b) Community partnerships; (c) Student Support; and (d) Teaching and Learning (see Figure 2). Through these four zones, the HPSS intervention intended to integrate healthy living into several British Columbia secondary schools and sought to intrinsically motivate students to participate in regular physical activity and make healthy food choices. (For further description on the HPSS project see Appendix A).

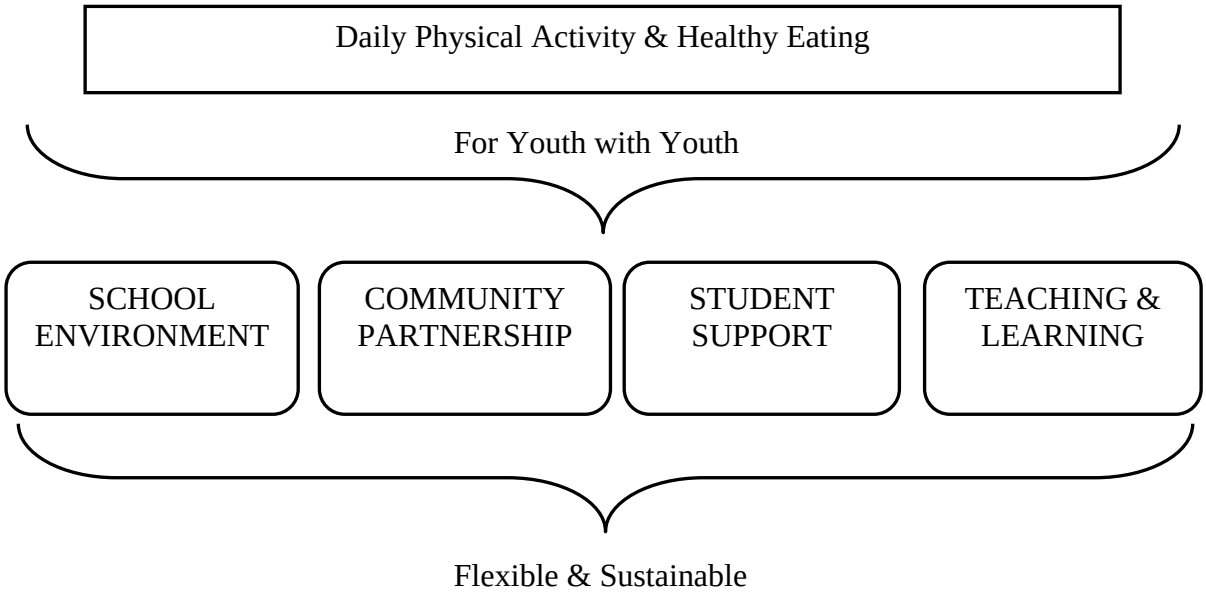


Figure 2. Health Promoting Secondary Schools Framework

The four action zones. The projects within this study integrated the efforts and actions of students, teachers, school administrators and community partners across 4 zones:

School environment/culture zone. This Action Zone included the physical environment as well as the school culture and values embodied by its teachers, staff, and students. The goal for the School Environment/Culture Action Zone was to make healthy choices the easy choice by creating safe and inclusive school environments, supporting healthy living policy development, and celebrating and encouraging a whole-school approach to healthy living. This zone was comprised of two parts: (a) policy development and implementation and (b) school-wide events/campaigns. An example of a school health policy may be to integrate healthy eating into the culture of the school by incorporating the Guidelines for Food and Beverage Sales in British Columbia Schools. Actions for this policy may include removing vending machines and/or advertising healthy foods and beverages. An example of a whole-school event may be to promote active transportation to school by implementing an 'Active Transportation Week'. Actions for this school-wide event may include an advertisement campaign of the benefits of active transportation and/or setting a school goal and tracking the number of students who participated in active transportation that week.

Specifically, school personnel at each HPSS intervention school was asked to develop and implement a minimum of two school health policies and two school-wide events/campaigns (at least one per semester) – one of which included a community partnership. The two health policies and two school-wide events/campaigns were developed with the assistance of the HPSS School Health Facilitator (myself) and the schools' Action Team. An Action Team was a school committee (6 – 10 individuals) composed of youth (at least 50%) and teachers. Action Teams met regularly and with

the help of the HPSS School Health Facilitator developed and implemented health policies and school-wide activities, of their choosing, which promote or encourage healthy living within their school. These activities were based on the results of the Healthy Schools Planner Assessment Tool (HSPAT). This assessment tool was an online tool designed to assess a school's health environment in the areas of physical activity and healthy eating. Teachers on the Action Team completed this assessment. Upon completion they received an individualized electronic feedback report regarding the present status of the physical activity and healthy eating opportunities in their school. The Action Team then used this feedback as well as their own input to create and implement the health policies and school-wide events. Action Teams received a template to set and track individual school goals and identify the actions to undertake in order to create the policies and events. Action Teams also received a HPSS Planning Guide. This guide included a detailed overview of the HPSS intervention as well as numerous health policy examples and whole-school events/campaign ideas. Table 11 includes a summary of the SDT constructs targeted in the School Environment/Culture Action Zone.

Table 11
Self-Determination Theory Constructs Targeted in the School Environment/Culture Action Zone

SDT Construct	School Environment/Culture Action Zone
Autonomy	▪ School Action Teams chose, planned and implemented at least two school policies to promote physical activity and/or healthy eating. ▪ School Action Teams chose, planned and implemented at least two school-wide events to promote physical activity and/or healthy eating. ▪ Students in intervention schools were able to choose to participate in the school-wide events.
Relatedness	▪ Students on Action Team Committee developed a sense of belonging as they worked together to plan and implement the policies and events. ▪ Students in intervention schools participated in the school-wide events

	creating connection and belonging towards their school and their peers.
Competence	▪ Students on the Action Team developed the skills and knowledge needed to plan and implement physical activity and healthy eating policies and events in their school. ▪ Students in intervention schools gained knowledge regarding healthy lifestyle behaviours from the development of school health policies and from the participation in the school-wide events.

Community partnership zone. The Community Partnership Action Zone provided intervention schools with various tools, resources and ideas on how to connect with their community to increase opportunities for physical activity, healthy eating, and positive partnerships. The purpose of this zone was to connect schools with community organizations and build partnerships to increase a school's capacity to offer innovative opportunities for physical activity and healthy eating. Positive community partnerships can serve many purposes for schools, including: the expansion of the resources available to students; opportunities for students to explore their community; the development of positive relationships with community organizations; and increase the opportunities for students to gain experience and healthy life skills.

Intervention schools were asked to develop and implement at least one school-wide event that involved community partnership. Prior to determining what actions schools implemented in the Community Partnership Zone, a baseline assessment of what already exists was necessary. Schools were given a Community Inventory developed by the HPSS team that allowed school Action Teams the opportunity to find out what people, organizations, and resources were available for their students outside of the school. Health Promoting Secondary Schools developed two approaches to conducting a community inventory. The first was a short questionnaire that could be used if Action Teams in the participating schools already knew what actions they wanted to take. If

schools choose to select this option, a template was provided for Action Teams to identify community resources (e.g., key stakeholders, partnerships) that may support the Community Partnership Action Zone. The second option was to conduct a focus group with the members of the Action Team. Led by a member of the HPSS team, this focus group guided the Action Team through a series of questions and activities that provided them with a comprehensive list of community services and facilities currently available outside of their school. This was recommended for Action Teams that were not as familiar with community resources and needed to brainstorm what action they would like to take. Further, the focus group would enable the Action Team to determine what community links and resources they would like to investigate further and implement at their school. All five Action Teams in the intervention schools chose to complete the short questionnaire as they felt they already knew what actions they would like to take. Table 12 includes a summary of the SDT constructs targeted in the Community Partnership Action Zone.

Table 12
Self-Determination Theory Constructs Targeted in the Community Partnership Action Zone

SDT Construct	Community Partnership Action Zone
Autonomy	▪ School Action Teams chose which Community Inventory they would like to complete. ▪ School Action Teams chose, planned and implemented at least one school-wide event/campaign that involves the community. ▪ Students in intervention schools were able to choose to participate in the school/community event(s).
Relatedness	▪ Students on Action Team Committee developed a sense of belonging as they worked together to plan and implement the community event(s). ▪ Students in intervention schools participated in the school/community event(s) creating connection and belonging towards their school, community, and their peers.
Competence	▪ Students on the Action Team developed the skills and knowledge needed to plan and implement a community event(s).

	▪ Students gained knowledge regarding healthy lifestyles from the participation in the school/community event(s). ▪ Students in intervention schools gained knowledge regarding the physical activity and healthy eating opportunities available to them within their community.

Student support zone. Health Promoting Secondary Schools project provided students in intervention schools with several tools and resources to support them in making behavioural changes relating to physical activity and healthy eating. The tools and supports included a health bin and web-based personalized behaviour change support tools (HPSS website). Each intervention school received $2500 to purchase equipment, supplies and resources for their 'health bin' and $500 to help implement the school-wide events (see Appendix B for a description of the purchases made by each intervention school). Based on the goals and planned activities (health policies and whole-school events) Action Teams, with the consultation of other students and teachers/administrators and with the help of the HPSS School Health Facilitator (myself), selected and purchased equipment they felt their school needed to implement their school's health policies and whole-school events. Each HPSS intervention school had access to the HPSS web-based personalized behaviour change support tools that allowed students and teachers to log in, set up a personalized profile, set goals and track progress (www.healthyactiveschools.ca). Features of the website include:

- Self-Assessment Quizzes: Brief questionnaires were issued 2-3 times over the course of the school year. Each questionnaire was offered for one week and users were asked to respond daily to report progress regarding physical activity and healthy eating behaviours by answering specific questions (e.g. "How many sugar-sweetened beverages did you drink today?" "How many servings of fruits and vegetables did you

eat today?" "How many minutes of physical activity did you perform today?" "How many minutes did you spend in front of a computer or television screen today?").

- Action Team Challenges: Action Team members were able to set up school-wide challenges, which were scheduled weekly or monthly. For example, a challenge might be to, “replace one snack a day with raw veggies or fruit.” For each challenge, students can chose to accept the challenge or not. Once they accept, they tracked their progress with yes/no responses, via the website or by short message service (i.e., text message). Students were also able to track their personal progress vs. school-wide data (i.e., how many other students successfully completed this challenge at their school).
- Personal Goals: In addition to joining school-wide challenges, students could also create personal goals (e.g., “I will skip my daily Coffee Crisp and opt for a banana instead, every day for 2 weeks”) and/or respond to lifestyle assessments and be able to chart their progress (e.g., a graph of their fruit and vegetable intake or their physical activity levels).
- Broadcast Short Message Service Messages: The HPSS project team and each school had the ability to send short message service messages to all students enrolled in the study (e.g., healthy tips, whole-school event reminders, etc.). Students would also be able to record goal progress via short message service (e.g., by texting "YES" or "NO" to a set number to track their progress on a given school-wide challenge or personal goal).
- Email functionality: The HPSS project team and each school had the ability to send email messages to all students enrolled in the study. Students' email addresses were

collected at the onset of the study and were used as part of their website user profile.

- Blog: When users log in, their home screen was a blog feed showing the latest posts from the Action Team. Comments were enabled for all users and Action Team members, teachers and HPSS team members to have comment moderation privileges.
- Tips and Links Block: There was a sidebar block shown throughout each school's project site displaying tips and links. The HPSS team seeded this with 30 tips/links that were randomly rotated as users move through the site. Action Team members were able to add to and edit the content of this block.
- Polls: Action Teams had the option of posting short polls on the site as a user engagement tool. All users had the ability to vote once per poll.
- Pages: There were several content pages on each school site:
    - Goal-Setting: This page was to help students (and teachers) learn how to set appropriate goals. It contained information on writing goals and encouraged users to celebrate their achievements, etc.
    - Teacher Materials & Supports: These materials were posted by the HPSS team and were accessible only to teachers, across all five schools.

Table 13 includes a summary of the SDT constructs targeted in the Student Support Action Zone.

Table 13
Self-Determination Theory Constructs Targeted in the Student Support Action Zone

SDT Construct	Student Support Action Zone
Autonomy	▪ Schools chose the contents of their Health Bin using the $2500 provided by HPSS. ▪ Students and teachers had access to web-based personalized behaviour change support tools where they could set up a personal profile, take self-assessment quizzes (choose from quizzes on physical activity, healthy eating, screen time, and sugar-sweetened beverages), and set

	and monitor their goals.
Relatedness	▪ Students developed a sense of belonging towards their school through school-wide challenges and school polls set up on the HPSS website.
Competence	▪ Students became aware of their personal health behaviours through the completion on the self-assessment quizzes, goal setting and monitoring. ▪ Students gained knowledge through the tips, blogs, polls, and pages of the HPSS website.

Teaching and learning zone. In this Action Zone intervention schools were asked to implement a Planning 10 module and an innovative Physical Education 10 curricula. The Planning 10 course contains the mandatory health education curriculum taught in British Columbia high schools in which students are offered learning opportunities to think critically about health in four areas: healthy living, health information, healthy relationships, and health decisions. The goal of HPSS Planning 10 is to provide students with an opportunity to experience a behaviour change process that leads to a healthy lifestyle. Six lessons were created by an HPSS researcher and reviewed by a committee of Planning 10 teachers to help teachers engage their students in personalized activities that allowed them to examine their daily habits and make behavioural changes related to physical activity and healthy eating. Within the six lessons, students set personal physical activity and/or healthy eating goals, as well as tracked and monitored these goals. More specifically, students were asked to examine healthy behaviours related to: (a) physical activity; (b) fruit and vegetable consumption; (c) sugar sweetened beverage consumption; and (d) screen time. Health Promoting Secondary Schools provided teachers with Planning 10 lessons to be implemented as part of the HPSS intervention and teachers were asked to track and record their implementation of the six lessons. For more information on each lesson and the Planning 10 Tracking Tool see Appendix C.

The HPSS Physical Education 10 curriculum supported the implementation of a physical education program based on increasing students' intrinsic motivation through autonomy, relatedness, and competence. Course design was based on the premise, if a physical education course emphasizes development of students' autonomy (sense of choice), relatedness (sense of social attachment), and competence (sense of efficacy), then students will be more intrinsically motivated to engage in meaningful participation in physical education. The HPSS Physical Education 10 course incorporated autonomy (e.g., choice of group members, choice of activities taught within the course), relatedness (e.g., class team building activities), and competence (e.g., knowledge of their current physical activity level both in and out of class) within physical education lessons. Teachers were asked to implement at least one action from each SDT construct (autonomy, relatedness, competence) in every physical education lesson, promote enrolment in elective physical education programs, and keep track of their actions in the HPSS Physical Education tracking tool. It was anticipated and also strongly encouraged that teachers use their own existing activities and resources, which coincided with a given HPSS action and the SDT constructs. Appendix D includes examples of the HPSS Physical Education 10 actions and tracking tool.

Health Promoting Secondary Schools Physical Education 10 teachers received a resource manual that included instructional strategies, ready to use lessons and examples of effective activities to increase students' intrinsic motivation toward physical education and physical activity, and enhance students' perceptions of autonomy, relatedness, and competence. The resource manual was adapted from the work of Gibbons et al. (2010). Gibbons et al. developed resource manual to support

teachers in their efforts to enhance female students' motivation towards physical education. Concepts drawn from Deci and Ryan's (1985) SDT of motivation provided the theoretical framework for this resource manual. Table 14 includes a summary of the SDT constructs targeted in the Teaching and Learning Action Zone.

Table 14
Self-Determination Theory Constructs Targeted in Teaching & Learning Action Zone

SDT Construct	Teaching & Learning Action Zone
Autonomy	▪ Planning 10 teachers were given six adaptable health lessons. Planning 10 teachers were able to choose when and how these lessons are implemented into their courses. ▪ Physical education teachers were given a resource with numerous adaptable examples of activities and instructional strategies. Physical Education 10 teachers were able to choose when and how these activities and/or instructional strategies are implemented into their courses. ▪ In Planning 10 students were able to choose which healthy lifestyle behaviour (physical activity, healthy eating, sugar-sweetened beverages, screen time) they want to improve. Once students choose a behaviour, they set and monitored personal goals regarding the chosen health behaviour. ▪ Within the HPSS Physical Education 10 students were provided with choices within their physical education classes.
Relatedness	▪ Within the HPSS Planning 10 and Physical Education 10 students participated in activities that created connection and belonging towards their peers and teacher.
Competence	▪ Students in Planning 10 classes developed goal setting and behavioural monitoring skills. ▪ Students in Planning 10 classes became aware of their personal health behaviours through goal setting and monitoring. ▪ Students in Physical Education 10 gained the skills and knowledge needed to live an active healthy lifestyle.

Research design. A randomized comparison trial was used to evaluate the effects of the overall HPSS intervention. Eccles, Grimshaw, Campbell, and Ramsay (2002) stated that randomized designs assess the impact of an intervention through comparison with a randomly allocated group that serves as the usual practice condition. According to

Puffer, Torgerson, and Watson (2005) this type of design is used when randomization of individuals is not possible and therefore groups or clusters of individuals (i.e., schools) are the unit of randomization instead. When this occurs, randomization takes place at one level (i.e., school level) and data collection occurs at a different level (i.e., individual level) (Donner, & Klar, 2000). Within this study schools were the unit of randomization.

School Recruitment Procedures

Due to budgetary parameters and feasibility limitations HPSS recruitment procedures reflected a tiered and geographically bounded approach. School districts on the lower mainland of Vancouver and southern Vancouver Island within affordable traveling distance were first identified. In British Columbia, school districts initially examine all requests for research before individual schools, principals or teachers could be approached. Packages containing the following information were mailed out to 18 school districts: an overview of the purpose of the project, HPSS model and core implementation requirements; and, the battery of questionnaires and outline of objective measures to be used. Nine of the school districts consented to be involved; seven declined and no response was received from two districts even after three follow-up telephone/email reminders. After securing school district approval, schools within those districts currently offering alternative grade 11 physical education classes (e.g., strength training, girls-only, lifestyle and wellness) were identified; 48 met this criterion. Principals of these schools were then contacted and sent the HPSS recruitment package for their consideration. A 50% response rate from school districts invited on lower mainland or island (9/18 districts) was achieved; this was out of a total of 60 school districts in the province or 15% representation.

Following school district approval, a 21% response rate from school principals/teachers (10/48 schools) was achieved; this is out of a total of 578 high schools in the province. Finally, a 23% (455/1980) response rate from students/parents in the ten participating schools consenting to be part of the study was achieved. Please note that all grade 10 students in the five intervention schools were exposed to HPSS model and activities/events/policies, even though less than a quarter consented to be measured. In conclusion, ten schools were pair matched based on demographics and geographic characteristics and then randomly assigned to condition, intervention or usual practice, with five intervention schools and five usual practice schools participating in this study. Refer to Figure 3 for a visual representation of recruitment procedures and Table 15 for school demographic and geographic characteristics.

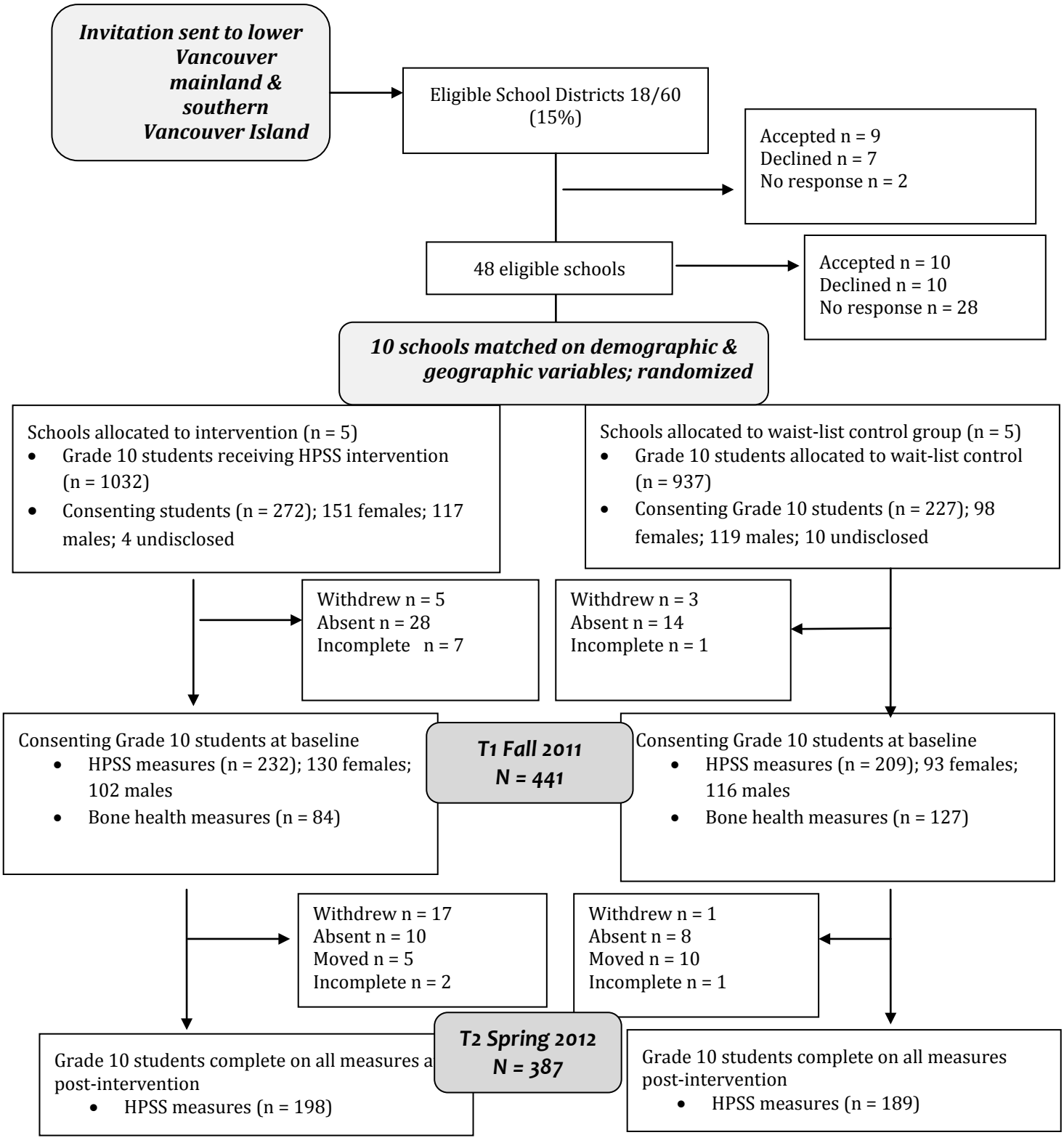


Figure 3. Recruitment Diagram

Table 15
Participant School Demographics and Characteristics

School (Location)	Grade 10 population	Total Visible Minorities	Aboriginal Grade 10 population	School District Avg. Family Income	Semester/ Linear system	School Setting
Intervention School 1	248	44%	8.5%	$82,572	Semester	Suburban
Control School 1	308	32.9%	1.0%	$87,091	Semester	Suburban
Intervention School 2	305	44%	2.6%	$82,572	Semester	Suburban
Control School 2	262	44%	1.5%	$82,572	Semester	Suburban
Intervention School 3	55	4.0%	32.7%	$57,490	Semester	Rural
Control School 3	151	1.6%	13.2%	$64,039	Linear	Rural
Intervention School 4	262	7.5%	11.1%	$96,013	Semester	Semi-residential/ Rural
Control School 4	173	7.5%	1.7%	$96,013	Semester	Semi-residential/ Rural
Intervention School 5	162	5.0%	20.4%	$80,556	Semester	Rural/Residential
Control School 5	43	4.5%	18.6%	$72,060	Semester	Rural

*intervention school with pair matched usual practice school below.

British Columbia secondary school background information. In British Columbia, students must complete Planning 10 and Physical Education 10 to fulfill provincial graduation requirements. Planning 10 is designed to help students develop the fundamental skills and knowledge needed to make decisions in the present and their future. Specifically, Planning 10 covers four curricula areas: graduation planning, education and career, health, and finances. In the area of health, Planning 10 focuses on healthy living, health information, healthy relationships, and health decisions (British Columbia Ministry of Education, 2007). Health Promoting Secondary Schools Planning 10 lessons focused on the areas of healthy living, health information, and health decisions. Planning 10 is a co-educational course offered to students in either the first semester or second semester of the school year within the HPSS intervention and usual practice schools. The British Columbia Ministry of Education (2007) recommends 115-120 hours for the Planning 10 course, of which 36 hours are to be devoted to the health component.

In British Columbia schools, Physical Education is a required course from kindergarten through grade 10. The British Columbia Ministry of Education (2008) stated the aim of Physical Education 10 is to "enable students to develop the knowledge, movement skills, and positive attitudes and behaviours that contribute to a healthy active lifestyle" (p.11). Physical Education 10 is the final mandatory physical education course for students. The course, is offered in a semester or linear timetable, and is gender-segregated or co-educational depending on the choice of each individual school. The British Columbia Ministry of Education (2008) recommends 115-120 hours of instructional content to be devoted to Physical Education 10. Physical Education is an

optional subject in the 11th and 12th grade. Generally, students select their courses for grade 11 in the second semester of grade 10.

Participant recruitment. After receiving ethical approval from the University of Victoria and obtaining permission to conduct research from the participating school districts, principals, and teachers, participant recruitment began. Participant consent/assent were attained by the completion of a form that described the purpose of the study, addresses the anonymity of the participants and any known risks and benefits associated with participating. Participants were informed that their identity would remain confidential as all individual records and results would be analyzed and referred to by number code only. In focus group interviews complete anonymity could not be guaranteed; however, participants were asked to not repeat what others say outside of the focus group and were informed that other group members might know their identity and would hear what they say. Every effort was made to ensure that participants understood that participation was entirely voluntary and that there was no consequence for declination of participation.

Student recruitment. Students in grade 10 were recruited through their Planning 10 and/or Physical Education 10 classes at the beginning of the school year (i.e., September). The teacher presented and described the study to the students during class time. Students were asked to provide assent and parental consent and return the signed form to their teacher (Planning 10 or Physical Education 10). Grade 10 students were recruited for three main reasons: (a) Planning 10 contains the only mandatory health education curriculum taught in British Columbia secondary schools in which students are offered learning opportunities to think critically about health in four areas; (b) grade 10 is

the final year of compulsory physical education; and (c) to evaluate the effectiveness of innovative physical education curriculum on grade 10 students' enrolment rate in grade 11 elective physical education.

Current Study

The overall purpose of the larger HPSS study was to implement and evaluate a health promoting, whole-school health approach, grounded in SDT (Wharf-Higgins et al., 2013). This study consisted of three inter-related projects within the HPSS intervention (see Table 16 for a summary of the three projects including research design, research questions, data collection strategies, and analysis; see Figure 4 for study timeline). The purpose of Project 1 was to gain an understanding of the experiences of Planning 10 teachers, Physical Education 10 teachers, and the Action Team as they planned and implemented school-based healthy living strategies. Project 2 evaluated the impact on and the relationship between SDT constructs and students' motivation to engage in health related-behaviours. Project 3 evaluated the motivation of students in Physical Education 10 classes grounded in SDT and its impact on their enrolment in grade 11 elective Physical Education.

Table 16
Summary of the Three Inter-related Projects

Project 1 Research Design: Qualitative Methods		
Research Question	Data Collection	Analysis
1. What were the experiences of teachers and the Action Team as they plan and implement school-based healthy living strategies?	Focus Group Interviews with Planning 10 and Physical Education 10 Teachers and Action Team members. Observations (school visit observations; Action Team meeting observations) and documents (minutes from Action Team meetings and each school's Action Plan) were collected.	Thematic Analysis
2. What motivated teachers and the Action Team to plan and implement school-based healthy living strategies? Did the teachers and the Action Team within HPSS schools feel a sense of autonomy, relatedness, and competence when planning and implementing school-based healthy living strategies?	Focus Group Interviews with Planning 10 and Physical Education 10 Teachers and Action Team members. Observations (school visit observations; Action Team meeting observations) and documents (minutes from Action Team meetings and each school's Action Plan) were collected.	Thematic Analysis
Project 2 **Research Design: Two-arm randomized controlled trail**		
Research Questions	Measures	Analysis
1. Did HPSS significantly increase students' level of self-determined motivation to engage in health-related behaviours compared to a comparison/usual practice school?	Behavioural Regulations Exercise Questionnaire Healthy Eating Motivational Scale	Multivariate Analysis of Covariance
2. Does HPSS significantly increase students' perceptions of autonomy, relatedness, and	Physical Activity Motivational Scale	Analysis could not be conducted because the

competence towards physical activity behaviours compared to a comparison/usual practice school?		scale used did not display adequate loadings based on the theoretical framework.
3. What was the relationship between students' perceived autonomy, relatedness, and competence towards physical activity behaviours and students' state of motivation?	Behavioural Regulations Exercise Questionnaire Physical Activity Motivational Scale	Analysis could not be conducted because Physical Activity Motivational Scale did not display adequate loadings based on the theoretical framework.

Project 3
Research Design: Two-arm randomized controlled trail

Research Question	Measures	Analysis
1. Did HPSS Physical Education 10 significantly increase students' level of self-determined motivation in physical education compared to students in comparison/usual practice schools?	Physical Education Motivational Scale	Analysis could not be conducted because the scale used did not display adequate loadings based on the theoretical framework.
2. Did HPSS Physical Education 10 significantly increase students' perceptions of autonomy, relatedness, and competence towards physical education compared to a comparison/usual practice school?	Physical Education – Autonomy, Relatedness, Competence Scale	Multivariate Analysis of Covariance
3. Did the experiences of students in HPSS Physical Education 10 influence enrolment in grade 11 elective Physical Education?	Data collected from each participant school	Multivariate Analysis of Covariance

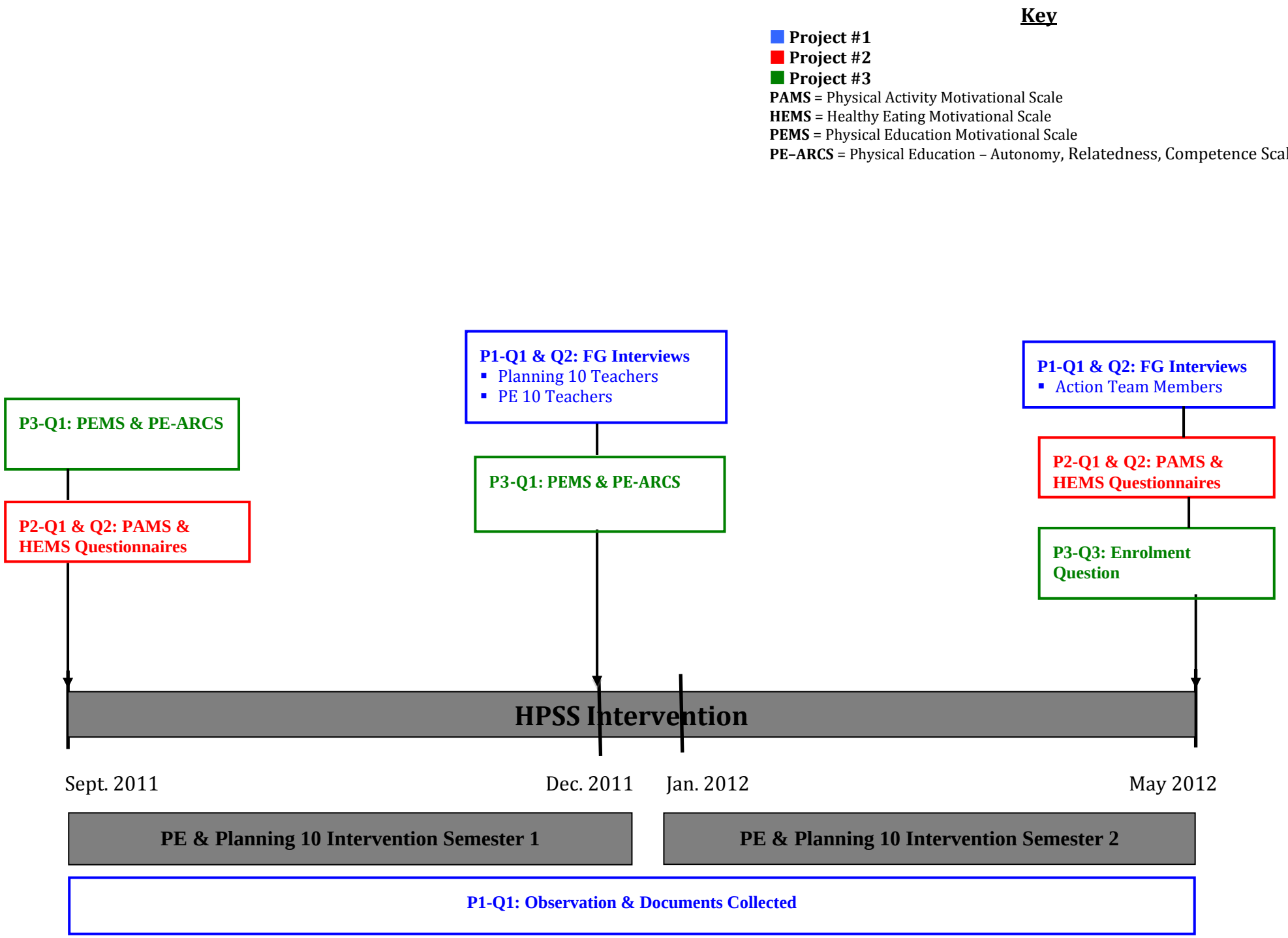


Figure 4. Timeline of Data Collection

Chapter 4. Project 1

The Experiences and Motivation of Key Stakeholders in the Development and Implementation of a Choice-Based Whole-School Health Model

Abstract

The purpose of this project was to gain insight into the experiences and motivational processes of teachers (Planning 10 and Physical Education 10) and Action Team members (teacher members and student members) as they planned and implemented the Health Promoting Secondary Schools (HPSS) intervention. Health Promoting Secondary Schools engaged teachers and youth in the planning and implementation of a whole-school health model aimed to improve the physical activity and eating behaviours of high school students. The intervention components were specifically informed by Deci and Ryan's (1985) self-determination theory. Twenty-three teachers and 37 Action Team members (29 student members; 8 teacher members) participated in focus group interviews. In addition, Action Team meeting minutes were collected and observations (i.e., school visits and observations of Action Team meetings) were conducted throughout the intervention process. Analysis of the data revealed five themes associated with participants' experiences and motivational processes: (a) Competing Responsibilities, Technical Difficulties, and Lack of Computer Access; (b) Resources, Reminders, Workshops, and Collaboration; (c) Choice-Based Design Impacts Participants' Experiences; (d) Teacher Control Impacts Student Engagement; and (e) Teacher Job Action Inhibited Implementation of HPSS Action Plans. The findings from this study can facilitate future school-based projects by providing insights into student and teacher perspectives on the planning and implementation of a whole-school health model.

Introduction

Complex whole-school interventions are a commonly used strategy to target changes to student health behaviours. Whole-school interventions provide a comprehensive multi-level approach to school-based health promotion initiatives that address change to the school environment, school policies, and to curriculum, to support healthy practices among students (Beaudoin, 2011; van Sluijs et al., 2008). Fullan (2007) defined change within educational settings as a "change in practice" (p. 30). Educational change researchers described the educational change process as "variable" with successful change depending on numerous factors (Fullan, 2007; Hargreaves, 2005). The degree to which these factors are addressed determines if the change occurs in the desired direction, if the change is a superficial change, a partial change, or no change at all. Several factors have been identified as influencing the change process including factors that challenge the change process and factors that assist in success (Fink & Stroll, 2005; Fullan 2002, 2007; Hargreaves, 2005). For example, Hargreaves (2005) emphasized the following factors can challenge the educational change process: (a) the reason for change is not clearly demonstrated and therefore poorly conceptualized by the change agents; (b) the change is too broad and ambitious for those involved (e.g. teachers) or it is too limited and specific that little real change occurs; (c) the change is too fast for the people involved to cope or too slow they become impatient and move on to something else; (d) the change is poorly resourced, there is not enough money for resources, or time for teachers to plan; (e) there is no long term commitment to the change to carry people through the anxiety and frustration of the initial and unavoidable setbacks; and (f) students, the recipients of the intended change, are not involved in the change process.

One important factor influencing effective change in school-based reform initiatives is the motivation of those involved in the change effort. Effective change in school practices requires those involved in the reform process to be motivated towards the intended change and internalize the value of the intended change (Assor, Kaplan, Feinber, & Tal, 2009; Fullan, 2002, 2007; Deci, 2009). Such internalization will occur when those responsible for the change are directly involved in the change process. Meaning that teachers, those responsible for the delivery of the change, and students, the recipient of the change, are involved in application of new ideas and practices (Assor et al., 2009; Fullan, 2007). This process in which teachers and students are involved in the change represents an approach to school reform that allows for the ideas, beliefs, and values of the people responsible for the change to be heard. According to Deci (2009) this will assist teachers and students to internalize the value of the new initiative, and in turn, their experience will likely be satisfying and the change will likely be effective.

Too often educational change efforts are initiated and developed by external change agents, suppressing the voices of those directly involved in the change (Fullan, 2007; Hargreaves, 1994). Characteristically, school reforms are prescribed approaches that are developed by district and school administrators with little involvement from teachers and students (Fullan 2002, 2007; Deci, 2009). Wilson et al. (2008) and St. Leger and Nutbeam (2000) stated teachers and students have not, in most cases, been involved in the development or implementation of school health initiatives. Specifically for whole-school health interventions, Dzewaltowski et al. (2009) noted that programs tend to promote health behaviour change through a top-down approach where expertise and control of the implementation lies in the investigative team and dissemination flows in a

top-down fashion. Further, students, the recipients of the change, are often not involved in the change process. Researchers, such as, Gibbons and Naylor (2007) and Naylor and McKay (2009) suggest programs that target the adolescent population might be more successful if adolescents are placed in a leadership role – empowering them to make positive decisions that affect their health. Gibbons and Naylor (2007) discussed considerations for whole-school health approaches for youth and proposed "the involvement of youth in the planning and implementation of activities is a cornerstone principle" (p. 12). The authors stated programs designed with student input are more likely to succeed, as students who believe their preferences are considered in the program design, development, and execution demonstrate significantly higher participation in the new program. In sum, an approach to education reform, in which teachers and students are involved in the process of change, allows for teachers and students to undergo the complex internalization process necessary to fully identify with the new initiatives.

A theoretical framework that might show promise in guiding educational reform efforts and school-based health initiatives is the self-determination theory (SDT). Self-determination theory is a macro-theory of human motivation that aims to explain an individual's goal-directed behaviour (Deci & Ryan, 1985, 2000). The theory suggests that people are inherently self-motivated, eager to learn, develop, and succeed because the satisfaction itself is rewarding (Deci & Ryan, 1985, 2000). However, the theory also posits that people can be thwarted in the other direction as a result of their environment. The degree in which one's environment facilitates optimal motivation is dependent on the satisfaction of three basic psychological needs – the need for autonomy, the need for competence, and the need for relatedness (Deci & Ryan, 1985, 2000; Ryan & Deci,

2000). The need for autonomy represents an individual's desire to experience a sense of choice and feel volition in carrying out a task (Deci & Ryan, 1985, 2000). The SDT suggests that individuals feel autonomous when they understand the value or relevance of the task and therefore can identify with it (Deci & Ryan, 2000; Ryan & Deci, 2000). To support one's need for autonomy, SDT-based research identified several factors, which include: providing opportunities for participation and choice, allowing for individuals to follow their own unique approach, and encouraging self-initiation and experimentation (Deci & Ryan, 1985; Visser, 2010). Self-determination theory research has also identified factors associated with thwarting the satisfaction of autonomy, these factors include: imposing ideas and goals, maximizing external control, and emphasizing tangible rewards, evaluations, deadlines, and punishments (Deci & Ryan, 1985; Visser, 2010). The theory also suggests individual's need to feel competence towards the intended behaviour. The need for competence is defined as individual's inherent desire to feel effective in their environment (Deci & Ryan 1985, 2000). Feelings of competence are necessary for individuals to approach optimal challenge that allow them to learn and develop (Deci & Ryan, 1985, 2000; Ryan & Deci, 2000). Formulating and achieving realistic goals, having effective outcomes, and providing optimal challenge, can fulfill the one's need for competence (Ryan & Deci, 2000; Visser, 2010). Lastly, the need for relatedness is defined as an individual's inherent desire to feel connected to others (Deci & Ryan, 1985, 2000). Within interpersonal contexts, such as school and classroom settings, relatedness satisfaction is essential for the process of internalization (Deci & Ryan, 2000; Ryan & Deci, 2003). Ryan and Deci (2003) suggest relatedness support is important, as people are not inclined to internalize value from those they do not feel

connected to. To satisfy an individual's need for relatedness, Visser (2010) has highlighted the following supporting factors: inquiring about individual's views and concerns, acknowledging individuals perspectives, and creating cooperative working, learning, and change approaches. Whereas, factors primarily hindering relatedness include: emphasizing competition, being non-responsive or dismissing individual concerns and views (Visser, 2010).

The application of SDT to school-based reform initiatives might be particularly relevant because of the conceptual ties to the propositions of educational change literature. From the perspective of the SDT, effective change in organizations will occur when both the nature of the change and the process through which the change is facilitated allows satisfaction of individual's needs for autonomy, competence, and relatedness (Assor et al., 2009; Deci, 2009; Deci & Ryan, 2000). Educational change researchers, such as Fullan (2007) and Hargreaves (2005), highlight several recommendations and support strategies for successful reform that align with the psychological needs proposed by SDT. First, providing flexible change initiatives and structuring reform in an autonomy-supportive way is essential to effective change in educational settings (Fullan, 2007; Hargreaves, 2005). Fullan (2007) and Hargreaves (2005) discussed the importance of flexible programs that incorporate the voices of both teachers and students. Flexible reform initiatives assist with the integration of the new program into existing practices. This integration is more probable when new initiatives are able to adapt to the unique needs of individual schools, teachers, and students (Fullan 2002, 2007). This adaptation occurs through creating an environment, which allows for teachers and students to alter new initiatives to meet local needs. Flexibility in program

design, through the integration of choice, is important for new components to be modified and reinvented to meet unique needs of local schools, teachers, and students. Hargreaves (2003) advised against the use of prescriptive programs, as the rigidity of such programs might not address actual needs of individual schools, teachers, and learners. Specifically, educational change literature recommends teachers be in control of delivery methods through flexible curricula and student input be incorporated in program features (Fullan, 2007, 2011; Hargreaves, 2005). To achieve this, Fullan (2007, 2011) recommend placing educators and students at the center of the change by allowing their voices to be heard and their ideas be incorporated. Assor et al. (2009) stated SDT has the potential to help educators design reforms that promote new initiatives without suppressing the autonomy of teachers. To support the involvement of students in the change initiatives and support students' need for autonomy, research suggests the learning environment teachers create and teachers' motivation style towards students can impact perceptions of autonomy support among students. For example, Weimer (2013) suggested a student-centered approach to learning allows students to be involved in the learning process. Weimer (2013) described several principles that often need to be changed in order to create student-centered learning environments. These include shifting the responsibility from the teacher to the students and proactively assisting their students in the learning process. Further, Reeve (2012) and Niemic and Ryan (2009) recommend teachers provide choice, acknowledge students' ideas and feelings and incorporate student voices to satisfy perceptions of autonomy.

In relation to the need for competence, providing teachers with the appropriate support to promote feelings of efficacy towards change efforts can satisfy perceptions of

competence in the educational change process. Fullan (2007) identified several factors that impact changes in practice that are associated with creating competence-supportive environments. First, Fullan (2007) discussed an overloaded school agenda impacts teachers' perception regarding their ability to implement new initiatives. He suggests that schools are overloaded with multiple improvement agendas and therefore it is not only whether they perceive the change as important but also how important it is relative to other responsibilities. Fink and Stroll (2005) also emphasized that teachers are often flooded by an overabundance of changes over a short time period, which results in teachers who are exhausted, unwilling, and unmotivated for change. The authors noted that often the cause of this resistance to change is the pressures teachers face in the day-to-day realities of the job. Second, a balance between complexity and reasonable demands placed on the teachers need to be achieved in order for successful change. The complexity of the change and the requirements placed on those responsible for the reform can impact efficacy beliefs towards the change. According to Fullan (2007) complexity refers to the difficulty and the magnitude of change required of the individuals responsible for implementation. Simple changes may be easier to implement but these changes may not make a significant difference. Complex changes accomplish more but also demands more from the individuals responsible for implementation. In order for successful change, a balance between complexity and reasonable demands placed on those responsible for the change must be attained. Third, Fullan (2007) and Hargreaves (2005) and school-based intervention research highlighted the importance of adequate support for teachers throughout the change process. This support includes materials and other resources, professional development opportunities for teachers, and sufficient

teacher preparation time. Fullan (2007) and Hargreaves (2005) described these supports are necessary if teachers are to make the necessary changes required of the new initiative. School-based intervention research has also highlighted the importance of support strategies for those responsible for implementing the intended changes. Jain and Langwith (2013) explored key stakeholders perceptions of factors influencing the implementation of a school-based obesity intervention. Study results showed that greater assistance and training throughout the interventions was needed to assist school personnel use the available resources. Further, Gleddie and Melynchuk (2009) and Franks et al. (2007) have recommended professional development opportunities for those involved in the change process (e.g., teacher workshop) is an essential support strategy for the implementation of new school-based health initiatives.

In relation to the need for relatedness proposed by SDT, principles of educational change highlight the importance of establishing meaningful relationships and collaboration among and between the stakeholders involved in the reform initiative. According to Fullan (2007), collaboration across districts and school and between teachers and students plays an enormous role in commitment to reform efforts. This collaboration creates a context in which teachers and students can form relationships based on a common goal and work together to make change. Moreover, Fullan (2007) noted individuals involved in the change could negotiate the challenges and celebrate the successes that are inherent in the change process. School-based intervention research has also highlighted the importance of collaborative relationships within reform efforts. For example, Hoyle, Samek, and Valois (2008) discussed the recommendations for the development and continuous improvement of health promoting school model based on

the experiences from a whole-school health program in a school district in Colorado. The authors suggested the formation of school learning communities at the district level and the establishment of lateral support (i.e., school to school and teacher to teacher) to increase capacity of the implementation of health programs in school settings.

Based on the propositions of SDT and concepts associated with educational change, the reform efforts or the process by which the new program is implemented should include autonomy support by having the change agents be involved in the process and feel a sense of volition, competence support so change agents feel effectiveness towards carrying out the reform, and relatedness support by facilitating meaningful relationships among and between schools, teachers, and students (Deci, 2009; Deci & Ryan, 2000; Fullan, 2007). A variety of theoretical frameworks have been applied to school-based health promotion interventions including social cognitive theory (e.g., Newmark-Sztainer, Story, Hannan, & Rex, 2003; Young, Phillips, Yu, & Haythornthwaite, 2006) trans-theoretical model (e.g., de Barros et al., 2009), socio-ecological (e.g., Pate et al., 2005; Simon et al., 2004), or no theory (e.g., Jamner et al., 2004). However, little information has been gathered on the application of SDT to a whole-school health approach. Further, few intervention studies have involved teachers and students in the change process. In studies that have engaged teachers and students in the planning and implementation of school-based interventions (e.g., Healthy Youth Places, Dzewaltowski et al., 2009; Girls in Sport, Okley et al., 2011), the researchers did not gather information on the experiences of the teachers and students in the change process. Assor et al. (2009) noted that one critical reason for the failure of many school reform efforts is the insufficient attention to the complex process that change agents, or

those responsible for the change, must undergo to fully identify with the new ideas promoted by external change agents. Therefore, the purpose of this project was to gain insight into the experiences and motivational processes teachers and students involved in an educational change initiative framed in self-determination theory, Health Promoting Secondary Schools (HPSS). Both the content of the HPSS program and the process by which the teachers and students were supported in the planning and implementation were grounded in SDT.

Research Questions

The following research questions were addressed in Project 1:

1. What were the experiences of the Action Teams (teacher and student members), Planning 10 teachers, and Physical Education 10 teachers, in planning and implementing school-based healthy living strategies?
2. What motivated the Action Teams (teacher and student members), Planning 10 teachers, and Physical Education 10 teachers, to plan and implement school-based healthy living strategies? Did the teachers and students within HPSS schools report a sense of autonomy, relatedness, and competence when planning and implementing school-based healthy living strategies?

Methods

Project 1 was part of a larger study being conducted at the University of Victoria, entitled 'Health Promoting Secondary Schools' (HPSS) (Wharf-Higgins, Voss, Naylor, Gibbons, Rhodes, et al., 2013). The goal of HPSS was to improve the physical activity and eating behaviours of grade 10 students in five intervention schools. HPSS was a choice-based, whole-school model shaped 'For Youth With Youth' that allowed schools and students to create individualized action plans that facilitated change at the school and individual levels. The following sections provide a brief overview of the larger HPSS intervention and a description of Project 1.

Overview of the Larger HPSS Intervention

Health Promoting Secondary Schools was a whole-school health approach addressing changes to the school environment and school policies, in addition to curriculum, to support healthy practices among students (Wharf-Higgins et al., 2013). The HPSS intervention was based on the theoretical foundations of Deci and Ryan's (1985) SDT, was flexible, and tailored to meet the individual needs of schools. In accordance to the foundation of the theory, the HPSS intervention sought to positively affect student's level of motivation towards physical activity and healthy eating by enhancing students' perceptions of autonomy, relatedness, and competence. Specifically, the overall goal of HPSS was to increase the levels of physical activity (overall and in physical education), fruit and vegetable consumption, and enrolment in optional physical education; and, decrease the amount of screen time and sugar sweetened beverage consumption among youth enrolled in the intervention schools. To achieve this, the intervention consisted of four choice-based intervention Action Zones: (a) School

Environment/Culture Zone; (b) Community Partnership Zone; (c) Student Support Zone; and (d) Teaching and Learning Zone. The goals of and actions taken in each HPSS Action Zone are presented in Table 17.

Table 17
Overview of HPSS Action Zones

HPSS Action Zone	Goal of Zone	Actions	Actions Implemented By
School Environment/ Culture Zone	Making healthy choices the easy choice by creating safe and inclusive school environments, supporting healthy living policy development, and celebrating and encouraging a whole-school approach to healthy living.	This zone was comprised of two parts: (a) policy development and (b) school-wide events/campaigns. *Policy development* – the development, maintenance or enhancement of two school health policies. *School-wide events/campaigns* - implementation of a minimum of two school-wide events/campaigns (one of which included a community partnership).	School Action Team[1]
Community Partnership Zone	Connecting with the community to increase extra-curricular opportunities for physical activity, healthy eating and positive partnerships.	Developed and implemented at least one school-wide event that involved community partnership. Prior to determining what actions schools implemented, a baseline assessment of what already exists was completed to find out what people, organizations, and resources were available for their students within the community.	School Action Team
Student Support Zone	Providing personalized support tools to encourage youth to make and maintain behavioural changes relating to physical activity and healthy eating.	Schools received several tools and resources to support them in making behavioural changes relating to physical activity and healthy eating, including: a health bin ($2500 to purchase equipment, supplies and resources and $500 to help implement the school-wide events) and a web-based personalized behaviour change support tools (HPSS website).	School Action Team; Planning 10 Teachers; Physical Education 10 Teachers
Teaching and Learning Zone	Implementing enhanced healthy living curriculum in Planning 10 and Physical Education 10 to	Schools implemented a HPSS Planning 10 module and Physical Education 10 intervention programs. The goal of HPSS Planning 10 was to provide students with an opportunity to experience a	Planning 10 teachers; Physical

[1] An Action Team was a school committee (6 – 10 individuals) composed of youth (at least 50%) and teachers. The engagement of youth in the design and delivery of school-wide events, activities, and policies was a major focus of the HPSS intervention. As such, Action Teams were strongly encouraged to allow the school-wide events and policies to be constructed by the youth themselves with the help of teacher members and the HPSS School Health Facilitator.

	support a whole-school approach to an active, healthy lifestyle.	behaviour change process that leads to a healthy lifestyle. The goal of the HPSS Physical Education 10 curriculum was to increase students' intrinsic motivation towards physical activity and physical education through the enhancement of autonomy, relatedness, and competence.	Education Teachers 10

Description of Project 1

The purpose of Project 1 was to gain insight into the experiences and motivational processes of school Action Teams and teachers as they planned and implemented the HPSS intervention. The participants in this study included Action Team members (n = 37), Planning 10 teachers (n = 9), and Physical Education 10 teachers (n = 14) across five intervention schools. The Action Teams were comprised of both students (n = 29) and teachers (n = 8). The role of the Action Teams was to plan, implement, and track whole-school events and policies to promote physical activity and healthy eating within HPSS intervention schools. An underlying philosophy of the HPSS intervention was to encourage adolescent participation in the development and implementation of the HPSS components. In keeping with this philosophy, Action Teams were strongly encouraged to allow the school-wide events and policies to be constructed by the youth themselves with the help of teacher members and the HPSS School Health Facilitator. Participating teachers in HPSS intervention schools were either responsible for planning, implementing, and tracking the HPSS curricula pieces (i.e., HPSS Planning 10 and HPSS Physical Education 10) or were responsible for planning, implementing, and tracking whole-school events/policies as members of the Action Team. Some teachers had multiple roles as members of the Action Teams and Physical Education 10 and/or Planning 10 teachers.

The following section includes descriptions of the role of the school-wide Action Team and their activities, a description of the HPSS curricula pieces (Planning 10, Physical Education 10) and role of the teachers within each of these subjects, followed by

a summary of the HPSS intervention components highlighting the differences among components and an overview of SDT application to HPSS.

School Action Teams. An Action Team was a school committee (6 – 10 individuals) composed of students (at least 50%) and teachers. Participant schools established an Action Team in one of two ways: (a) a new school committee was formed or (b) an existing school committee served as the Action Team. For Option A, a newly formed committee, the HPSS contact person (a teacher in the HPSS school) recruited interested students and teachers to be members of the Action Team. For Option B, an existing committee, a previously established school committee (e.g. student council) took on the responsibilities of the Action Team. Of the five intervention schools, three schools formed a new committee and two schools used an existing committee. Action Teams met to develop and implemented health policies and school-wide activities, of their choosing, which promote and encourage healthy living within their school. An example of a school health policy might be to integrate healthy eating into the culture of the school by incorporating the Guidelines for Food and Beverage Sales in British Columbia Schools. Actions for this policy might include removing vending machines and/or advertising healthy foods and beverages. An example of a school-wide event might be to promote active transportation to school by implementing an 'Active Transportation Week.' Actions for this school-wide event might include an advertisement campaign of the benefits of active transportation and/or setting a school goal and tracking the number of students and teachers who participated in active transportation that week.

Each school's Action Team developed the health policies and school-wide events/campaigns with the assistance of the HPSS School Health Facilitator (myself).

These activities were based on the results of the Healthy Schools Planner Assessment Tool. This was an online tool designed to assess a school's health environment in the areas of physical activity and healthy eating. Teachers on the Action Team completed this assessment and upon completion received an electronic individualized feedback report of the present status of the physical activity and healthy eating opportunities in their school. The Action Team then used this feedback as well as their own input to create and implement the health policies and school-wide events. Action Teams were also provided with a HPSS Planning Guide. This guide included a detailed overview of the HPSS intervention as well as numerous health policy examples and whole-school events/campaign ideas. The Action Teams were asked to set and track individual school goals and identify the actions to undertake in order to create the policies and events in a provided HPSS template. Appendix E includes the HPSS Action Plan template.

Role of the Action Teams within Project 1. School Action Teams were asked to meet regularly to help plan whole-school events and policies. Specifically, each HPSS intervention school Action Team was asked to develop and implement a minimum of one school health policy and two school-wide events/campaigns (at least one per semester) – one of which one should include a community partnership. Action Teams were also asked to record minutes during their meetings throughout the intervention year and participate in a focus group interview at the completion of the school year. To view the Action Team meeting minutes recording form refer to Appendix F.

The following section includes a description of the HPSS curricula pieces (Planning 10 and Physical Education 10) and role of the teachers within each of these subjects.

HPSS Planning 10 module. The goal of HPSS Planning 10 was to provide students with an opportunity to experience a behaviour change process that leads to a healthy lifestyle. Specifically, the goal of HPSS Planning 10 was to increase students' intrinsic motivation towards physical activity and healthy eating by enhancing their perceptions of autonomy, relatedness, and competence. The Planning 10 course contains the mandatory health education curriculum taught in British Columbia secondary schools. As part of Planning 10, students are offered learning opportunities to think critically about health in four areas: healthy living, health information, healthy relationships, and health decisions. Health Promoting Secondary Schools provided teachers with Planning 10 lessons to be implemented as part of the HPSS intervention. Six lessons were created by an HPSS researcher and reviewed by a committee of Planning 10 teachers to help teachers engage their students in personalized activities that allowed them to examine their daily habits and make behavioural changes related to physical activity and healthy eating. Within the six lessons, students set personal physical activity and/or healthy eating goals, as well as tracked and monitored these goals. More specifically, students were asked to examine healthy behaviours related to: (a) physical activity; (b) fruit and vegetable consumption; (c) sugar sweetened beverage consumption; and (d) screen time. Concepts drawn from Deci and Ryan's (1985) SDT of motivation provided the theoretical framework for the Planning 10 module. The HPSS Planning 10 program supported students' autonomy by allowing students to choose which healthy lifestyle behaviour they wanted to improve (physical activity, fruit and vegetable consumption, sugar-sweetened beverages, and/or screen time). Throughout the HPSS Planning 10 program, teachers were provided opportunities to allow for student choice. To support the

need for competence, students developed goal setting and behavioural monitoring skills. For example, in Lesson 3 students created a personalized action plan for achieving their personal goals regarding physical activity and/or healthy eating. Students also learned how to adjust their goal setting plan and for continued improvements in their goal setting area. To support students' need for relatedness, students participated in activities that created connection and belonging towards their peers and teacher. For instance in Lesson 5 students shared their goals and progress with their peers and discussed areas for improvement to help better achieve their personal goals. For more information on each lesson see Appendix C.

Role of Planning 10 teachers within Project 1. Teachers of Planning 10 were asked to deliver the HPSS Planning 10 module and participate in a focus group interview at the completion of the Planning 10 course. The HPSS Planning 10 module included six lessons and one of two tracking challenges. Teachers were encouraged to adapt and alter the lessons to meet the specific needs of their students. Planning 10 teachers were also asked to keep track of their actions in the tracking tool provided by HPSS. In the focus group interview, teachers were asked to discuss their experiences in and motivation towards planning and implementing the HPSS Planning 10 module.

HPSS Physical Education 10. The goal of HPSS Physical Education 10 was to increase students' intrinsic motivation towards physical education and physical activity by enhancing students' perceptions of autonomy, relatedness, and competence. Course design was based on the premise, if a physical education course emphasizes development of students' autonomy (sense of choice), relatedness (sense of social attachment), and competence (sense of efficacy), then students will be more intrinsically motivated to

engage in meaningful participation in physical education. The HPSS Physical Education 10 course incorporated autonomy (e.g., choice of group members, choice of activities included in the course), relatedness (e.g., class team building activities), and competence (e.g., knowledge of their current physical activity level both in and out of class) within physical education lessons.

Health Promoting Secondary Schools Physical Education 10 teachers received a resource manual that included instructional strategies, ready to use lessons and examples of effective activities to increase students' intrinsic motivation toward physical education and physical activity. The resource was adapted from the work of Gibbons, Humbert, and Temple (2010). Their work utilized a formative research process to develop a resource manual to assist teachers in the translation of the concepts of SDT into actions they could implement into their physical education classes in order to create more meaningful and motivating physical education experiences for female students. Actions ranged from curriculum actions (e.g., using input from students to design course content), to learning environment actions (e.g., providing competitive and non-competitive game play options), to assessment actions (e.g., providing choices in skill assessment) (Gibbons et al., 2010). As the HPSS program targeted both female and male students, additional strategies and activities were included in the manual to create more meaningful and motivating physical education experiences for all students, including males. The HPSS Teacher Advisory Committee, a committee of six physical education teachers in British Columbia who volunteered to provided advice and suggestions on the HPSS Physical Education 10 manual, and other physical education teachers in British Columbia, offered strategies and activities they have successfully used in their courses to engage male

students. The HPSS research team, with the advice of the Teacher Advisory Committee, then selected from these activities based on the propositions of SDT and/or adjusted these activities to better align with SDT concepts (e.g., allow student choices within the suggested activity). Concepts drawn from Deci and Ryan's (1985) SDT of motivation provided the theoretical framework for these actions. It was anticipated and also strongly encouraged that teachers use existing activities and resources that they might have, which coincided with a given HPSS action and the SDT constructs. Appendix D includes further information on the HPSS Physical Education 10 program.

Role of Physical Education 10 teachers within Project 1. Physical Education 10 teachers were asked to deliver the HPSS Physical Education 10 program and participate in a focus group interview at the completion of the Physical Education 10 course. The HPSS Physical Education 10 component required Physical Education 10 teachers to implement at least one action from each SDT construct (autonomy, relatedness, competence) in every physical education lesson through strategies provided in the HPSS Physical Education 10 resource. Physical Education 10 teachers were also asked to keep track of their actions in the tracking tool provided by HPSS. In the focus group interview, teachers discussed their experiences in and motivation towards planning and implementing HPSS Physical Education 10.

Summary of HPSS Intervention Components. As previously described, within the HPSS intervention three different groups of individuals were responsible for implementing three distinctive components. The three intervention components and individuals responsible for the change included: (a) whole-school events and policies implemented by Action Teams; (b) the HPSS Physical Education 10 component

implemented by Physical Education 10 teachers; and (c) the HPSS Planning 10 component implemented by Planning 10 teachers. Differences were present among the three intervention components and the responsibilities placed on the individuals in charge of the change. The intervention components differed on three main aspects: (a) the duration of the required change (i.e., length of the intervention component); (b) the degree of the change (i.e., number of HPSS actions to be implemented), and (c) the structure of the choices offered to participants (i.e., choice-based design). First, the duration of the required change varied among the three intervention components. Action Teams were asked to implement HPSS actions throughout the entire year of the intervention (i.e., September – June). Whereas, HPSS Physical Education 10 and HPSS Planning 10 teachers were asked to make changes throughout one semester (i.e., September – January). Second, the number of HPSS actions/activities/lessons to be implemented within existing practices varied greatly among intervention components. Action Teams were required to implement at least two whole-school events and one school policy over the course of the school year. Within the compulsory part of the HPSS Physical Education 10 component, physical education teachers were asked to implement one action from each of the three sections of the HPSS resource binder in every physical education class for the entire semester. This meant Physical Education 10 teachers were required to implement three HPSS actions/activities/lessons everyday throughout the entire length of the Physical Education 10 course (i.e., one semester). For HPSS Planning 10 teachers, teachers were asked to implement six previously developed lessons throughout the Planning 10 course and one of two Tracking Challenges (i.e., Re-Think Your Drink or Power Down). The six lessons and tracking challenges were not intended

to be implemented as a unit rather distributed throughout the semester to engage students in personalized activities that allowed them to examine their daily habits and track their progress. Lastly, the choice-based design varied among intervention components. Action Teams were given an open-choice format in which they had to generate ideas, create an Action Plan, and develop and implement whole-school events and policies of their choosing. Action Teams were not provided with previously developed whole-school events and policies in which they could select, as in the HPSS curricula components of the intervention. Action Teams were required to develop their own Action Plan, which included the development of whole-school events and policies. Within the HPSS Physical Education 10 component of the intervention, Physical Education 10 teachers were provided with a vast amount of suggested actions and ready to use resources that they could choose to implement into their existing practices. For HPSS Planning 10 component, the choices within the HPSS Planning 10 module were embedded within the six lessons. In most cases, Planning 10 teachers were asked to make one of two choices within each of the six lessons. Table 18 provides and overview of the HPSS intervention components and associated responsibilities of the participant groups.

Table 18
Overview of the Three HPSS Intervention Components and Responsibilities of Participant Group

	Action Teams	Physical Education 10 Teachers	Planning 10 Teachers
Duration of the Change	1 school year (Sept. – June.)	1 Semester (Sept. – Jan.)	1 Semester (Sept. – Jan.)
Degree of the Change	Two whole-school events One school-wide policy	Three HPSS Actions in every Physical Education 10 class	6 HPSS Lessons; 2 HPSS Tracking Challenges

Structure of the Choices	Open-Choice Format: develop own whole-school events and policies	Comprehensive list of actions and ready to use resources to choose from	Choice embedded within the six lessons and choice of two tracking challenges

Application of SDT to Planning and Implementation of HPSS. The HPSS intervention was informed by the three psychological needs proposed by SDT – the need for autonomy, the need for competence, and the need for relatedness. The HPSS intervention sought to support these three needs among the individuals responsible for the change – Action Teams, Physical Education 10 teachers, and Planning 10 teachers. By applying principles of SDT to HPSS, individuals involved in the planning and implementation of HPSS might be more motivated towards the change process.

To support the need for autonomy, students and teachers were provided opportunities to follow their own unique approach to program implementation through a flexible program design. HPSS was a choice-based model that allowed students and teachers to make choices throughout the change process. Action Teams were given considerable flexibility with regards to the development and implementation of events and policies. Opportunities were made for Action Team members to take an active leadership role in choosing and planning events. Teachers were provided with options or choices for integrating HPSS curricula intervention pieces into their classrooms. These choices included: which HPSS action to be implemented, method of implementation, and timing of actions. Second, in order to adopt and endorse the HPSS initiative and bring about health promoting changes, teachers and students need necessary support to acquire competence towards the change effort. The HPSS initiative provided students and teachers with support to promote competence towards the intended change. These

strategies included: professional development opportunities, personnel to support teachers and students during the change process, and curricula resources. Third, to support the need for relatedness among those involved in the change process, HPSS promoted the collaboration of teachers and students and sought to create cooperative change environment. Action Team members worked together to plan and implement school events and policies and teachers were encouraged to collaborate with other teachers on the HPSS curricula initiatives. Table 19 provides an overview of how the three psychological needs proposed by SDT – autonomy, competence, and relatedness – were incorporated for the three participant groups.

Table 19

SDT Psychological Needs of Participant Groups Supported by HPSS

	Autonomy	Competence	Relatedness
Action Teams	Choice of whole-school events and policies Teacher and student input incorporated into events and policies	Students members developed the skills and knowledge needed to plan and implement school-wide events and policies HPSS Action Team Workshop opportunities were provided A HPSS Health Coordinator assisted with the development of events and policies	Members worked together to plan and implement school events and policies Individual perspectives were acknowledged and cooperative working environments were sought
Physical Education 10 Teachers	Teachers were able to select actions, activities, and/or lessons from the HPSS Physical Education 10 curricula resource Teachers were able to choose when and how these lessons were implemented into their courses	Teachers were provided with a HPSS Physical Education 10 workshop A HPSS Health Coordinator assisted teachers with the curricula materials and provided support to teachers when needed	Teachers were encouraged to collaborate with other Physical Education 10 teachers in their school on the HPSS curricula initiatives
Planning 10 Teachers	Teachers were given six adaptable health lessons with choices embedded within each lesson and choices of pre-developed Tracking Challenges Teachers were able to choose when and how these lessons were implemented into their courses.	Teachers were provided with a HPSS Planning 10 workshop A HPSS Health Coordinator assisted teachers with the curricula materials and provided support to teachers when needed	Teachers were encouraged to collaborate with other Planning 10 teachers in their school on the HPSS curricula initiatives

Participant Recruitment

Action Team members (both teacher and student members) and Planning 10 and Physical Education 10 teachers were contacted through email and/or in person to participate in the study at the beginning of the 2011/2012 school year (i.e., August/September). Participants completed and returned a consent form (adults) or an assent form (students) prior to the onset of the study.

Participants

Action Teams. Each of the HPSS Action Teams[2] participated in a focus group interview. A total of 8 teachers and 29 students were interviewed for a total of 37 Action Team Members. See Table 20 for school, gender, and grade breakdown of Action Team members who participated in the focus group interviews.

[2] School 5 did not plan and implement whole-school events/policies. The school created an Action Team and conducted four Action Team meetings in semester one. However, due to job action, teachers could no longer participate in extra-curricula activities. Therefore, the Action Team did not implement any whole-school events/policies. The student members of the Action Team did participate in a focus group interview at the end of the school year to gain insight into their experiences with HPSS.

Table 20
Action Team Members Who Participated in Focus Group Interviews

School (Location)	Total (%) (N = 37)	Teacher (n = 8)	Teacher Gender		Student (n = 29)	Student Gender		Grade			
			Female	Male		Female	Male	9	10	11	12
School 1*	6	0	_	_	6	6	0	4	2	0	0
School 2	8	2	2	0	6	3	3	2	2	0	2
School 3	7	2	1	1	5	2	3	0	1	2	2
School 4	10	4	2	2	6	4	2	2	2	2	0
School 5**	6	0	_	_	6	4	2	0	3	2	1

*Teachers on the Action Team did not participate due to scheduling conflicts.
**Teachers on the Action Team did not participate due to job action.

Teachers. Nine Planning 10 teachers and fourteen Physical Education 10 teachers in five schools delivered the HPSS program and participated in a focus group interview. Table 21 includes the school and gender breakdown of participating Planning 10 Teachers. Table 22 includes the school and gender breakdown of participating Physical Education 10 Teachers.

Table 21
Planning 10 Teachers by School and Gender

School (Location)	Total (%) (N = 9)	Teacher Gender	
		Female (n = 3)	Male (n = 6)
School 1	2	0	2
School 2	3	2	1
School 3	1	0	1
School 4	3	1	2
School 5*	0	_	_

*School 5 Planning 10 teachers did not participate due to job action.

Table 22
Physical Education 10 Teachers by School and Gender

School (Location)	Total (%) (N = 14)	Teacher Gender	
		Female (n = 5)	Male (n = 9)
School 1	2	1	1
School 2	3	0	3
School 3	3	3	0
School 4	4	0	4
School 5	2	1	1

Reflexivity

Reflexivity is the process by which a researcher is transparent, aware, and takes ownership over their personal perspective and any bias that may accompany it (Malterud, 2001; Patton, 2002). As the researcher is the primary data collection instrument, reflexivity provides an opportunity for the researcher to understand how his or her experiences, perceptions, and understandings affect the research process (Thomas et al., 2005). Malterud (2001) stated "a researcher's background and position will affect what

they choose to investigate, the angle of investigation, the methods judged most adequate for this purpose, the findings considered most appropriate, and the framing and communication of conclusions" (p. 483-484). Therefore, as suggest by Patton (2002), a researchers own biases for conducting a study should be considered in order to position personal bias during the collection and analysis of qualitative data.

During my childhood and throughout my adolescence I was very physically active. My family exposed me to many sports growing up and we considered ourselves a 'sports family.' I enjoyed playing team sports, being active with my friends, and challenging myself to reach high levels of competition. In elementary and high school I loved physical education. The physical education programs offered during my schooling were primarily sport-based. As I considered myself an athlete, I really enjoyed the sport activies offered in physical education and had positive physical education experiences. During high school I was highly involved with sports and I played on a variety of different sports teams throughout high school. My positive physical education experiences inspired me to pursue a career as a high school physical education teacher. I completed undergraduate degrees in education and kinesiology. During my undergraduate education, I played basketball for the University of Saskatchewan Huskies and coached basketball at community and provincial levels.

I taught high school physical education for three years in Saskatoon, Saskatchewan. During this time I noticed many of my female students displayed a lack of enthusiasm, interest and enjoyment for physical education. In my third year as a high school physical education teacher a colleague and I decided we would alter the content of our physical education courses and our teaching methods to try to better meet the needs

of our disengaged female students. We began to replace team sports with individual activities, reduce competitive play, take our students into the community, and ask the students what types of activities they would like in the course. We had some success in reaching our students and witnessed many previously disengaged young women start to enjoy being active. Through this experience I started to shift my thinking from 'these students simply do not like to be active' to 'how can we alter physical education to meet the needs of female students?' It is through this experience that I developed an interest in understanding how physical education can assist students to enjoy physical activity and engage in physically active lifestyles. My experiences as a high school physical education teacher inspired me to pursue graduate school. During my masters degree I continued to develop my interest in motivating students in physical education programs and was introduced to the research process. My masters project focused the factors involved in students decision to enroll in elective physical education programs. In my doctoral work I expanded to the larger school environment and its impact on student physical activity behaviours. Through my work with HPSS, I was able to gain insight into the motivational process of students in physical education and how we can design physical education programs and school environments to meet their needs and promote healthy active lifestyles.

During this research process, I have considered my own experiences with physical activity, physical education, and as a physical education teacher. I was aware and have considered my subjectivity as a researcher. My previous experiences as an educator impacted my judgements of the schools and teachers I worked with. I believe my experience as a teacher helped me establish relationships with the schools, teachers, and

students in the HPSS program. However, I was careful to position myself as a researcher and was reflective on how my experiences shaped my interactions with the participants and my interpretation of the data collected.

Data Collection

The data collection procedures in Project 1 included multiple forms of data. Three sources of data were used: (a) minutes from Action Team Meetings, (b) direct observations (school visits and Action Team meetings), and (c) focus group interviews (Action Team members, Planning 10 teachers, and Physical Education 10 teachers). Table 23 includes an overview of the data sources. These data sources were utilized to gain insights and understandings of participants' experiences and motivational processes in the planning and implementation of the HPSS intervention. The following sections provide a comprehensive description of the three sources of data used in this study.

Table 23
Purpose and Information of Each Data Collection Source

Data Source	Purpose of Collection Source	Information Each Source Provides
Documents Action Team Meeting Minutes	Understand the participants' experiences and motivation towards planning and implementing the HPSS intervention.	*Action Team Meeting Minutes* – the process involved in planning and implementing whole-school events and policies.
Observations School Visits Action Team Meetings	Directly observe behaviours of participants in order to understand their motivation towards planning and implementing the HPSS intervention; and allow the researcher to enter into and understand the intervention setting and the experiences of the participants.	*School Visits* – directly determine whether or not the HPSS intervention was being delivered as planned. *Action Team Meetings* – directly observe the interactions of the action team and the motivational processes involved in planning and implementing whole-school events and policies.
Focus Group Interviews Teachers Action Team Members	Understand the participants' experiences and motivation towards planning and implementing the HPSS intervention.	*Teacher Interviews* – understand experience and motivation of teachers in planning and implementing the curricula pieces of HPSS. *Action Team Interviews* – understand experiences and motivation of Action Team in planning and implementing whole-school events and policies.

Minutes from Action Team Meetings. Action Team meeting minutes were collected to help understand the experiences of the Action Teams in the planning and implementation of the whole-school events and policies. The focus of the Action Team meetings was to generate ideas for whole-school events and policies. Recording the minutes from the meetings provided documentation of these ideas and associated discussion. In order to standardize the recording of minutes, a recording sheet was created for this study (see Appendix F). The number of Action Team meetings varied at each school (i.e., each intervention school held 4 – 6 Action Team meetings in the intervention year), therefore the number of meeting minutes collected varied for each HPSS intervention school (please refer to Table 24). I attended at least three Action Team meetings per intervention school and participated in the meeting and interacted with the Action Team members. A member of the Action Team recorded the meeting minutes. The recording sheet was collected at the end of the meeting or emailed to me for the meetings I did not attend.

Table 24
Action Team Meetings Conducted and Meeting Minutes Collected

School (Location)	Total # of Action Team Meetings			Meeting Minutes
	Semester 1	Semester 2	Total	
School 1	4	2	6	4
School 2	4	4	8	4
School 3	3	2	5	3
School 4	4	2	6	3
School 5	4	0	4	3
Total	19	10	29	17

Observations. School visit observations and Action Team meeting observations were used to: (a) observe behaviours of participants in order to gain insight into their

motivation towards planning and implementing the HPSS intervention; and (b) allow the researcher to enter into and understand the intervention setting and the experiences of the participants.

Observations of school visits. The purpose of the observations allowed the researcher to collect data on the behaviours and interactions of the participants. Throughout the intervention I visited the intervention schools, talked to participants about their experiences with HPSS, observed and participated in school events, and recorded specific observable behaviours. The observations were guided by a pre-determined protocol in which project implementation activities, notable non-occurrences, and discussion with participants were recorded (see Appendix G). Fifteen school observations (e.g., discussions with participants, observations of school events) were recorded (three per intervention school).

Observations of Action Team meetings. The purpose of the observation of Action Team meetings was to document the behaviours of the Action Team members. Specifically, the objective these observations was to record participants' contribution to the meetings, the engagement of youth members, and participants' motivation towards planning and implementing healthy living strategies into their school. I attended at least three Action Team meetings per intervention school and recorded my observations for these meetings. In order to standardize the recording of observations, a meeting observation guide was created for this study. Specific observable behaviours were pre-determined in relation to the research question and an observational protocol was used. Field notes were taken during the meetings and after the meetings. Appendix G includes the observation recording form used for school visits.

Focus group interviews. Semi-structured focus group interviews were conducted to capture the experiences and motivational of the participants within the HPSS intervention. Focus group interviews were conducted with Action Teams members and teachers from the five intervention schools. Questions in the focus group interview guide were focused on gathering information about the experiences of students and teachers in the planning and implementation of the HPSS intervention. Specifically, interview questions concerned the factors that helped participants implement the HPSS intervention and the factors that hindered the implementation of HPSS. Questions also included areas in which the intervention could be improved. All focus group interviews were audio-recorded.

Action Team. Five focus group interviews were conducted with members of Action Teams, one interview at each intervention school. Student Action Team members and teacher Action Team members were interviewed together in one focus group interview. An HPSS research team member led focus group interviews with the Action Team. The interview guide covered the following topics: (a) factors facilitating and inhibiting the planning and implementation of whole-school events and policies (e.g., "What factors do you think facilitated the planning and implementation of the events and activities?"); (b) Action Team members perceptions and satisfaction of autonomy, competence, relatedness (e.g., "Did you feel you were able to make your own decisions regarding the implementation of the events and activities?"); (c) improvements and suggestions to enhance the success of HPSS (e.g., "What improvements could be made to HPSS to enhance its success in other schools?"). Appendix I includes the focus group interview guide for the Action Team participants.

Teachers. Focus group interviews were conducted with Planning 10 teachers (n = 4) and Physical Education 10 teachers (n = 5). Focus group interviews were conducted separately based on subject taught – Planning 10 teachers and Physical Education 10 teachers were interviewed separately. Each focus group included 2-4 participants. Interviews were conducted with teachers during their preparation time, lunchtime, or after school at the end of semester one (i.e., January/February). I conducted all interviews with Planning 10 and Physical Education 10 teachers. The interview guide covered the following topics: (a) factors facilitating and inhibiting the planning and implementation of HPSS Planning 10/Physical Education 10 (e.g., "What factors do you think facilitated the planning and implementation of the HPSS Physical Education 10 program?); (b) teachers' perceptions of autonomy, competence, relatedness (e.g., "Did you feel you were able to make your own decisions regarding the implementation of the activities and actions in the Planning 10 lessons?"); (c) improvements and suggestions to enhance the success of HPSS (e.g., "What improvements could be made to HPSS Physical Education 10 to enhance its success in other schools and physical education classes?"). Appendix J includes the focus group interview guide for teachers. Table 25 includes an overview of the data collected in Project 1.

Table 25
Overview of Data Collected in Project 1

Data Source	Data Collected
Documents	
Action Team Meeting Minutes	17 meeting minutes recorded
Observations	
School Visits	15 observations recorded (3/school)
Action Team Meeting Observations	19 observations recorded
Focus Group Interviews	
Planning 10 Teachers	4 focus group interviews
Physical Education 10 Teachers	5 focus group interviews
Action Teams	5 focus group interviews

Trustworthiness

Consistent with qualitative research methods a level of trustworthiness must be established. Thomas et al. (2005) described trustworthiness as a quality achieved in a study when the data collected are generally applicable, consistent, and neutral. Researchers (e.g., Lincoln & Guba, 1985; Miles & Huberman, 1994; Patton, 2002; Thomas et al., 2005) frequently discuss four concepts to establish the quality of qualitative data: credibility, dependability, confirmability, and transferability. The following section describes how these four concepts were addressed in Project 1. First, credibility or verification refers to the 'truth value' of the findings (Lincoln & Guba, 1985; Thomas et al., 2005). Credibility has been addressed in this project through triangulation, prolonged engagement, and peer debriefing. Triangulation is a method used in qualitative studies to check and establish trustworthiness or validity from multiple perspectives (Miles & Huberman, 1994; Patton, 2002). In this study, two types of triangulation were used: data triangulation and methodological triangulation. Data triangulation, according to Creswell and Miller (2000), involves using multiple and different sources of information to enhance the validity of the research study. The purpose of data triangulation is the collaboration and converging of evidence from multiple sources. Within this project, in-depth interviews were conducted with different groups of participants including Action Team members, Planning 10 teachers, and Physical Education 10 teachers from five different schools. The second type of triangulation used in this study was methodological triangulation, specifically 'within-method' triangulation. Within-method triangulation occurs when the researcher uses multiple methods within a qualitative or quantitative paradigm to increase validity of the

research findings (Casey & Murphy, 2009; Denzin, 1989). For this investigation, three methods of data collection were used to address the research questions: minutes from Action Team meetings, observations notes from school visits and Action Team meeting observations, and focus group interviews.

Prolonged engagement was also used to establish credibility within this study. Ryan, Coughlan, and Cronin (2007) recommend prolonged engagement between the researcher and the participants in order to establish relationships and trust. I was in regular contact with Planning 10 teachers, Physical Education 10 teachers, and Action Teams over the course of the intervention (i.e., approximately 12 months) to develop relationships and establish trust. I visited the participant schools numerous times over the year to develop an in-depth understanding of the intervention and the participants. I also attended the Action Team meetings to gain understanding of their implementation and planning of the school-wide events and health policies and attended several whole-school events.

The second concept to address the quality of the data in a qualitative study is dependability. Thomas et al., (2005) stated that dependability or validation refers to a study's consistency or the soundness and accuracy of the findings. To achieve dependability within this study I completed member checks. According to Thomas et al. (2005), member checking occurs when the researcher goes back to the participants to share the results and see whether they agree with them. Schwandt (2001) described member checks as an important procedure for verifying the findings and ensuring they are valid. Participants were given the transcripts (via email) and asked to review them for accuracy, send any changes back, clarify statements, and add anything that may be

missing. As a result of member checking, a few participants added additional comments to questions within the transcripts. Dependability was also enhanced through triangulation, as described above, to ensure that the limitations of one method of data collection are counteracted by the use of alternative data collection methods.

Confirmability refers to the demonstration and description on how study conclusions have been reached and addresses whether another individual can place faith in the results (Ryan et al., 2007; Thomas et al., 2005). Confirmability in this project was established through the use of an audit trail in which decisions about data collection and the interpretation of data are carefully documented in a manner to which another researcher can arrive at the same conclusions about the data. An in-depth description of the processes within the project was provided to allow others to assess the extent to which proper research practices have been followed. All decisions were carefully tracked and recorded through all stages of the research processes. In addition, according to Ryan et al., (2007) confirmability is usually established when credibility and dependability are achieved.

The fourth concept to establish trustworthiness in qualitative research is called transferability and is defined as the potential for the results of one setting to be transferred to other settings (Ryan et al., 2007; Thomas et al., 2005). Transferability is crucial when evaluating whether or not the results may be useful in other settings or to those who are conducting similar research (Merriam, 2009; Ryan et al., 2007; Thomas et al., 2005). Since generalizability is not a goal of qualitative inquiry and most qualitative research studies do not benefit from large randomly selected populations, transferability is an important quality to establish in qualitative studies. To establish transferability, the

researcher may present reasons why a given study may apply to other settings. Context, participants, and setting are critical when interpreting the results of qualitative research and must be presented clearly in order for readers to evaluate the conclusions (Merriam, 2009; Thomas et al., 2005). In this project, results may be transferable to other schools, as many schools operate in a similar fashion within a similar setting, but ultimately the reader must determine the study's transferability (Ryan et al., 2007; Thomas et al., 2005). To address transferability, a thorough description of the schools and participants is included in this project (e.g., school location, school population, participant characteristics). This will allow readers to assess whether the setting and results will transfer to their particular setting or future research study.

Analysis

Qualitative thematic analysis was used to identify patterns and themes within the data set. All data were stored and analyzed together using NVivo 10.0, a qualitative data management program. The content of the minutes from Action Team meetings, observations, and focus group interviews were reviewed for categories and themes. Thematic analysis was carried out combining the different data sources. This section will discuss the steps used to analyze the data. Analysis of the data was completed following the methods outlined by Braun and Clark (2006).

To understand the participants' experiences and motivation towards planning and implementing the HPSS intervention, meeting minutes, observations, and focus group interviews were analyzed using thematic analysis. Thematic analysis involved searching across a data set to find repeated patterns of meaning. Braun and Clark define a "pattern of meaning" as meanings that cluster together to form themes from the data. Braun's and

Clark's (2006) six phases for thematic analysis were followed: Phase 1: Familiarize yourself with the data; Phase 2: Generate Initial Codes; Phase 3: Search for Themes; Phase 4: Review Themes; Phase 5: Define and Name Themes; and Phase 6: Produce the Report. In Phase 1, meeting minutes, observations, and interviews were transcribed into Microsoft word documents and the data were read and re-read in order to familiarize myself with the data and identify regularities and patterns. Braun and Clark (2006) recommended reading the data in an active way, where the researcher is searching for meanings and patterns. The authors also suggested taking notes during this phase to refer back to in the subsequent phases. I took notes and recorded coding ideas as I read through the transcripts. At the end of Phase 1, I had read and familiarized myself with the data, generated an initial list of ideas and what was distinct about each of them.

In Phase 2, words and phrases that represented the topics and patterns were recorded into initial codes, which represent the most basic element of the raw data. In this phase I followed the suggestions of Braun and Clark, I coded (a) for as many potential themes as possible, to keep possibilities open later; (b) extracts of data inclusively, meaning I kept a portion of the surrounding data to ensure I did not lose the context; and (c) individual extracts of data into all themes in which they fit into.

In Phase 3, codes were sorted into different potential themes. Following the recommendations of Braun and Clark (2006), I began to consider how different codes may combine to form an overarching theme and used a visual representation to help sort the different codes into themes (i.e., NVivo map). At the end of this phase, a collection of possible themes and subthemes were formed and all extracts of data were coded in relation to them.

In Phase 4, themes were reviewed and refined looking for themes that cohered together meaningfully with clear and identifiable distinctions between themes. Braun and Clark (2006) suggested two levels of reviewing and refining the themes. Level one involved reviewing at the level of the coded data extracts, meaning all collated extracts for each theme appear to form a coherent pattern. If a theme does not fit or is problematic then the theme needs to be reconsidered, re-worked, or a new theme needs to be created. Once themes appear to form a coherent pattern and a candidate thematic map, level two of the analysis began and followed a similar pattern in level one but involved the entire data set. At this level, I considered if the thematic map accurately reflects the meanings evident in the data set as a whole and coded any additional data within themes that had been missed in earlier coding stages. By the completion of this phase I had a fairly clear picture of what the different themes were and how they fit together.

In Phase 5, themes were defined and further refined to identify the essence of what each theme was about and the aspect of the data that each theme captured. Braun and Clark (2006) suggested determining what aspect of the data each of the identified themes captures. I completed this by going back to the collated data extracts for each theme and paraphrasing the content of the data with narrative on what was interesting about each them and why. At the completion of Phase 5, themes were clearly defined, described in two or three sentences, and named.

Phase 6 involved the writing of the analyses and describing the data through narrative descriptions. This phase began, when I had a set of fully worked-out themes. I followed Braun and Clark's (2006) recommendations of providing sufficient evidence of the themes through data extracts to represent the prevalence of each theme. I embedded

these extracts into narrative descriptions of the data and making an argument in relation to my research question. At the completion of this phase, the story of the data was presented in a concise and coherent manner.

Results

The following section presents the results of the qualitative thematic analysis. Five distinct themes resulted from analysis of focus group interviews, observations, and the minutes of Action Team meetings. The themes are described in detail using excerpts from the three data sources and provide insight into the experiences of Action Team members, Physical Education 10 teachers, and Planning 10 teachers as they plan and implement HPSS initiatives. The first two themes focus on the barriers to and supports for the implementation of HPSS intervention components. The third theme focuses on the choices provided within the HPSS intervention design and how this contributed to participants' experiences during implementation. The fourth theme highlights the varied level of student engagement on HPSS Action Teams. The final theme concentrates on the impact of teacher job action within schools at the time of the intervention on the implementation of the HPSS program. Table 26 includes titles of the five themes from the qualitative analysis of the meeting minutes, observations, and focus group interviews.

Table 26
Themes from the Meeting Minutes, Observations, and Focus Group Interviews

Theme 1: Competing Responsibilities, Technical Difficulties, and Lack of Computer Access
Theme 2: Resources, Reminders, Workshops, and Collaboration
Theme 3: Choice-Based Design Impacts Participants' Experiences
Theme 4: Teacher Control Impacts Student Engagement
Theme 5: Teacher Job Action Inhibited Implementation of HPSS Action Plans

Theme 1: Competing Responsibilities, Technical Difficulties and Lack of Computer Access

Theme 1 describes the major barriers inhibiting participants' level of implementation of the HPSS program. Action Team members, Physical Education 10 teachers, and Planning 10 teachers encountered barriers when planning, developing, and implementing school-wide events/policies and curricula components. Based on the focus group interviews, minutes from Action Team meetings, and observations, the participants accomplished the basic implementation goals of the program; however, participants experienced two major barriers that inhibited their level of implementation. These two barriers included: (a) competing responsibilities and (b) technical difficulties and lack of computer access. These two barriers to HPSS implementation differed among participant group (i.e., Action Team members, Physical Education 10 teachers, Planning 10 teachers). Competing responsibilities was a barrier to the implementation of HPSS experienced by Action Team members and Physical Education 10 teachers. The multiple responsibilities Action Team members and physical education teachers encountered each day impacted the time they were able to devote to the HPSS program. Action Team members (both student and teacher members) and physical education teachers described their desire to plan and implement more HPSS actions/activities but due to other demands such as coaching, teaching responsibilities and other committee obligations they felt limited in what they could accomplish.

Technical difficulties and lack of access to computers inhibited the implementation of the HPSS program among Planning 10 teachers. Planning 10 teachers reported the HPSS website was not functioning as intended, which inhibited their use of

the website and associated activities. In addition, teachers discussed the limited accessibility of computer labs within their schools also inhibited HPSS website use. Competing responsibilities, technical difficulties, and lack of computer access were barriers influencing participants' level of implementation of the HPSS intervention components and are described in further detail in the ensuing sections.

Competing Responsibilities. Competing responsibilities was a barrier to the implementation of HPSS among student and teacher Action Team members and Physical Education 10 teachers. For Action Teams, members struggled with the tension of implementing their planned actions and other competing obligations. Action Team members wanted to implement more events and policies within their school to promote positive health behaviours among students, however, because of other responsibilities several Action Teams were not able to implement the HPSS program as desired. Action Teams in each HPSS intervention school were asked to develop and implement a minimum of one school health policies and two school-wide events/campaigns and record their policies and events in a tracking tool provided. At the beginning of the school year Action Teams developed an Action Plan with proposed events and activities. Based on the data collected, some of the planned events and activities were not completed. Action Teams had difficulty scheduling meeting times to plan and implement the activities within their Action Plans. This difficulty with scheduling meetings to implement the events and policies within their Action Plan was demonstrated in an excerpt from the Action Team meeting minutes and a quotation from a teacher Action Team member:

> Action Team members are struggling with the feasibility of implementing their ideas and actions that they had planned at the beginning of the year. The members want to put on events but feel it is not doable due to time constraints. (AT Meeting Minutes 3)

Action Teams described the multiple responsibilities that inhibited their ability to plan and implement HPSS whole-school events and policies. Both teacher and student Action Team members described the struggle of balancing the HPSS committee responsibilities and other commitments. Student Action Team members described the conflicts between academic responsibilities and other committee obligation and the time needed for HPSS. Teacher members experienced time conflicts between implementing the HPSS whole-school events and policies and the everyday demands required for their job. Quotes from two student Action Team members and one comment from a teacher Action Team member demonstrate the difficulty in implementing events and policies due to competing priorities and other responsibilities:

> I think it was just everything and just in a busy school year and we all have busy crazy active lunch hours and stuff that finding time to meet is always tough. (Female Student – AT 4)

> Some people were just socially busier than others and it always just felt for me that we always just ran out of time in planning and stuff. But I don't honestly think that would change in any school year, you know, we're all just so busy that that was the one thing that time wise for me was a challenge. (Female Student – AT 3)

> Looking at a calendar and going okay not this week, when is our window? It was like one day where we said 'Lets make it happen.' We had a week and a half to do it (plan and implement an event)…because we have so many outdoor pursuits happening that we have numerous kids on trips…yeah so I think time is honesty our biggest challenge. (Female Teacher – AT 4)

Although Action Teams had difficulty scheduling the time needed to implement the planned activities in their Action Plans, a few Action Team members did express the gratification they felt when the events/policies in their action plan were implemented. One teacher described this in the following statement:

> Stuff in our Action Plan from the beginning we actually followed through on a lot and it was neat that it actually came to fruition. (Female Teacher – AT 1)

Competing responsibilities also inhibited physical education teachers' level of HPSS implementation. Physical Education 10 teachers were asked to implement at least one action from each SDT construct (autonomy, relatedness, competence) in every physical education lesson through a selection of strategies provided in the HPSS Physical Education 10 resource. When physical education teachers were asked to describe their experiences implementing the HPSS Physical Education 10 module, most Physical Education teachers indicated that competing responsibilities was a barrier to their implementation. One physical education teacher stated, "This semester was fairly busy for me. But in terms of how I like it (HPSS Physical Education 10), that's high. But in terms of what I could have done, I could have done more. So I rate medium" (Male PE Teacher – PE 4). The data collected from school observations also represented the busy everyday schedules of physical education teachers:

> Today the PE office was extremely busy. It was hard to discuss the progress with HPSS PE 10 with the PE teachers. They were too busy to have a solid conversation with me. (School Visit Observation 8)

Physical Education 10 teachers discussed several other responsibilities that conflicted with the implementation of physical education curricular piece of HPSS. These included other academic responsibilities, coaching obligations, and everyday demands of the job. For example, two Physical Education 10 teachers commented:

> With teaching another subject like science most of my prep time goes to science…setting it up and marking. I did look through the binder every once in awhile. And once basketball season started up I need to go to practice. I did use it but not as much as I probably should have. (Male PE Teacher – PE 2)
>
> It's distracting the revolving door of the PE office and the basketball and the eligibility appeals and the sports and the recycling. (Female PE Teacher – PE 2)

In the focus group interviews many Physical Education teachers discussed they implemented actions in certain sections of the HPSS Physical Education 10 resource binder more often than actions in other sections. This difference in implementation levels among the sections within the HPSS Physical Education 10 resource binder appeared to be due to the amount of preparation time some sections required to plan for the associated activities. Several physical education teachers explained the "Choice" section of the HPSS Physical Education 10 module was highly implemented, whereas the other two sections, "Skills, Knowledge and Leadership" and "Connection and Belonging" were less implemented. The teachers noted the actions/activities/lessons in the Choice section were the quickest and easiest to implement and required the least amount of preparation time.

For example, allowing students to choose a partner or choose 8 of 10 stations did not require a lot of extra planning or preparation. Whereas activities such as implementing pedometers into a lesson or incorporating team building games into a unit required more preparation. One teacher stated, “I found that the choice was easy, didn’t take anymore time, it’s the middle section (Skills, Knowledge, and Leadership) one that was tough. I would have had to use a lot of extra prep time for that” (Male PE Teacher – PE 4).

Although several physical education teachers discussed they implemented actions from the Choice section most often, a few physical education teachers noted the Skills, Knowledge, and Leadership section of the HPSS Physical Education 10 module was the section they implemented the most due to the ready -to- use lessons and activities. This section of the resource manual included ready-to-use resources such as fitness circuit cards and workout programs. A few teachers commented they used the resources in this section because the lessons and activities were ready to go and did not take a lot of preparation time. In addition, they felt the Choice section could be implemented easily into the Skills, Knowledge, and Leadership section of the HPSS Physical Education 10 resource binder. For example, providing students choice of 10 of 12 yoga poses from the yoga circuit cards in the Skills, Knowledge, and Leadership section allowed teachers to incorporate two sections of the Physical Education 10 module in one lesson. This was evident in the following quote and observation note:

> I think I used the middle one (Skills, Knowledge, and Leadership section) for myself, like you got the workout and the yoga and circuits all ready to go and then you can add a little bit of the choice in there, ‘choose 5 of 7 stations’, ‘create a yoga sequence using 5 poses.’ (Female PE 10 Teacher – PE 2)

> The choice section seems to be the section teachers are using the most because they are able to incorporate it into other sections of the physical education module, and it is easily implemented and quick for teachers to do. (School Visit Observation 11)

In addition, the physical education teachers suggested they would have a higher implementation level if they were to implement HPSS into their physical education courses for a second time. Teachers emphasized more preparation time was necessary to become familiar with the HPSS Physical Education 10 program, build on the activities/actions implemented the first semester, as well as modify the activities to meet the specific needs of their students. Consider the following examples from two physical education teachers:

> Well, this is our first time doing it (HPSS) so I think if I had another shot at it I would improve. I think that's exactly what it is; you just have to build upon it. You use what you like out of the binder and then next semester you're going to build on it. Just to have another shot at it would help. (Male PE Teacher – PE 4)

> If I had this binder longer, like two years, I think I would start going in and changing things in the USB, modifying for whatever class I have. But for the first time round it was great that we could just pop things out of the binder. (Male PE Teacher – PE 3)

The availability of adequate time for planning and meeting in Action Team members and physical education teachers' daily schedules appeared to be an important barrier impacting the implementation of HPSS. The data showed the time available to plan and implement HPSS was limited and Action Team members and Physical

Education 10 teachers had difficulty scheduling to meet and plan for HPSS events and activities. Competing responsibilities for their time during the school day effected Action Team's ability to implement whole-school events and policies planned in their Action Plans. Competing responsibilities also effected physical education teachers' implementation of actions in all three sections of the HPSS Physical Education 10 resource binder. As a result, some sections were implemented more often than other sections. In sum, the competing responsibilities the Action Team members and Physical Education 10 teachers faced were barriers to the planning and implementation of the HPSS intervention.

Technical Difficulties and Lack of Computer Access. The primarily barrier faced by the Planning 10 teachers focused on technical difficulties associated with using the HPSS website and online resources. For the beginning portion (approximately 3 weeks) of the intervention, the HPSS website was not working properly and accessibility to the school computer lab was limited in some of the intervention schools. In the HPSS Planning 10 module, one lesson required students to use the HPSS website. In this lesson students were instructed to log onto the HPSS website and complete self-report questionnaires to assess their health behaviours. In addition, Planning 10 classes were encouraged to use the HPSS website throughout the course to monitor and track student health goals and progress. The Planning 10 teachers discussed they had technical difficulties with the HPSS website. Several teachers reported that when they asked their students to log into the HPSS website the students were unable to do so. When this issue was resolved by the HPSS research team, they had already moved on to a different lesson or unit and did not take their classes back to the computer lab to access the website. The

following quotes from two Planning 10 teachers and an observation note reflect this issue:

> I had allocated three days to the website so I think when the trouble was first identified and then it took a long time for it to be fixed and then by that time I felt like there was no time left so I couldn't go back and actually get them on that website. I tried three times but then the kids weren't motivated to go back to it. (Female Planning 10 Teacher – Plan 2)
>
> It was not developed on time and it was developed with some glitches and these are all the little things that turn off this type of student away from getting into it cause they have the first impression that this website is not good for me. (Male Planning 10 Teacher – Plan 1)
>
> Planning 10 teachers discussed their frustration with the website. Their students were unable to log on. They had planned their lesson around the website and therefore were fairly frustrated when it wasn't working. (School Visit Observation 6)

Teachers also reported access to a computer lab, which was needed to access the HPSS website, was limited due to the high demand of other teachers wanting to use the school's computer lab and/or limited number of computer classrooms within participating schools. This was a barrier to the implementation of the HPSS Planning 10 activities associated with the HPSS website and as a result the HPSS website was not used as intended. This was evident in the following quotes:

> "It is really hard to get into the computer labs at school. We only have three labs and it's just impossible to get in there" (Male Planning Teacher – Plan 3).

> "There are not a lot of grade 10 classes that are going to do that (use computers for curricula activities) or have access to a computer classroom, or take them down to a computer lab to do a project like this" (Male Planning Teacher – Plan 1).

Theme 1 described the barriers that inhibited participants' level of HPSS implementation. Competing responsibilities, technical difficulties, and lack of access to computer labs were prominent obstacles participants faced in participating in the HPSS intervention. The implementation process suffered from these identified barriers, and as a result, certain aspects of the intervention were not implemented as intended. Appendix K includes additional excerpts to represent Theme 1.

Theme 2: Resources, Reminders, Workshops, and Collaboration

Theme 2 provides insight in the type and amount of support that was necessary to help Action Teams and teachers implement HPSS into their existing practices. A few different types of support were identified by participants, including providing ready- to-use resources, offering workshop opportunities, collaborating and working with others on common HPSS goals, and providing frequent reminders and check-ins. In addition to the types of supports needed, participants discussed the amount of support required to overcome the challenges inherent in implementing a new program. In some instances a sufficient amount of support was achieved through the HPSS program, in other instances participants needed additional support. The type and amount of support necessary for participants to implement HPSS is further discussed within this theme.

The HPSS Physical Education 10 and Planning 10 curricular resources were identified as an important support strategy to implementing the HPSS program. Physical

Education 10 and Planning 10 teachers viewed the HPSS curricular resources as a supporting factor to the planning and implementation of the HPSS curricular components. Health Promoting Secondary Schools provided teachers with resource manuals (i.e., Physical Education 10 resource and Planning 10 resource) to help support the planning and implementation of HPSS. These resource manuals were designed to assist teachers implement actions, activities, and lessons into their classes which positively affect students' level of motivation towards physical activity and healthy eating. Although not all aspects of the resource manuals were used (e.g., HPSS website), as previously discussed in Theme 1, the manuals appeared to be the appropriate type of support needed to implement the HPSS program. One physical education teachers stated: "Ya it definitely helps implement the program when it's like, here's the stuff you need as opposed to here's the program good luck" (Male PE Teacher – PE 3). The HPSS resource manuals lessened the time it would have taken teachers to develop their own resources to meet the intervention objectives. As competing responsibilities was an identified barrier to participants' implementation of HPSS intervention components (Theme 1), the HPSS resource manuals enhanced teachers' ability to implement the intervention within their already busy schedules. In the absence of these resources teachers would have felt less able to meet the objectives of HPSS program, as they believed they would not have the time to create their own resources. This was evident in the following excerpts:

> Teachers seem pleased with the resources. A few teachers (Physical Education 10 teachers) discussed that they were happy we provided them with resources as they wouldn't have time to worry about how they were going to do the intervention. (School Visit Observation 1)

> I am so busy in the semester coaching or whatever just to have the resource binder to go to and pick things out of was really helpful (Male PE Teacher – PE4).
>
> If I had to do it with my own stuff I probably wouldn't of done it. Like I have my own health lessons that are part of planning but I will keep using this. It forms a good base for the health stuff of Planning 10 now that I made it into what I wanted to I will keep using it. (Male Planning 10 Teacher – Plan 1)

In addition, teachers perceived the resources as high quality documents containing user-friendly materials. Specifically, teachers described the resources as effective because of the inclusion of instructional methods the teachers were already familiar with and the alignment between HPSS objectives and existing curricular objectives. Teachers' perceptions of the HPSS resources are shown in the following quotations:

> I mean we are all pretty amazed at the resources. I mean if I didn't know anything – man! It's all right there! It's a piece of cake. I would have my whole plan and just add different implements or whatever. (Male PE Teacher – PE 1)
>
> I think it is good to be open to new ideas as long as it fits into the course we are teaching. If we have a health component already we didn't change we just incorporated your into the health component which is a component required by this course. So we are just having a new idea but keeping the curriculum. (Male Planning Teacher – Plan 1)

The resource manuals were provided to the teachers in two different formats: a hard copy and an electronic copy. The teachers discussed these two formats supported their implementation of the HPSS curricular components. The hard copy allowed teachers to easily select an activity and/or lesson from the binder and implement that activity/lesson

into their classes. The electronic copy, provided on a USB, allowed teachers to adapt HPSS activities/lessons to meet their own pedagogical preference and the needs of their students. Teachers noted these two formats as a support for the implementation of the HPSS curricular components:

> Having the binder to go off of and having the USB with everything then I could cut and paste what I want and make it what I wanted and how I wanted to teach it.
>
> If I just had to do exactly what was out of that book I would have just not done some of it cause I was like this isn't what I want so I would have just not done it. I could go though it and make it how I want it. USB stick was a huge help. (Male Planning 10 Teacher – Plan 2)
>
> I liked that there were some hand-out, clear lessons, and a USB key, and everything in digital form was nice so I could adapt a little bit if I wanted to. I thought it (Planning 10 resources) was very well written and at a good level for the kids. (Male Planning 10 Teacher – Plan 3)

The HPSS workshop was also an effective type of support identified by all three participant groups (i.e., Action Teams, Physical Education 10 teachers, Planning 10 teachers). As part of the HPSS intervention, Action Team members, Physical Education 10 teachers, and Planning 10 teachers participated in a workshops to familiarize themselves with the HPSS program. As the HPSS School Health Facilitator, I delivered Action Team workshops and teacher workshops (separate Physical Education 10 and Planning 10 teacher workshops). The workshops took place at the beginning of semester 1 (i.e., early September) and were one to two and a half hours in duration depending on the timeslot provided by schools. The workshops had three main goals: (a) create

awareness of the four goals of HPSS (increase the levels of physical activity [overall and in physical education], fruit and vegetable consumption, and enrolment in optional physical education; and, decrease the amount of screen time and sugar sweetened beverage consumption); (b) familiarize participants with the HPSS intervention components and tracking tools; and (c) provide examples of actions/activities/lessons for teachers and examples of whole-school events and policies for Action Team members. Action Team members, Physical Education 10 teachers, and Planning 10 teachers believed the HPSS workshop supported their level of implementation. Consider the following quote, "It was motivating to have you come in for that workshop. If you hadn't come in I don't know how much motivation we would have had to look through all that material" (Female Planning 10 Teacher – Plan 2).

Although providing participants with a workshop opportunity at the beginning of the intervention year was generally viewed as an effective strategy to support HPSS implementation, the amount of time for the workshop was insufficient to support the needs of Physical Education 10 teachers. Physical Education 10 teachers suggested more time be devoted to the workshop due to the vast amount of information being covered and suggested having an additional workshop in the middle of the semester to re-group, discuss what has been going well, and any issues that have arose. These quotes reflected the Physical Education teachers' perceptions of the HPSS workshop and represent the need for more allotted time for workshop opportunities:

> "In terms of helpful, if you didn't do it (the workshop) then that would have been not good, so it was good that you came, just longer." (Male PE Teacher – PE 4)

> "It almost felt overwhelming having all those resources and really only having an hour or so (for the HPSS workshop). I almost wonder if it would be worthwhile doing as a Pro-D option. And having a full day's workshop for PE teachers to sign up." (Male PE Teacher – PE 3)
>
> "Maybe if we had a Pro-D day, like we had at the beginning, if we had another workshop in the middle. Especially half way in so that we had time to try a few things and then come together and talk. That would have helped." (Male PE 10 Teacher – PE 4)

Another issue with the HPSS workshop discussed in the interviews with all participant groups was the length of time between the workshop and the start of the HPSS intervention. After the completion of the workshop teachers had to wait to implement the HPSS intervention until after students' baseline measurements were complete. This meant, that participants had to hold off on implementing the HPSS lessons and activities until two to four weeks after the workshop. Many participants expressed the workshop had motivated them to start implementing HPSS, however, this motivation was lost during this waiting period. One physical education teacher expressed this in the following quote:

> "We met and then didn't do anything for like three weeks. That gap was no good. It would be better to come and give us an intro then come back when we were allowed to start. You got us all motivated and geared up then by the time we could do it that motivation and excitement was lost." (Male PE Teacher – PE4)

In addition to resources, email reminders, and workshop opportunities, the opportunity to collaborate with others involved in the HPSS program was identified as an

effective type of support strategy. The support received from collaborating with others involved in the HPSS programs was seen by Action Team members, Physical Education 10 teachers, and Planning 10 teachers as an important support strategy for the implementation of the HPSS intervention. Several aspects appeared to contribute to meaningful collaboration. These aspects included: a sense of connection to the program; working with others towards a common goal; discussing HPSS with others to help generate and share ideas; and sharing the workload. Action Team members discussed how the collaboration with other members on the Action Team helped in the planning and implementation of whole-school events and policies. For student Action Team members working towards a common goal created a fun environment where they could develop and implement events and policies for their school. Student members described being part of the school Action Team provided a sense of belonging to their school community and a fun and enjoyable experience. This was evident in a comment from a student Action Team member and an observation note from an Action Team meeting observation:

> Working with others made it more fun and you did things as a group instead of by yourself. And it was a good way to get involved in the school community and knowing that it was making people make healthy choices was good. (Male Student AT Member – AT 2)
>
> Student members seem to be collaborating and having fun doing so. (AT Observation 5)

Due to other commitments such as academic work and being members of other school committees, the schedules of student Action Team members were demanding. Student

Action Team members described the ability to share the workload with other members helped them accomplish their team's goals. Two youth members and an excerpt from an Action Team meeting minute described this sentiment:

> Talking to each other and generating more ideas was helpful to figure out what activities to put in for the next month or next couple of weeks. (Female Student AT Member – AT 2)
>
> Spreading the work out as well. We have other commitments and if one person couldn't make something they could be like oh ya could you go and do that. (Female Student AT member – AT 3)
>
> Students grouped together and assigned tasks to be finished next meeting. (AT Meeting Minute 8)

Teachers also mentioned that the collaboration with others supported their implementation of the HPSS Planning 10 and Physical Education 10 modules and enhanced their level of connection with other teachers in their department. Teachers described that this strategy supported implementation through the sharing of resources and the generation of new ideas. Physical Education 10 teachers shared HPSS resources they had used in their classes with other teachers in their departments. Planning 10 teachers met together as a group at the beginning of the year, discussed the HPSS lessons and how they felt these lessons could be incorporated into their existing programs. In some schools, the Planning 10 teachers continued to meet several times throughout the year to discuss progress and share ideas with one another. This collaborative support was evident in a school visit observation note and two excerpts from the focus group interviews:

> A Planning 10 teacher discussed that his colleague has already taught the health unit this semester. He was meeting with him to talk about how he fit HPSS into the health unit and any suggestions he may have. (School Visit Observation 10)
>
> We would meet to discuss HPSS and share our progress and what worked and what didn't work. The sharing was nice and helpful. (Male Planning 10 Teacher – Plan 4)
>
> It (HPSS) increased that (collaboration with other Physical Education teachers in their school). We normally don't collaborate. If I see them doing a fun game I might ask them about it. It definitely encourages it. (Male PE Teacher – PE 4)

Although the Physical Education 10 and Planning 10 teachers discussed collaborating with others was a type of support strategy that assisted in the implementation of the HPSS curricular components, they also expressed that more collaboration could have further supported them in the planning and implementation of HPSS. Specifically, teachers suggested two additional collaborative relationships that might have further supported their participation in the HPSS intervention: (a) connecting with teachers in other departments within their school that were involved with HPSS (e.g., Planning 10 teachers collaborating with Physical Education 10 teachers); and (b) connecting with other teachers in other HPSS schools (i.e., cross school collaborations). Teachers explained collaborations would have helped generate new ideas, create a sense of community, and develop a larger HPSS network. A few participants perceived a lack of awareness of the HPSS model as a whole. They expressed their awareness of the portion of the project they were directly involved in (i.e., Physical Education 10, Planning 10, or Action Team); however, were unaware of other components of the HPSS

program. For example, a Planning 10 teacher explained how he knew there was a Physical Education 10 HPSS component but he did not know what it was and believed it would be beneficial for all teachers to be aware of the entire HPSS initiative.

> It would be interesting to know what they are doing on the other side of your project like I have a general idea, but the Planning 10 teachers may want to know ok you are doing this and the PE teachers are doing this. (Male Planning 10 Teacher – Plan 1)

Participating teachers also suggested that creating connections between HPSS schools might help create a larger network and enable HPSS participants to share their experiences. One physical education teacher explained:

> We hardly ever see anyone from other schools, especially from 61 and 63 (school districts) so having that would beneficial too, just making those connections and all of a sudden, we're emailing people at 'School X' or at 'School Y' and exchanging ideas, so I think just building that network would be a really beneficial thing. Cause right now with this I know there are 9 other schools involved but everybody their just blank faces. Like I know its happening in Chilliwack, but I have no idea who's doing it or what they are doing. (Male PE 10 Teacher – PE 3)

An effective support strategy identified only by Physical Education 10 teachers was email reminders. I sent bi-monthly reminders to all participant groups (Action Teams, Physical Education 10 teachers, Planning 10 teachers) throughout the intervention year. These emails included general reminders to implement HPSS actions and to track their actions in the provided tracking tools. I also suggested specific

action/activities/lessons from the HPSS curricular resources binders for Physical Education 10 teachers and Planning 10 teachers and sent Action Teams suggestions for whole-school event and policies (e.g., Active Transportation week). Although email reminders were sent to all participants, physical education teachers were the only participant group to identify the emails as a support strategy for implementation. Physical education teachers described these emails as an effective method to help them remember to implement HPSS and guide them to activities in the resource binder. Two physical education teachers expressed this in the following comments:

> Anytime I got an email from you it really helped I was like 'oh ya I got to do this'. Emails are good keep doing that. Even if I saw your name and I didn't open it it reminded me. (Male PE 10 Teacher – PE 2)
>
> The reminders helped! I even have things photocopied and ready to go and then days like today happen and you are like I guess I am not doing that today. Then oh Christmas is here and oh… so its ready but I need to implement it and then just the class just happens and some times its just not what I intended. (Female PE 10 Teacher – PE 2)

Whereas the Physical Education teachers expressed the email reminders was an effective support strategy to the implementation of HPSS Physical Education 10, they suggested the need for more email reminders than the bi-monthly schedule. Physical education teachers suggested receiving more email reminders were have helped increase the number of HPSS Physical Education 10 actions/activities/lessons they implemented into their classes. Consider the following excerpts:

> Teachers (Physical Education 10 teachers) asked for more reminder emails from me as they are struggling to remember to implement HPSS. (School Visit Observation 10)
>
> More emails from you (when asked what would improve implementation you more). (Male PE 10 Teacher – PE 1)

Overall, several supports were needed to implement the HPSS program into existing practices. These supports included resources, reminders, workshops, and collaboration with others. Although these types of supports were provided to participants, the amount of support provided by these strategies, at times, was insufficient. To further support implementation, participants identified the need for more frequent email reminders throughout the intervention, greater workshop opportunities to support the implementation of the HPSS intervention, and more opportunity for collaboration between others involved in the intervention. Appendix L provides additional support for Theme 2.

Theme 3: Choice-Based Design Impacts Participants' Experiences

This theme represents participants' perceptions on the choices provided within the HPSS intervention design and how this contributed to their efforts to implement the program. The HPSS program was a choice-based design in which participants were required to deliver a minimal threshold of HPSS intervention components, while specific intervention pieces and implementation details were tailored to meet needs of individual school communities. The type and amount of choices provided to participants differed based on intervention component. Meaning that, Action Teams, Physical Education 10 teachers, and Planning 10 teachers were all given different choices within the HPSS

program design. The type and amount of choice within the HPSS design varied from "open-ended" in which participants could create and implement their own actions and activities, to developed lessons with choices embedded in the lesson format (e.g., Planning 10 teachers could choose to implement one of two ready-to-use activities to assess who and what influences students' personal health behaviours in Lesson 4 of the curricular module). Specifically, Action Teams were given an open-choice format in which they had to generate ideas, create an Action Plan, and develop and implement whole-school events and policies of their choosing. Within the HPSS Physical Education 10 component of the intervention, Physical Education 10 teachers were provided with a comprehensive list of actions and ready to use resources that they could choose to implement into their existing practices throughout an entire semester. For HPSS Planning 10 component, the choices within the HPSS Planning 10 module were embedded within the six lessons. In most cases, Planning 10 teachers were asked to make one of two choices within each of the six lessons. This theme highlights the different perspectives of the choice-based design of the three intervention components and how this impacted the participants' experiences with HPSS.

The perceptions of the choices provided to HPSS Action Teams differed among Action Teams. When Action teams were asked in the focus group interviews what factors made it difficult to implement HPSS, two Action Teams discussed the difficulty creating an Action Plan. The field notes from the Action Team meetings also supported this notion. Specifically, these HPSS Action Teams described the difficulty they had generating ideas for whole-school events and policies. Within the compulsory part of the HPSS program, Action Teams were required to plan and implement a minimum of two

whole-school events and one school health policy. An "open choice" format was offered in which Action Teams could design and implement physical activity and healthy eating events and policies that met the needs of their school. The members emphasized the need for more direction and fewer choices within the HPSS design. According to these two Action Teams, this would have improved their experiences with HPSS and their implementation of whole-school events and policies. Members on these Action Teams commented that even though examples were provided in the HPSS Planning Guide, it was difficult to generate ideas for the whole-school events and policies that met their schools needs and were practical and logistically feasible. Comments from the focus group interviews and field notes from observations of the Action Team meetings showed that trying to generate ideas for their Action Plan monopolized the majority of the Action Team meetings. The time used for the generation of ideas could have been allocated to the implementation of the activities. This is demonstrated in a quote from a student Action Team member and two excerpts from Action Team meeting observations:

> It's incredibly hard to come up with our own ideas, to be thinking creatively and you know, think that what you're actually thinking is a good idea or thinking of how you're going to put it to use. It's a lot easier to sort of brainstorm if you've already have something…someone comes in and says to you let's try and do this. (Male Student Action Team Member – AT3)
>
> Most of the meeting was spent coming up with ideas for their Action Plan. (Action Team Meeting Observation 2)

> The Action Team is still trying to come up with ideas for their school plan. At this point Action Plans should be completed and started to be put into action. (Action Team Meeting Observation 5)

To help in the development of Action Plans, members from these two HPSS Action Teams recommended providing teams with more concrete ideas for HPSS events and policies. The members suggested providing Action Teams with a generic Action Plan with school-wide events and policies that could meet the needs of most schools or a list of events and policy ideas that Action Teams could choose from. The participants recognized the importance of providing Action Teams' with choice in order to meet the individual needs of participating schools and allow input into the Action Plan; however, they felt the process of developing an Action Plan was too challenging and time consuming. The following comments and excerpts from collected documents reflect this:

> Maybe if you came in with that and said 'This is an idea that you know most schools go with, maybe try this right off the bat' and then that might be one way to sort of get rolling. (Female Student – AT 4)

> Provide some ideas, at least all schools could probably need, there's probably a few things that everybody could agree that you need anyway. By coming up with your own ideas it actually is more difficult. (Male Student – AT 3)

> Action Team members asked me to send them additional ideas for whole-school events and policies to help generate ideas for actions in their school. (Action Team Meeting Minute 2)

Based on the data collected, two of the five Action Teams perceived the choice format as too open-ended and would have preferred more direction and perhaps a generic

Action Plan to help with the generation of whole-school events and policy ideas. The purpose of the open choice format was to meet the needs of individual schools by allowing Action Teams to create their own action plan. However, the cost of this choice design was the time needed to generate ideas and develop an action plan. The other three Action Teams did not mention the choice-base format in the interview conversations as impacting their experiences with the HPSS intervention.

Within the compulsory part of the HPSS Physical Education 10 program, physical education teachers were asked to implement at least one action, of their choosing, from each of the sections in the HPSS Physical Education 10 resource binder in every physical education lesson. The HPSS Physical Education 10 resource manual was divided into three sections: (a) Choice; (b) Skills, Knowledge, and Leadership; and (c) Connection and Belonging. As such, Physical Education 10 teachers were required to implement three HPSS actions into each Physical Education class. Within these three sections, numerous actions, activities, lessons, and units were provided for teachers to select from. Although Physical Education 10 teachers perceived having choices was essential to effective implementation into existing practices, the amount of choices provided was viewed as time consuming and overwhelming. The physical education teachers needed a considerable amount of time to familiarize themselves with the options provided and select the actions/activities/lessons that best met their pedagogical preferences and the needs of their students.

Physical education teachers appreciated HPSS allowing them to select the activities to implement into their classes. The teachers valued and appreciated the flexible choice-based design of HPSS as it allowed them to remain in control of the materials

used in their classes and choose the actions/activities/lessons they perceived as most appropriate for their students. Many physical education teachers noted that having choices was motivating and without choices they would be less motivated to implement the program. This is described in the following excerpts:

> It was nice because you can pick and choose. It was so refreshing and that is motivating in itself. You think to yourself that you want to do it. (Male PE Teacher – PE 4)
>
> I wouldn't have done it. I would have been less motivated (on what would have happened if not given any choices). (Male PE Teacher – PE 4)

The teachers also expressed that due to the choices provided to them, they were able to easily fit HPSS into their existing curricula and adapt the HPSS resources to fit the needs of their students. This is evident in the following quotes and observation note:

> We just picked and chose what fits into our unit so we don't have to change our curriculum so much to fit the HPSS needs. We can modify the binder stuff and use it for what we need to do. (Male PE Teacher – PE 4)
>
> This is what I liked best, that I was given choices. I never felt like I had to do something. I wouldn't want to be forced something, I wouldn't want to force something on the kids that I knew wouldn't work for them. So I liked how there were so many options and ways of delivering it. (Female PE Teacher – PE 5)
>
> PE teachers were using the USB to adapt resources. (School Visit Observation 12)

Although the vast majority of the physical education teachers liked the idea of having choices, the wide range of choices provided within the resource manual was less than optimal for some participants. Comments from the focus group interviews and the school

visit observation notes demonstrated that a few physical education teachers were struggling with the number of choices in the HPSS Physical Education 10 module:

> It might have been easier to be told here are 10 things and just to know you're fitting it in somewhere. But it was nice to have the options and know that I didn't have to do everything and I could modify where needed. (Male PE Teacher – PE 5)

Overall, the majority of the physical education teachers perceived having choice within the HPSS Physical Education 10 components as essential for the implementation of a new program into existing practices. However, a few physical education teachers perceived the amount of choices provided within the HPSS Physical Education component as an aspect of the intervention that would require a lot of time to fully integrate into existing practices.

Of the three participant groups, Planning 10 teachers were given the least amount of choice in the implementation of their curricular piece. For Planning 10 teachers, six Planning 10 lessons were provided along with the needed resources to implement the lessons (e.g., student handouts; teacher backgrounders). The choice-based design of the HPSS Planning 10 unit was embedded within the six lessons. This meant that Planning 10 teachers were asked to implement all six provided lessons, however, they could adapt the content and structure of the lessons to meet their needs and the needs of their students. Teachers could adapt lessons by using the electronic copy of the resources (provided on a USB) or by selecting the activity choices within the six lessons. For example, after Lesson 4 teachers were asked to conduct in-class tracking challenges to help keep students engaged in working towards their previously set health goals.

Teachers could choose from a 'Power Down Challenge' in which students focused on limiting their screen time or a 'Re-Think Your Drink Challenge' in which students focused on eliminating sugar-sweetened beverages from their diet. These choices were perceived by all of the Planning 10 teachers as essential to the implementation of a new program into existing practices. They valued the adaptability of the resources and the ability to revise the program to meet their students' needs. No negative aspects of the amount of choices were discussed in the focus group interviews or observed during school visits. The positive perception of the type and amount of choice in the HPSS Planning 10 module is shown in the following excerpts:

> I think if you had started with 'we are giving you this money' and said 'you have to do it this way', and if its mandated that you have to do it this way, I don't think that would have been a good idea cause we could tell you to take your money and go away. I think it is good you did it this way because we still cover the objectives you want us to we can just do it our way. I feel you gave us choices and resources. (Male Planning 10 Teacher – Plan 1)

In sum, the three participants groups perceived the choice-based design of the HPSS intervention as essential to the implementation of new programs into existing practices. The participants described the importance of being able to adapt the program to meet their specific individual needs. However, the amount and type of choice provided impacted their experiences with the HPSS intervention. For two of the HPSS Action Teams, the open-choice format made the generations of ideas and the creation of an Action Plan difficult. The members of these two Action Team members discussed the need for more concrete examples and the need for more direction when creating their

Action Plans. For the HPSS Physical Education 10 component, a few Physical Education 10 teachers described the amount of choices provided as overwhelming and time consuming and they would have liked more time to familiarize themselves with the options provided. Planning 10 teachers had positive perceptions towards the choice-based design of the HPSS Planning 10 component. They valued the adaptability of the resources and the options within the lessons. Appendix M supports Theme 3 with additional evidence.

Theme 4: Teacher Control Impacts Student Engagement

Theme 4 focuses on the involvement of the students in the HPSS intervention. An underlying philosophy of the HPSS intervention was to encourage adolescent participation in the planning and implementation of the program components to enable students to make positive decisions that affect their health and take an active leadership role in the development of whole-school events and policies. This involvement was intended to empower youth to make positive decisions on behalf of their peers and create events and policies that were more impactful coming from the youth themselves as opposed to adult sources. This theme presents the uneasy situation where students were supposed to have significant involvement in the planning and implementation of the whole-school events and policies yet at times student voices were not always heard and their ideas were not always implemented. The range of student engagement varied among Action Teams. Students' level of engagement in the HPSS intervention was dependent on the approach of the teacher members. The degree to which teachers controlled the decision-making impacted the level of youth engagement.

On three of the five HPSS Action Teams, student members did not feel engaged in the planning and development process of the HPSS intervention and believed they should have had more input. One student member stated: “I think the students should have more say I think than the teachers” (Female Student – AT 5). Based on comments from the focus group interviews and the Action Team observation field notes and meeting minutes, teacher members on Action Teams in which students felt less engaged tended to monopolize the majority of the discussions. These teacher members controlled the meetings by dominating the conversations, and rejecting and/or dismissing students’ ideas. Fewer questions were asked to student members and less effort was put forth to involve students in the team discussions. The domination of the meetings by some teachers is evident in the following Action Team meeting observations and focus group interviews:

> The meeting was fairly dominated by teachers. I tried to ask the youth their opinions and if they had any ideas for events but the teachers still dominated most of the conversations. (AT Meeting Observation 9)
>
> There was a lot of sitting there and listening to them (teachers) talking. (Female Student AT – 3)
>
> The youth on this team are quiet. Will suggest things sometimes but teachers seem to ignore their ideas and just keep talking. (AT Meeting Observation 11)

The intent of the HPSS whole-school events and policies was to represent the ideas and desires of the student members, and in turn, the student body as a whole. However, on these three Action Teams students did not take on a leadership role and student members did not feel the meetings were a place to openly share their ideas and

respectfully contest teachers' ideas. The student members explained during the Action Team meetings the teachers chose events and policies they felt should be implemented or provided students with option to choose from, rather than listening to the students' ideas. The student Action Team members articulated they felt the teachers did not always listen to their ideas and sometimes the teachers told them their idea was not doable. As a result, students did not genuinely partake in the planning of activities or the decision-making. This is represented in an excerpt from the documents collected and focus group interviews:

> Personally, sometimes the teachers, their opinions clash and we're just sitting there like waiting and listening to them argue. (Female Student – AT 4)
>
> Teachers provided students with three choices of activities to improve their cafeteria. Students will decide for next meeting. (AT Meeting Minutes 9)
>
> It was kinda like they were the last decision and if they didn't like it we weren't going to do it and it was not necessarily what we wanted to do. Yeah, and then the teachers would be like 'Oh no we can't do that.' (Female Student AT Member– AT 5)

On other two Action Teams, student members felt heard, empowered, and viewed themselves as contributing members of the team. The interviews, observations, and meeting minutes showed that students voices were heard, their ideas were considered, and they held leadership roles on their Action Teams. The student members described how they worked with the teachers to plan and develop whole-school events and policies. The teachers encouraged students to take the lead in the development of ideas. Consider the following excerpts:

> It was a joint effort (development of Action Plan). We would give out ideas and pass it through the team. (Female Student – AT 2)
>
> The teachers asked the students what they felt other students in the school wanted. The students suggested a few ideas. The students seemed really excited about planning the events. (AT Meeting Observation 2)
>
> Students will develop survey with their ideas for activities to be given to other students. (AT Meeting Minute 7)

This empowerment that students described was a result of the teachers' actively engaging students in the decisions. Students recognized the importance of teachers encouraging, supporting, and facilitating their ideas to be executed as this empowered them to make changes to their school environment. Teachers also described student involvement on the Action Team as beneficial for students. This is shown in the following quotations from a student Action Team member and a teacher Action Team member:

> It was important for teachers to give us the ability to get more ideas and put them in a big picture and actually, they were actually coming true as well. Like the Zumba and then the yoga classes. I mean students can just do so much with the help of the teachers. (Male Student AT Member – AT 1)
>
> It was good to see students initiating things and showing responsibility. (Male Teacher – AT 2)

The three data sources from this study showed the type of involvement of students on the HPSS Action Teams varied among schools. This variation appeared to be dependent on the teacher members actively involving students in the planning and development of whole-school events and policies. Action Teams with teacher members

who listened to and engaged students in the intervention process and created a collaborative environment experienced more youth engagement. This resulted in student ideas and thoughts being welcomed and considered in the development of the Action Plan. On the Action Teams in which students felt less engaged and heard, the teachers' perspectives overran the students' perspectives. Additional evidence supports this theme in Appendix N.

Theme 5: Teacher Job Action Inhibited Implementation of HPSS Action Plans

Theme 5 focuses on a particular event in time that impacted the implementation of the HPSS program. At the start of the HPSS intervention, and the beginning of the 2011-2012 school year, teachers in British Columbia began job action in order to protest the stalled contract bargaining process. Job action required teachers to withdraw from their non-teaching duties. Non-teaching duties included extra-curricula activities such as supervision duties, administrative tasks (e.g., completing report cards), meetings with administrators, and any other roles that were considered outside the normal job description (e.g., coaching school sport teams; being a member of school committees). As HPSS was considered 'outside the normal job description,' job action within British Columbia schools impacted the implementation of the HPSS program. However, a difference in interpretation of the job action was evident between participating schools. Teachers in some schools continued with their non-teaching duties, while others withdrew from their non-teaching duties. In addition, Physical Education 10 teachers and Planning 10 teachers were less impacted by the job action. The HPSS curricula components (Physical Education 10 and Planning 10) were within curricula activities that teachers could integrate during class time and were considered within the normal job

description. However, Action Teams were affected by job action, as meetings and events were most often scheduled outside school hours (e.g., lunch, after school) and considered "outside the normal job description," and therefore teachers were not able to attend. As such, the Action Teams, in particular, appeared to be impacted by job action and identified this as an inhibiting factor to the implementation of whole-school events and policies. With this said, Action Teams seemed to interpret the concept of "outside the normal job description" in different ways resulting in four of five Action Teams continuing their involvement with the HPSS Action Team. One HPSS Action Team completely discontinued the participation of the HPSS intervention half way through the school year due to the restrictions in participation of extra-curricular activities. The other four Action Teams continued their participation in the HPSS intervention; however, their ability to implement whole-school events and policies was compromised given the restrictions associated with the concept of "outside the normal job description. This theme discusses the impact of teacher job action on the implementation of whole-school events and policies.

Action Team members described the influence of job action on their implementation of HPSS. No specific question regarding the job action was asked within the interviews with Action Team members, however, discussions around participants' experiences planning and implementing whole-school events and policies generated dialogue related to the job action. The timing of the HPSS intervention was perceived as unfortunate among Action Team members. They felt the job action inhibited their ability to fully implement the HPSS intervention and believed a different intervention year

would have improved their uptake of the program. Two quotations from Action Team members described the influence of job action on the implementation of HPSS:

> "It (HPSS) would have been better if the teachers strike wasn't happening." (Student AT Member – AT 3)

> "I think unfortunately this is just a bad year because of the job action and people are not necessarily as focused." (Teacher AT Member – AT 1)

School Action Teams fared differently in terms of the job action impacting HPSS implementation. This was dependent upon teacher willingness to continue with HPSS commitments within the limitations associated with their job action. This included teachers discontinuing extra-curricula activities, supervision responsibilities, and meetings with administrators. The discontinuation of these activities all impacted the uptake of HPSS. For example, the limited contact with administration negatively impacted the implementation of HPSS events and policies, as the events and policies required administrator approval. Due to job action, attaining approval from administration was difficult due to the limited communication between administrators and teachers. Action Team members expressed the restriction of "no interaction with administrators" resulted in many of the school-wide events not being carried out to full potential or carried out at all. This limitation on the ability of teachers to implement aspects of the HPSS program was evident in the school visit observation and the interviews with Action Team members. Consider the following examples:

> Teachers said they were frustrated with trying to get the monthly newsletter items in the newsletter because of job action – they are not allowed to communicate

with administrators. Administrators are in charge of approving contents of newsletter. (School Visit Observation 3)

We didn't have administrative support for that (whole-school event - fitness buffet) so that was very difficult. There were numerous people that wanted to do it but we didn't have administrative support to say yes you can do that. (Female Teacher – AT 1)

Job action also required teachers to withdraw from extra-curricula activities. Many of the planned HPSS events and policies required teacher supervision outside of teaching hours. This limitation on the facilitation of extra-curricula activities hindered many activities in the HPSS Action Plans. Consider the following examples:

Developed policy regarding no weight room fee, however, couldn't tell if it increased weight room participation as weight room is closed because of job action (no supervision). (AT Meeting Minute 18)

It will be difficult to get teachers to supervise the weight room afterschool due to job action. (AT Meeting Minute 10)

As previously indicated, the teachers' job action affected HPSS schools differently. Although job action negatively impacted the planning and implementation of the HPSS whole-school events/policies in all HPSS intervention schools to some degree, four of five intervention schools continued the implementation of HPSS within the job action limitations. Teachers at one school (School 5) decided to discontinue involvement in the HPSS intervention. Consequently, no events or policies were implemented during the intervention year and I was unable to speak to the teachers on the Action Team about their situation. I did, however, conduct a focus group interview with the student members

of the Action Team. The students explained the reason for the discontinuation of their school's Action Team was due to teacher job action. One student described their situation, "The main reason why we stopped (having Action Team meetings) was the teachers strike and the teachers couldn't meet with us" (Student AT Member – AT 3). Although the students on the Action Team expressed interest in the HPSS project and would have preferred to continue with the Action Plan they had developed, they understood that without teacher support events and policies would be very difficult to implement:

> The teachers were sort of like the driving force they were the ones that were really encouraging it…not that we didn't want to but they were the ones that said like we have a meeting today and that kind of stuff. (Student AT Member – AT 3)
>
> They couldn't do anything about it, their hands were tied. (Student AT Member – AT 3)

Overall, limitations associated with the teachers' job action negatively impacted implementation of the HPSS program. Most Action Teams planned and implemented physical activity and healthy eating events and policies within the limitations imposed by the teachers' job action. However, the findings showed that job action impacted the completion of the HPSS Action Plans. For one school, job action resulted in the HPSS Action Team to be discontinued and therefore no whole-school events or policies were implemented. This theme is further supported by evidence in Appendix O.

Summary of Findings

In this study, data were collected from three different sources: minutes from Action Team meetings, observations of school visits and Action Team meetings, and

focus group interviews with Action Team members, Physical Education 10 teachers and Planning 10 teachers. The findings provided context to the experiences of Action Team members, Physical Education 10 teachers, and Planning 10 teachers as they planned and implemented HPSS activities. In sum, five themes resulted from the thematic analysis. Theme 1: Competing Responsibilities, Technical Difficulties, and Lack of Computer Access described the major barriers inhibiting participants' level of implementation of the HPSS program. Competing responsibilities, technical difficulties, and lack of access to computer labs were prominent obstacles participants faced in participating in the HPSS intervention. Theme 2: Resources, Reminders, Workshops, and Collaboration provided insight in the type and amount of support necessary to help participants implement the HPSS intervention components into their existing practices. This theme highlighted the different types of supports needed and the amount of support required to overcome the challenges inherent in implementing a new program. Theme 3: Choice-Based Design Impacts Participants' Experiences highlighted the different perspectives on the type and amount of choice provided to the three participant groups and how this impacted the participants' experiences with HPSS. The three participant groups perceived the choice-based design of the HPSS intervention as essential to the implementation of new programs into existing practices. The participants described the importance of being able to adapt the program to meet their specific individual needs. However, the amount and type of choice provided impacted their experiences with the HPSS intervention. Theme 4: Teacher Control Impacts Student Engagement discussed students' varied level of engagement on the HPSS Action Teams and the dependence of this engagement on the approach of the teacher members. Theme 5: Teacher Job Action Inhibited

Implementation of HPSS Action Plans reflected the impact job action had on Action Teams' ability to plan and implement whole-school events and policies. The findings showed most Action Teams planned and implemented physical activity and healthy eating events and policies within the limitations imposed by the teachers' job action. However, job action resulted in one HPSS Action Team discontinuing their involvement; therefore no whole-school events or policies were implemented at that school.

Discussion

The purpose of Project 1 was to explore the involvement of students and teachers in the development and implementation of a whole-school health model framed in SDT (Deci & Ryan, 1985; 2000). Specifically, the findings offer insight into the experiences and motivation of Action Team members, Physical Education 10 teachers, and Planning 10 teachers in the planning and implementation of the HPSS intervention. Health Promoting Secondary Schools represents a progression in educational change initiatives from previous reform efforts by directly involving students and teachers in the change process. The process by which students and teachers were supported in the planning and implementation of the HPSS initiative were grounded in SDT. This HPSS project provided the opportunity to understand the experiences and motivation of those involved in the change process of a complex educational initiative. The results of this study highlight the importance of the three psychological needs posited by SDT in educational change initiatives.

The concept of competence is notable in three of the five themes (Theme 1, Theme 2, and Theme 3). Whereas Theme 1 focused on the barriers inhibiting the planning and implementation of HPSS program, Theme 2 highlighted a range of competence supportive strategies that helped teachers overcome the barriers, while Theme 3 focused on the choice-based design of the HPSS initiative. In Theme 1, Action Teams and Physical Education teachers identified competing responsibilities as a barrier to the planning and implementation of HPSS intervention components. Participants discussed their struggle to devote their time to the HPSS program due to other responsibilities including academic and extracurricular commitments. These feelings represent

participants' low perceptions of competence towards the implementation of HPSS in harmony with other competing responsibilities. In other words, Action Team members' and Physical Education 10 teachers' beliefs in their ability to make the changes proposed by HPSS were low due to other responsibilities. It must be noted that Planning 10 teachers did not mention competing responsibilities as a barrier to the planning and implementation of the HPSS Planning 10 component. This might be explained by the varying demands placed on participant groups. As outlined previously and shown in Table 18, the HPSS Planning 10 component was the smallest both in size and duration; and the structure of the choices offered were simple and straightforward. Planning 10 teachers were responsible for implementing six previously developed lessons, with choices embedded within each lesson, and one of two tracking challenges. For HPSS Physical Education 10 teachers and Action Team members, the requirements of the HPSS initiative were much greater. Action Teams were asked to develop their own actions and implement changes throughout the entire intervention year. Physical education teachers were required to implement three actions from a vast amount of choices within the HPSS Physical Education 10 resource manual in every physical education class. Further, Physical Education 10 teachers had multiple roles within the HPSS program. Many Physical Education 10 teachers were also members on the HPSS Action Teams, placing greater responsibility on the Physcial Education 10 teachers. For HPSS Planning 10 teachers, the demands of the change were of lesser degree than that placed on Action Team members and Physical Education 10 teachers. As such, there were differences in the perceptions of competence towards the planning and implementation of the HPSS intervention among participant groups. Planning 10 teachers felt capable of implementing

the HPSS Planning 10 intervention component in conjunction with their regular responsibilities associated with being a full-time teacher.

The importance of competence perceptions to carry out intended changes has been highlighted by educational change literature and SDT research. Fullan (2007) noted that if teachers do not perceive they have the necessary time to implement the changes required by the new program they will not perceive the change is achievable. Specifically, the authors suggested that low self-efficacy towards program implementation negatively impacts teacher motivation for change. Fullan (2007) stated that teachers deal with day-to-day influences that negatively impact reform efforts including "constant daily disruptions both within the classroom, such as managing discipline and interpersonal conflicts, and from outside the classroom such as collecting money for school events and central office staff" (p. 24). The author concluded these day-to-day responsibilities impact teachers' available time for new program implementation. Further, Fullan (2007) and Hargreaves (2005) suggested the time required for implementing a new program is largely influenced by the demands of the change being implemented. Meaning that the greater the demands placed on the change agents the more time is needed for the change to occur. The propositions of SDT highlight the importance of individuals feeling capable and efficacious towards an activity to be motivated to engage in that behaviour (Deci & Ryan, 1985; Ryan, Lynch, Vansteenkiste, & Deci, 2011). Ryan, Williams, Patrick, and Deci (2009) stated one major reason identified within the SDT for an individual being amotivated toward a behaviour is the person does not feel a sense of competence to carry out a certain activity. According to Deci and Ryan (1985) perceived competence is a prerequisite for intentional action and

perceptions of competence are important, as people tend to avoid situations that they believe as exceeding their abilities and engage in activities in which they perceive match their abilities. Meaning, one will not be motivated to act without a belief that they are capable to yield the intended results. In other words, teachers and students involved in the HPSS programs must feel they are capable of implementing the intended changes in order to be motivated to make the change. The fewer choices, shorter duration, and fewer actions within the HPSS Planning 10 intervention component resulted in high competence beliefs towards the planning and implementation of the HPSS Planning 10 intervention component. The demands of the other HPSS components were much more challenging for Action Team members and Physical Education 10 teachers to implement effectively in concurrence with other competing responsibilities resulting in competence beliefs towards the planning and implementation of the HPSS program. For HPSS to be sustainable, time needs to be allocated to program development and implementation. This allocated time should be part of the teachers' regular workload. For example, one of their teaching blocks could be allocated to HPSS to allow for time in their regular workday to be devoted to the HPSS program. This may help alleviate the barrier of competing responisbilities and help sustain the HISS program in participating schools.

Theme 2 highlighted a range of strategies for helping students and teachers implement the HPSS initiative, feel more competent towards the change, and help address the barriers identified in Theme 1. For example, all three participant groups identified the HPSS workshop opportunities as an effective type of support strategy and Physical Education 10 and Planning 10 teachers indicated the HPSS resources supported the implementation of the HPSS curricula components. Although all participant groups

identified similar types of support needed for effective implementation, the amount of support necessary varied among participant group. Action Teams members and Physical Education 10 teachers suggested more support was needed to enhance their competence towards the implementation of the HPSS Physical Education 10 component and address the barriers discussed in Theme 1. For instance, Physical Education 10 teachers recommended longer more frequent workshop opportunities to enhance their competence towards the proposed changes and help alleviate the barrier of other competing responsibilities. Physical Education 10 teachers did not feel the workshop provided the necessary support needed to feel efficacious towards implementing the HPSS Physical Education 10 program. One workshop lasting approximately one and a half hours was insufficient for the demands associated with the HPSS Physical Education 10 intervention component. Specifically, physical education teachers discussed the need for a longer workshop due to the high volume of HPSS Physical Education 10 materials and an additional workshop in the middle of the semester to provide the time needed to plan and implement HPSS actions and allow an opportunity to discuss progress, share ideas, and address any issues that had arose.

Previous research has highlighted the importance of competence among those responsible for program implementation and provided strategies to support individuals' need for competence within educational change initiatives. Educational change researchers suggest it is essential to support teachers through the change process to enhance perceptions of competence towards new program implementation (Fullan, 2007; Hargreaves, 2005). This support will help the individuals responsible for the change feel capable of effectively implementing new educational initiatives. Fullan (2002; 2007) and

Hargreaves (2005) highlighted that one's beliefs in effective educational reform is largely influenced by the support provided during the change process. The authors discussed poor support through inadequate resources, insufficient time allotted for intended changes, and lack of support from external change leaders, lead to frustration towards, and avoidance of, change initiatives. School-based researchers recommend professional development go beyond the beginning of the intervention and extend throughout the intervention process in order to fully support teachers (Fullan, Cultress, & Kicher, 2005; Gleddie, 2011; Jain & Langwith, 2013). For example, Jain and Langwith (2013) showed that greater assistance and training throughout school-based obesity interventions was needed to assist school personnel use the available resources. Workshop opportunities as an essential support strategy for school-based health promotion interventions is further supported by Gleddie and Melynchuk (2009) in their evaluation of the Battle River Project and Franks et al. (2007) in their review of three school-based health promotion interventions. In sum, when new program requirements and the change required by new programs are substantial, additional supports need to be provided during the implementation period. Findings suggest support strategies, such as workshop opportunities, be provided to all individuals involved in the change process; however, for interventions that require a high degree of change, a wide range of support should be offered.

Another support strategy discussed by participants supporting their need for competence was the HPSS curricula resources. In an effort to help ease implementation of the HPSS curricula components into current teaching practices, reduce teacher burden, and enhance teacher competence towards the change effort, teachers were provided with

curricula resources. The HPSS curricula resources (i.e., HPSS Physical Education 10 and HPSS Planning 10 resource manuals) were identified as an effective support strategy among participating teachers. Physical Education 10 teachers and Planning 10 teachers viewed the curricular resources as essential in supporting their efforts in the change process. Previous research in school-based health promotion interventions supports the inclusion of resources in implementation efforts (e.g., Durlak & Dupre, 2008; Fullan, 2002, 2007; Hargreaves, 2005; Storey, Spitter, Cunningham, Schwartz, & Veugelers, 2011). The findings from this study extend beyond current literature and provide specific information regarding the type of resources necessary to support teachers' competence and effectively implement new programs into existing practices. First, it was clear that the teachers wanted and valued ready-to-use resources. One challenge noted by participants was the lack of time for HPSS due to other competing responsibilities. Providing ready-to-use curricula resources for teachers helped them manage their planning time and in the long run increase their competence. A second finding focused on the provision of options within support resources. As reflected in the conversations with the teachers in this study, the flexibility and choices in the resources supported the implementation of the new HPSS program into existing practices. Specifically, the choice-based design of the resources allowed teachers to adapt the HPSS curricular activities to meet their preferences and the needs of their students. The HPSS curricula resources provided choices in the: (a) actions/activities/lessons to be implemented; (b) teaching methods and delivery strategies used; and (c) timing of implementation. The choice-based design of the HPSS resources allowed teachers to align new materials with their current practices and help teachers feel competent in their ability to integrate new

curricula initiatives into existing courses.

However, it must be noted that some participants also discussed the choice-based design decreased perceptions of their competence towards implementing the changes associated with the HPSS initiative. In Theme 3, Action Team members and Physical Education 10 teachers discussed the choice-based design of HPSS program was time-consuming and overwhelming due to the vast amount of choices provided, in turn, lowering their competence beliefs in carrying out the intended changes. This challenge of finding a balance between autonomy-support and competence-support highlights the complexity of understanding how to effectively integrate choice into new programs. It appears that providing choice is essential in the process of educational change. However, it is apparent based on present findings that providing too many choices might negatively impacted one's experiences and motivation towards the planning and implementation the HPSS program. Although the intent of providing participants with choices was to satisfy their need for autonomy, and in turn increase intrinsic forms of motivation, it appeared that in some instances too many choices overwhelmed some participants. As such, competence considerations need to be taken into account when providing individuals with choices. In sum, the findings from this study suggest to satisfy one's need for competence in school-based change initiatives individuals responsible for the change must feel capable of implementing the program in concurrence with other competing responsibilities and everyday realities tied to being a teacher, feel able to meet the change demands required by the program, and be provided with adequate support to feel competent to complete the intended change. Additional efforts on the part of support strategies are needed for those involved in the change process to ensure implementation

success and enhance competence towards program implementation, especially when proposed changes are extensive.

The concept of relatedness is notable in Theme 2, where participants highlighted the importance of the collaboration with others in the HPSS initiative. Several factors supported participants' need for relatedness during the change process, including working with others towards a common goal, discussing HPSS with others to help generate and share ideas, sharing the workload, and a sense of belonging with their community. Fullan (2007) noted the importance of establishing meaningful relationships and collaboration among and between the stakeholders involved in the reform initiative to create a context in which teachers and students can form relationships based on a common goal and work together to make change. Deci (2009) stated an effective change approach within educational domains encourages a sense of belonging and connection with others who are part of the change process. Although, for majority of participants the need for relatedness seemed to be satisfied by the HPSS program, some participants made recommendations to increase the opportunities to interact with others engaged in the HPSS project. Specifically participants suggested two additional collaborative relationships. First, participants suggested sharing experiences and ideas between the five HPSS schools to create a larger community and develop a sharing network. This finding was consistent with Hoyle et al. (2008) who suggested that collaboration at both the district and school level can assist health promotion school programs develop support, build capacity, and be sustained. Perhaps the inclusion of school learning communities and lateral support between schools participating in the HPSS program would be beneficial and further enhance the need for relatedness.

Second, participants discussed the need to collaborate with individuals responsible for implementing the other HPSS intervention components within their school and recommended establishing more collaborative relationships to enhance their sense of relatedness within the HPSS initiative. Participants reported a lack of understanding and knowledge regarding the other HPSS intervention components. For example, Planning 10 teachers discussed they did not understand how the Planning 10 component fit within the HPSS initiative as a whole and what the other intervention components entailed. This highlights the need for collaboration and connection between the individual's responsible for each intervention component within a whole-school health approach. As HPSS was a whole-school approach to school-based health promotion, the intent was to address school health in an integrated and holistic manner. Whole-school health approaches intend to make changes in different 'zones' or 'pillars', however, these zones are to be harmonized to create a comprehensive and integrated approach. Based on present findings, the participants were unaware of the actions within other intervention components and how the components worked together to achieve intervention goals, perhaps resulting in a fragmented intervention as opposed to the intended integrated holistic approach. Further, many of the participating Physical Education 10 and Planning 10 teachers were also members of their school's HPSS Action Teams, narrowing the representativeness of the school population. The purpose of HPSS was to use a bottom-up approach in which teacher and student ideas, perceptions, and needs are included in the development of the Action Plan. However, in reality, the teachers participating in at the curricula level of HPSS were the same teachers partipating at the school level of HPSS. A wider range of teacher participation may have helped schools address the needs of the

school population and create greater collaboration within participating schools. In sum, to support the need for relatedness among the teachers and students responsible for the proposed changes within HPSS, collaborative relationships need to be further established between HPSS intervention schools, between those responsible for the different program components within each school, and a wider range of teacher involvement needed to be included for a whole-school approach.

The concept of autonomy is notable in Theme 3 and Theme 4. Whereas Theme 3 focused on the choice-based design of the HPSS initiative, Theme 4 provided insight into the involvement of students in the HPSS program. In Theme 3, participants discussed the choice-based design of the HPSS initiative. As reflected in the conversations with the participants, the flexibility and choices in the HPSS intervention supported the implementation of the new HPSS initiative into existing practices. The participants described the importance of being able to adapt the program to meet their specific individual needs and have a voice in program implementation. However, as previously discussed, finding a balance between autonomy support and competence support is essential within choice-based education programs. For example, HPSS Physical Education 10 teachers discussed they enjoyed being able to select activities that met their needs, however, teachers reported the number of choices in their program was time-consuming and overwhelming. This highlights the need to understand the model and structure in which choices are offered (e.g., number of choice options) and the impact on one's experiences and motivation.

Other researchers have emphasized the importance of providing choice within educational change initiatives and finding the optimal amount of choice to support the

need of autonomy and competence. Fullan (2002) and Hargreaves (2005) recommend providing flexible change initiatives and structuring reform in an autonomy-supportive way for effective integration of new initiatives into existing practices. Within the SDT, the offering of choices is considered a practice to support the need for autonomy. According to Deci and Ryan (1985, 2000) the need for autonomy can be satisfied by creating environments in which one can choose their behaviours based on personal needs, interests, and preferences. However, Iyengar and Lepper (2000) claim an individual can have too many options and feel overwhelmed and resentful at the effort entailed in the decision-making. Moreover, the authors stated having too many options is not a basic need and many options do not necessarily lead to feelings of autonomy but instead overburden. In a similar manner, Katz and Assor (2007) highlight the importance of satisfying the needs of all three SDT constructs in order for choice to be motivating. According to the authors, choice is motivating when the options are relevant to one's interests and goals (autonomy support), are not too numerous or complex (competence support), and are congruent to the values of one's culture (relatedness support). This highlights the complexity of understanding how to effectively integrate choice into new programs, and emphasizes the importance of satisfying all three needs proposed by SDT in educational change. This study adds to the literature by beginning to understand the how choices can effectively be integrated into new programs, however, more research is needed to fully understand an effective choice-based design.

Another aspect of autonomy discussed by participants in Theme 4, was the involvement of student Action Team members' in the planning and implementation of whole-school events and policies. The HPSS model was built around a 'For Youth With

Youth' strategy in order to empower youth to make positive decisions on behalf of their peers and create events and policies that were more impactful coming from the youth themselves as opposed to adult sources. Although the HPSS program attempted to support students' autonomy by having sufficient student involvement in the generation of health-promoting changes within their school community, the findings showed that some students perceived a marginal role in the development of whole-school changes. Analyses of the focus group interviews and Action Team meeting observation and minutes revealed youth members on three Action Teams believed their ideas were often not selected for whole-school events and/or policies. This allows for a comparison between the three Action Teams in which student members' need for autonomy were thwarted and the two Action Teams in which autonomy-support was satisfied. These differences might be explained by teachers' motivation style and approach to learning. It appeared that the teachers' behaviour on the Action Teams and how the teachers actively involved youth in the planning and implementation of events and policies influenced students' perceptions of autonomy. On the HPSS Action Teams that supported students' need for autonomy, the teacher members did not make all of the decisions for the students, rather made decisions in collaboration with student members. These teacher members were accepting of student ideas, encouraged open discussion, and involved students in the decision-making process. Student members took responsibility for the generation of ideas for whole-school events and policies and took a leadership role in the planning and implementation of these ideas. Whereas, students on the Action Teams in which their autonomy was not supported, the teacher members tended to dominate the conversations and did not consider student suggestions for whole-school events and policies.

The SDT provides insight as to how teachers' motivating styles affect student perceptions of autonomy (Niemiec & Ryan, 2009; Reeve, 2012; Reeve, Jang, Carrell, Jeon, & Bach, 2004). Reeve (2012) suggested a teachers' motivating style towards students could be conceptualized along a continuum that ranges from highly controlling to highly autonomy supportive. An autonomy supportive teacher identifies and nurtures students' needs, interests, and preferences and creates opportunities to have their internal motives guide their activity and learning (Reeve, 2012; Reeve et al., 2004). Niemic and Ryan (2009) suggest teachers' can support students' autonomy by providing choice, acknowledging students' feelings about the topic, maximizing student voices, and minimizing pressure and control. Reeve (2012) described a controlling teacher interferes with students' inner motives because they tend to make salient a teacher-constructed instruction agenda that defines what students should think, feel, and do. Niemic and Ryan (2009) stated that under controlling conditions, students' feelings of enthusiasm and interested are often replaced by boredom and disinterest and in turn students are no longer interested in the activity. Teachers on Action Teams in which students' autonomy needs were satisfied were highly autonomy-supportive. Whereas, teachers on Action Teams in which students' autonomy-support was not satisfied displayed more of a teacher-constructed agenda. This highlights the importance of teachers supporting students' needs for autonomy if students are to be effectively involved in the educational change initiatives. These findings also highlight the purpose of a student-centered teaching approach. Weimer (2013) stated a student-centered approach occurs when teachers' focus on the process of student learning and students have input into their own learning process. The author suggested student-centered teaching creates balances of

power between the teacher and the student by giving some control over decisions to the students. Applying a student-centered learning approach on HPSS Action Teams might have facilitated an autonomy-supportive environment. In sum, to achieve autonomy satisfaction among those involved in educational change initiatives choices need to be provided, however finding a balance between providing choices and supporting the need for competence need to be taken into account when offering choices within program design. Further, teachers providing autonomy-supportive environments to students involved in the change process through student-centered teaching approaches might be an effective approach.

In Theme 5, participants reflected on the job action, which was initiated in order to protest the stalled contract bargaining process. As it was not an option to delay the start of the HPSS intervention to wait for the bargaining process to be resolved, the program continued in schools during job action. Participants described the difficulty planning and implementing an educational change initiative during job action. Teachers discussed job action required them to withdraw from their non-teaching duties, such as extra-curricula responsibilities and other roles that are considered outside normal job description. There is limited research regarding the potential effects of job action on the implementation of school-based health promotion initiatives. The available research does show job action negatively impacts the implementation and results of other school-based initiatives (e.g., de Barros et al., 2009; Pabayo et al., 2006). For example, the Saude na Boa Project in Brazil (de Barros et al., 2009) coincided with teacher job action. The project was a school-based intervention on the promotion of physical activity among high school students in Brazil. The authors stated the teacher strike made it more complicated to

promote the program and collect follow-up data. In sum, job action appeared to disrupt the planning and implementation of the HPSS program, highlighting the importance of teachers and students in the implementation of new initiatives within school settings.

In terms of achieving effective educational reform, the findings of this study highlight strategies to effectively involve students and teachers in the change process. The findings also highlight the importance of understanding stakeholders' experiences in and motivation towards planning and implementing educational initiatives. However, limitations need to be acknowledged. The focus group interviews were conducted within pre-existing environments (i.e., schools). As such, participants in the focus groups knew each other (e.g., Physical Education 10 teachers from the same school). This might have resulted in less candid discussion and perhaps more reluctance among participants to be critical of their experiences. An additional limitation of this investigation was the inclusion of teachers and students in the Action Team focus group interviews. Teachers and students on school Action Teams were interviewed together in one focus group interview. This inherent power difference between teachers and students could create a situation where students are asked to disclose information that could influence their relationships with their teachers, causing students to be reluctant to answer specific questions candidly. Conducting separate focus groups for students and teachers would address this power difference.

In addition to limitations, this investigation had several methodological strengths. First, the collection of information using different methods (i.e., documents, observations, and focus group interviews) and different sources (i.e., Planning 10 teachers, Physical Education 10 teachers, and Action Team members) provided an in-depth understanding

of the research questions. Data triangulation and methodological triangulation decreased the risk of misinterpretation of data and improved credibility, dependability, and transferability of the findings. Second, consistency of the findings from multiple sources across five schools suggests that experiences with the HPSS program are similar throughout varying school environments. Third, positive reception of the HPSS program within participant schools indicates that this approach is viable and worthy of further examination.

In conclusion, this study contributes to the literature on involving students and teachers in educational change initiatives. This study highlights that effective change will more likely occur when both the nature of the change and the process by which the change is facilitated allows for satisfaction of the need for competence, relatedness, and autonomy among the individuals responsible for the change. First, a wide range of support strategies including workshop opportunities and resources are needed for those involved in the change process to enhance perceptions of competence towards the implementation of new programs. In complex multi-component programs, such as HPSS, where the demands of the change are extensive and teachers are asked to implement new programs on top of their current job responsibilities, sufficient support is needed throughout the entire reform initiative. Second, those involved in planning and implementation of the initiative will benefit from a range of collaborative relationships to increase sharing and learning opportunities, establish connection within and between school communities, and satisfy the need for relatedness. Third, a flexible program and choice-based design are necessary to match the new program with existing school practices, increase likelihood of sustainability, and satisfy the need for autonomy among

teachers and students. As teachers are the experts in their field, the curricula resources be designed to allow the teachers to remain in control of educational outcomes. In particular, teachers should be able to select the actions/activities/lessons to be implemented into their classes, how the new actions are delivered to students (i.e., teaching strategies), and when activities are implemented. However, a balance between providing choices and supporting perceptions of competence need to be considered in the choice-based design of reform initiatives. The findings from this study can be used to better understand how to involve teachers and students in educational change initiatives and which strategies and supports are necessary.

Chapter 5. Project 2

Effectiveness of a Choice-Based Whole-School Model to Increase Student's Motivation Towards Physical Activity and Healthy Eating

Abstract

The aim of this study was to investigate the effectiveness of a whole-school health approach framed in self-determination theory (SDT) of motivation (Health Promoting Secondary Schools [HPSS]) on grade 10 students' motivation to engage in physical activity and healthy eating. Health Promoting Secondary Schools was a choice-based model that allowed schools and students to create individualized Action Plans that facilitated change at the school and individual levels. In accordance to the foundation of SDT theory, the HPSS intervention sought to positively affect student's level of motivation towards physical activity and healthy eating by enhancing students' perceptions of autonomy, relatedness, and competence. To achieve this, the intervention consisted of four choice-based "Action Zones": (a) School Environment/Culture; (b) Community Partnerships; (c) Student Support; and (d) Teaching and Learning. A total of 379 grade 10 students in ten participant schools (5 intervention schools; 5 control schools) completed questionnaires pre and post intervention. Results showed students attending intervention schools reported significantly lower amotivation scores for healthy eating compared to students in usual practice schools. No significant differences were found between students in HPSS intervention schools and students in usual practice schools on motivation towards physical activity. The findings suggest that a choice-based whole-school health approach might be an effective approach for decreasing amotivation towards healthy eating among grade 10 students.

Introduction

Recent national reports in Canada indicated that adolescents are not meeting the recommended physical activity guidelines and therefore not receiving the numerous benefits associated with an active healthy lifestyle (Colley et al., 2011; Tremblay et al., 2009). The Active Healthy Kids Report Card (2014) published the results from the 2009-2011 Canadian Health Measures Survey, which showed only 4% of 12-17 year olds were accumulating at least 60 minutes of moderate-to-vigorous physical activity per day. Janssen and LeBlanc (2010) and Tremblay et al. (2010) recommend Canadian children age 5-17 years of age participate in 60 minutes of moderate-to-vigorous physical activity each day. As such, Canadian youth are falling well short of the Canadian physical activity guidelines. Parallel with increases in inactivity, many youth consume poor quality diets containing high amounts of fatty foods and sugar-sweetened beverages (Plotnikoff et al., 2009; Starkey, Johnson-Down, & Gray-Donald, 2001). Starkey et al. (2001) reported that Canadian youth aged 13-17 years of age consume more foods from the "Other" food category in Canada's Food Guide, which are typically higher in fat and calories than any other age group. Vanderlee, Manske, Murnaghan, Hanning, and Hammond (2014) found 80% of Canadian youth consumed sugar-sweetened beverages daily, with 44% consuming three or more sugar-sweetened beverages per day. Subsequently, poor diets and inactivity have been linked to unhealthy body weights, resulting in the primacy of obesity in pubescent years (Kimm et al., 2005; Tremblay & Willms, 2000; Tremblay et al., 2002).

Health promotion and education in the high school setting may be one effective vehicle to reverse these negative health trends. The World Health Organization (WHO,

1997) has recognized that schools are uniquely positioned to promote health and impact short and long-term knowledge and behaviours of young people. Cale and Harris (2006, 2013) also recognized the important role of schools and school-based programming (i.e., physical education) on the health behaviours of young people. Moreover, Heath et al., (2012) conducted a review of physical activity interventions and identified effective, promising, and/or emerging interventions. The authors reported school-based strategies that encompass physical education, classroom activities, after-school sports, and active transport as an effective strategy among school-aged children and youth. Story et al. (2009) noted that students spend approximately half their waking hours in schools and no other institution has as much continuous and intensive contact with students during the first decades of life. Furthermore, school programs have near universal enrolment and are delivered at no or little cost to families and students from diverse ethnic and socioeconomic backgrounds can be reached (Peterson & Fox, 2007; Story, 1999; Story et al., 2009). In addition, Story (1999) stated that schools are equipped with the facilities (e.g., gymnasiums, playing fields), programs (e.g., physical education), and the necessary personnel (e.g., physical education teacher, school counselor) to effectively promote health and/or prevent health issues. As a result, researchers (e.g., Cale & Harris, 2013; Story et al., 2009) have identified schools as a critical setting for health promotion.

Over the past decade a number of studies and several systematic reviews evaluated the effectiveness of interventions in promoting health in children and youth within a school setting (Fairclough & Stratton, 2005; Pardo et al., 2013; Slingerton & Borghouts, 2011; van Sluijs et al., 2008). In general, school-based interventions fall into one of three categories (a) educational strategies, which are classroom-based and are

focused on changing knowledge and attitudes of students, (b) environmental strategies, which focus on the physical environment and policies and practices within a school in order to promote health (Cale & Harris, 2006; Naylor & McKay, 2009) and (c) whole-school health approaches, which combine a number of key entry points (e.g., curriculum, school environment, community links etc.) where opportunities for a healthy lifestyle are maximized and reinforced and where one or more related components are employed to achieve the desired outcome (Naylor & McKay, 2009; Pardo et al., 2013). A review conducted by van Sluijs et al. (2008) concluded that multi-component whole-school health approaches were most effective when targeting adolescent populations. Moreover, the Global Advocacy for Physical Activity (2011) identified whole-school approaches as one of the seven "best investments" for improving physical activity levels.

Despite holding such promise for adolescent populations, to date whole-school health approaches within the high school setting are limited in the literature which has predominantly focused on younger students during elementary years (e.g., Alberta Project Promoting Active Living and Healthy Eating [APPLES], Fung et al., 2012; Child and Adolescent Trial for Cardiovascular Health [CATCH], McKenzie et al., 1996; Action Schools! British Columbia [AS BC!], Naylor, Macdonald, Zebedee, Reed, & McKay, 2006; Sport, Play, and Active Recreation for Kids [SPARK], Sallis et al., 1997) and middle school years (e.g., Healthy Youth Places, Dzewaltowski et al., 2009; Haerens et al., (2006); Middle School Physical Activity and Nutrition [MSPAN], McKenzie et al., 2004; Intervention Centered on Adolescents Physical Activity and Sedentary Behavior [ICAPS], Simon et al., 2004; Trial of Activity for Adolescent Girls [TAAG], Webber et al., 2008).

Two whole-school interventions at the high school level, the Lifestyle Education Activity Program (conducted in the U.S.; [LEAP], Pate et al., 2005) and the Dutch Obesity Intervention in Teenagers (conducted in Europe [DOiT], Singh et al., 2009), examined the effects of a comprehensive school-based intervention among grade 9 females and grade 9 female and male students, respectively. The Lifestyle Education Activity Program aimed to enhance physical activity self-efficacy and enjoyment and teach the physical and behavioural skills needed to adopt and maintain a healthy active lifestyle. The intervention successfully increased the physical activity levels, physical activity enjoyment, and girls' enjoyment of physical education within intervention schools. The Dutch Obesity Intervention in Teenagers aimed to improve physical activity and healthy eating among adolescents through the enhancement of self-evaluation, goal setting, social support and encouragement, and information regarding health behaviors. The intervention consisted of an educational program (11 lessons in biology and physical education) and an environmental component encouraging schools to offer additional physical education classes and healthy changes to the school cafeteria (Singh et al., 2009). The intervention resulted in improved body composition and decreased consumption of sugar-sweetened beverages among students in the intervention group (Singh, et al., 2009; Singh et al., 2007). These intervention studies yielded encouraging results supporting whole-school health approaches to improve physical activity and healthy eating behaviours among high school students.

Whole-school health approaches to date have characteristically included behaviour components from social cognitive theory and socio-ecological models, such as self-efficacy, goal-setting and self-monitoring (e.g., M-SPAN, TAAG, LEAP, DOiT) to

improve physical activity and healthy eating behaviours among students. An area of study that has become of increasing interest among researchers due to its connection to student health behaviours is the enhancement of motivation. According to Hagger and Chatzisarantis (2007) motivation refers to the process of initiating, directing, and sustaining behaviour. Wallhead and Buckworth (2004) suggested that school-based interventions embedded within motivational theoretical frameworks might be a valuable approach to improve health among youth. In a similar manner, Cale and Harris (2006) attested that motivation might be the key to both the initiation and continuation of physical activity and healthy lifestyle behaviors. As such, targeting students' motivation towards health behaviours may serve as a promising strategy in the promotion of health among adolescents. However, the majority of whole-school health approaches aimed at youth have yet to focus on the motivational process of students. A few school-based interventions have aimed to increase motivation towards health behaviours among elementary aged students. For example, Gorely, Nevill, Morris, Stensel, and Nevill (2009) implemented a multi-component school-based intervention, which included classroom sessions (i.e., physical education and health curriculum), physical activity events, and family involvement to promote physical activity and healthy eating among elementary aged children (i.e., 7-11 years old). The intervention focused on student goal setting, physical activity participation, a local media campaign, cross-curricula links, and providing choices for teachers and students. Results showed greater decreases in extrinsic motivation towards physical activity and fruit and vegetable consumption in the intervention group. Moreover, Wilson et al. (2005) investigated the impact of an afterschool program aimed to increase physical activity and psychosocial factors related

to physical activity such as, motivation, self-concept, and self-efficacy. The intervention consisted of self-monitoring strategies and goal setting practices, positive coping strategies for behaviour change, and choice of a variety of physical activities. Findings showed a significantly greater increase in physical activity motivation among students in the intervention group compared to the usual practice group. Previous research has shown that motivation towards health behaviours can be enhanced through intervention strategies, which target motivational processes.

A theoretical framework often used to study motivation among youth, given that its major propositions and constructs are pertinent to the adolescent developmental period, is Deci and Ryan's (1985) Self-Determination Theory. According to SDT, student behaviours can be broadly categorized as intrinsically motivated, extrinsically motivated or amotivated based on the different reasons or goals that accompany an action (Deci & Ryan, 2000). Each level of motivation is projected to have a variety of consequences for learning, performance, development, and personal experience. Self-determination theory proposes that an individual's level of motivation lies along a continuum of motivation from amotivated to intrinsically motivated. Hagger and Chatzisarantis (2007) and Ryan and Deci (2000) define intrinsic motivation as doing something because it is inherently interesting or enjoyable and for rewards innate in the activity (e.g., feelings of accomplishment, learning, interest). For example, an intrinsically motivated individual would participate in physical activity because of feelings of pleasure, enjoyment, and satisfaction that stem directly from the activities being taught and the environment in which one participates.

Whereas, extrinsic motivation refers to doing something for a reason outside the activity itself, a separable outcome, such as external rewards, pleasurable psychological states (e.g., pride, relief) or even avoidance of unpleasant psychological states (e.g., external punishment, shame, guilt) (Hagger & Chatzisarantis, 2007; Ryan & Deci, 2000). Self-determination theory proposes that extrinsic motivation can vary greatly in the degree to which it is autonomous. The least autonomous form of extrinsic motivation is external regulation. Ryan and Deci (2000) suggested an individual who is experiencing external regulation is engaging in behaviour to satisfy an external demand or obtain an external reward (e.g., grades). Introjected regulation reflects engaging in behaviour due to feelings of pressure in order to avoid guilt or anxiety or to attain ego-enhancement or pride. In other words, an individual engages in behaviour to enhance self-esteem or self-worth (Ryan & Deci, 2000). A more self-determined or autonomous form of extrinsic motivation, according to Ryan and Deci (2000a), is identified regulation. An individual experiencing identified regulation, has identified personal significance to the behaviour or has accepted it as personally important. For example, an individual who participates in physical activity because he/she sees it as relevant to one's health, which he/she values as an important aspect of one's life, has identified that behaviour as personally important. The most autonomous form of extrinsic motivation is integrated regulation, which occurs when identified regulations have been brought together with one's other values and needs. Deci and Ryan (2000) stated that integrated forms of regulation share many qualities with intrinsic motivation (i.e., both forms of motivation are autonomous). However, integrated forms of motivation are still extrinsic as one engages in a behaviour

to attain an outcome separate from the behaviour rather than for inherent pleasure and enjoyment.

Amotivation is defined as relatively aimless or purposeless behaviour or simply the absence of motivation (Deci & Ryan, 2000). Ntoumanis et al. (2004) suggested an amotivated student perceives no contingencies between their actions and outcomes, in turn; they lack willingness to participate and contribute passively or not at all. According to SDT, as one's motivational state moves toward intrinsic motivation, increases in cognition (e.g., efficacy), behaviour (e.g., physical activity level) and affect (e.g., enjoyment) will result (Deci & Ryan, 1985; Deci & Ryan, 2000). Further, Deci and Ryan (2000) proposed that behaviour, which is motivated by inherent factors, such as novel, pleasurable, ambitious, and gratifying experiences, will produce more sustainable behaviours than those behaviours produced by outside factors such as external rewards or pressure.

According to Deci and Ryan (2000) in order to attain intrinsic motivation, an individual's innate psychological needs must be fulfilled. Self-determination theory posits that three psychological needs – autonomy (i.e., a sense of choice), relatedness (i.e., a sense of social connection), and competence (i.e., a sense of efficacy), determine the state of an individual's motivation to engage in a specific behaviour. Specifically, Deci and Ryan (2000) stated if students' need for autonomy, relatedness, and competence were met they would experience elevated levels of intrinsic motivation. In contrast, when these basic psychological needs are thwarted, the associated benefits are diminished and low motivation or avoidance will result.

Research has shown that one's level of motivation influences one's health-related behaviours. For instance, Wilson et al. (2005) examined the effects of a 4-week student-centered after-school intervention that emphasized increasing intrinsic motivation and behavioural skills for physical activity. Students were able to select a variety of the physical activities offered weekly, develop a program name and motto, and develop ideas for promoting physical activity to peers. Findings revealed that adolescents in the intervention program showed greater increases in time spent being physically active and reported higher physical activity motivation than adolescents in the comparison group. The authors concluded the intervention provided support for the importance of allowing youth to have input and choices in developing and selecting physical activities as part of the intervention program. Moreover, Yli-Piipari et al. (2009) found students with "high motivational profiles" (i.e., high levels of intrinsic motivation) reported moderate levels of engagement in physical activity, whereas students with "low motivational profiles" (i.e., low levels of intrinsic motivation) demonstrated low levels of engagement in physical activity. Research on SDT in the area of healthy eating is limited, in particular with the adolescent population; however, there is promising research suggesting the theoretical constructs proposed by SDT is a promising framework for understanding healthy eating behaviours. Teixeira, Patrick, and Mata (2011) stated that motivation plays a central role in the capacity to adopt and sustain healthful diets. The authors further stated that interventions, which include the promotion of an individual's sense of autonomy over their eating behaviours, would most likely experience success. In addition, Wilson et al. (2002) found changes in dietary behaviours among adolescents were highly correlated with a positive increase in motivation for healthy eating. Based on

these studies and others, enhancing one's intrinsic motivation is likely to result in positive outcomes such as improved physical activity and healthy eating behaviours.

Taking into consideration that few studies have examined the effect of a whole-school health approach on high school students' level of motivation towards physical activity and healthy eating, the purpose of this investigation was to evaluate the effectiveness of a whole-school health approach framed in SDT of motivation (Health Promoting Secondary Schools [HPSS]), on grade 10 students' motivation to engage in physical activity and healthy eating.

Research Questions and Hypotheses

The following research questions were addressed in Project 2:

1. Did HPSS significantly increase students' level of self-determined motivation to engage in health-related behaviours compared to a comparison/usual practice school?

   Hypothesis: It was hypothesized that students in HPSS would report significantly higher levels of self-determined motivation than students in comparison/usual practice schools.

2. Did HPSS significantly increase students' perceptions of autonomy, relatedness, and competence towards physical activity behaviours compared to a comparison/usual practice school?

   Hypothesis: It was hypothesized that students in HPSS would report significantly higher levels of perceived autonomy, relatedness, and competence towards physical activity than students in comparison/usual practice schools.

3. What was the relationship, if any, between students' perceived autonomy, relatedness, and competence towards physical activity behaviours and students' level of self-determined motivation?

    Hypothesis: It was hypothesized that perceived autonomy, relatedness, and competence would predict intrinsic motivation positively and predict extrinsic motivation and amotivation negatively.

Method

Health Promoting Secondary Schools (HPSS) Intervention

Four action zones. The HPSS intervention was based on the theoretical foundations of Deci and Ryan's (1985) self-determination theory. In accordance to the foundation of the theory, the HPSS intervention sought to positively affect student's level of motivation towards physical activity and healthy eating by enhancing students' perceptions of autonomy, relatedness, and competence. To achieve this the intervention consisted of four choice-based intervention Action Zones: (a) School Environment/Culture Zone; (b) Community Partnership Zone; (c) Student Support Zone; and (d) Teaching and Learning Zone (Wharf-Higgins, Voss, Naylor, Gibbons, Rhodes, et al., 2013).

School environment/culture zone. This Action Zone included the physical environment as well as the school culture and values embodied by its teachers, staff, and students. The goal for the School Environment/Culture Action Zone was to make healthy choices the easy choice by creating safe and inclusive school environments, supporting healthy living policy development, and celebrating and encouraging a whole-school approach to healthy living. This zone was comprised of two parts: (a) policy development

and implementation and (b) school-wide events/campaigns. An example of a school health policy may be to integrate healthy eating into the culture of the school by incorporating the Guidelines for Food and Beverage Sales in British Columbia Schools. Actions for this policy may include removing vending machines and/or advertising healthy foods and beverages. An example of a whole-school event may be to promote active transportation to school by implementing an 'Active Transportation Week'. Actions for this school-wide event may include an advertisement campaign of the benefits of active transportation and/or setting a school goal and tracking the number of students who participated in active transportation that week.

Specifically, each HPSS intervention school was asked to develop and implement a minimum of one school health policy two school-wide events/campaigns (at least one per semester) – one of which should include a community partnership. The one health policy and two school-wide events/campaigns were developed by the school Action Team with the assistance of the HPSS School Liaison (myself). An Action Team was a school committee (6 – 10 individuals) composed of youth (at least 50%) and teachers. Action Teams met regularly and with the help of the HPSS School Liaison developed and implemented health policies and school-wide activities, of their choosing, which promoted or encouraged healthy living within their school. These activities were based on the results of the Healthy Schools Planner Assessment Tool (HSPAT). This assessment tool was an online tool designed to assess a school's health environment in the areas of physical activity and healthy eating. Teachers on the Action Team completed the HSPAT. Following completion an individualized feedback report regarding the present status of the physical activity and healthy eating opportunities in

their school was electronically provided. The Action Team then used this feedback as well as their own input to create and implement the health policies and school-wide events. Action Teams were given a template (paper or electronic) to set and track individual school goals and identify the actions to undertake in order to create the policies and events. Action Teams were also given a HPSS Planning Guide, which was a resource that included a detailed overview of the HPSS intervention as well as numerous health policy examples and whole-school events/campaign ideas. Table 27 includes the SDT constructs targeted in the School Environment/Culture Action Zone.

Table 27
Self-Determination Theory Constructs Targeted in the School Environment/Culture Action Zone

SDT Construct	School Environment/Culture Action Zone
Autonomy	▪ School Action Teams chose, planned and implemented at least two school policies to promote physical activity and/or healthy eating. ▪ School Action Teams chose, planned and implemented at least two school-wide events to promote physical activity and/or healthy eating. ▪ Students in intervention schools were able to choose to participate in the school-wide events.
Relatedness	▪ Students on Action Team Committee developed a sense of belonging as they worked together to plan and implement the policies and events. ▪ Students in intervention schools participated in the school-wide events creating connection and belonging towards their school and their peers.
Competence	▪ Students on the Action Team developed the skills and knowledge needed to plan and implement physical activity and healthy eating policies and events in their school. ▪ Students in intervention schools gained knowledge regarding healthy lifestyle behaviours from the development of school health policies and from the participation in the school-wide events.

Community partnership zone. The Community Partnership Action Zone provided intervention schools with various tools, resources and ideas on how to connect with their community to increase opportunities for physical activity, healthy eating, and positive partnerships. The purpose of this zone was to connect schools with community

organizations and build partnerships to increase a school's capacity to offer innovative opportunities for physical activity and healthy eating. Positive community partnerships can serve many purposes for schools including: the expansion of the resources available to students; opportunities for students to explore their community; the development of positive relationships with community organizations; and increase the opportunities for students to gain experience and healthy life skills.

Intervention schools were asked to develop and implement at least one school-wide event that involved community partnership. Prior to determining what actions Action Teams implemented in the Community Partnership Zone, a baseline assessment of what already exists was necessary. Action Teams were given a Community Inventory that allowed the opportunity to find out what people, organizations, and resources were available for their students outside of the school. Health Promoting Secondary Schools developed two approaches to conducting a community inventory. The first was a short questionnaire that could be used if Action Teams already knew what actions they wanted to take. If Action Teams selected this option, they received a template to help identify community resources (e.g., key stakeholders, partnerships) that may support the Community Partnership Action Zone. The second option was to conduct a focus group with the members of the Action Team. Led by a member of the HPSS team, this focus group guided the Action Team through a series of questions and activities that provided them with a comprehensive list of community services and facilities currently available outside of their school. This was recommended for Action Teams that were not as familiar with community resources and needed to brainstorm what action they would like to take. Further, the focus group enabled the Action Team to determine what community

links and resources they would like to investigate further and implement at their school. All five Action Teams in the intervention schools choose to complete the short questionnaire as they felt they already knew what actions they would like to take. Table 28 includes the SDT constructs targeted in the Community Partnership Action Zone. To view the events/policies implemented in each school see Appendix P.

Table 28
Self-Determination Theory Constructs Targeted in the Community Partnership Action Zone

SDT Construct	Community Partnership Action Zone
Autonomy	▪ School Action Teams chose which Community Inventory they would like to complete. ▪ School Action Teams chose, planned and implemented at least one school-wide event/campaign that involves the community. ▪ Students in intervention schools were able to choose to participate in the school/community event(s).
Relatedness	▪ Students on Action Team Committee developed a sense of belonging as they worked together to plan and implement the community event(s). ▪ Students in intervention schools participated in the school/community event(s) creating connection and belonging towards their school, community, and their peers.
Competence	▪ Students on the Action Team developed the skills and knowledge needed to plan and implement a community event(s). ▪ Students gained knowledge regarding healthy lifestyles from the participation in a school/community event(s). ▪ Students in intervention schools gained knowledge regarding the physical activity and healthy eating opportunities available to them within their community.

Student support zone. Health Promoting Secondary Schools project provided students in intervention schools with several tools and resources to support them in making behavioural changes relating to physical activity and healthy eating. The tools and supports included a health bin and web-based personalized behaviour change support tools (HPSS website). Each intervention school received $2500 to purchase equipment, supplies and resources for their ‘health bin’ and $500 to help implement the school-wide

events (see Appendix B for a description of the purchases made by each intervention school Action Team). Based on the goals and planned activities (health policies and whole-school events) Action Teams, with the consultation of other students and teachers/administrators and with the help of the HPSS School Liaison (myself), selected and purchased equipment they felt their school needed to implement their school's health policies and whole-school events. Each HPSS intervention school had access to the HPSS web-based personalized behaviour change support tools that allowed students and teachers to log in, set up a personalized profile. Table 29 includes the SDT constructs targeted in the Student Support Action Zone.

Table 29
Self-Determination Theory Constructs Targeted in the Student Support Action Zone

SDT Construct	Student Support Action Zone
Autonomy	▪ Schools chose the contents of their Health Bin using the $2500 provided by HPSS. ▪ Students and teachers had access to web-based personalized behaviour change support tools where they could set up a personal profile, take self-assessment quizzes (choose from quizzes on physical activity, healthy eating, screen time, and sugar-sweetened beverages), and set and monitor their goals.
Relatedness	▪ Students developed a sense of belonging towards their school through school-wide challenges and school polls set up on the HPSS website.
Competence	▪ Students became aware of their personal health behaviours through the completion on the self-assessment quizzes, goal setting and monitoring. ▪ Students gained knowledge through the tips, blogs, polls, and pages of the HPSS website.

Teaching and learning zone. In this Action Zone, intervention schools were asked to implement a Planning 10 module and an innovative Physical Education 10 curriculum. The Planning 10 course contains the only mandatory health education curriculum taught in British Columbia high schools in which students are offered learning opportunities to think critically about health in four areas: healthy living, health

information, healthy relationships, and health decisions. The goal of HPSS Planning 10 was to provide students with an opportunity to experience a behaviour change process that leads to a healthy lifestyle. Six lessons were created by an HPSS researcher and reviewed by a committee of Planning 10 teachers to help teachers engage their students in personalized activities that allowed them to examine their daily habits and make behavioural changes related to physical activity and healthy eating. Within the six lessons, students set personal physical activity and/or healthy eating goals, as well as tracked and monitored these goals. More specifically, students were asked to examine healthy behaviours related to: (a) physical activity; (b) fruit and vegetable consumption; (c) sugar sweetened beverage consumption; and (d) screen time. Health Promoting Secondary Schools provided teachers with Planning 10 lessons to be implemented as part of the HPSS intervention and teachers were asked to track and record their implementation of the six lessons. For more information on each lesson and the Planning 10 Tracking Tool see Appendix C.

The HPSS Physical Education 10 curriculum supports the implementation of a physical education program based on increasing students' intrinsic motivation through autonomy, relatedness, and competence. Health Promoting Secondary Schools Physical Education 10 teachers received a resource that included instructional strategies, ready to use lessons and examples of effective activities to increase students' intrinsic motivation toward physical education and physical activity, enhance students' perceptions of autonomy, relatedness, and competence. The resource was adapted from the work of Gibbons, Humbert, and Temple (2010). Teachers were asked to document specific SDT actions they implemented in their grade 10 physical education class(es). Actions ranged

from individual activities, to teaching strategies, to focused lessons. Concepts drawn from Deci and Ryan's (1985) SDT of motivation provided the theoretical framework for these actions (see Table 30 for the SDT constructs targeted in the Teaching and Learning Action Zone). Based on this theoretical framework, if physical education teachers emphasize the development of students' autonomy (sense of choice), relatedness (sense of social attachment), and competence (sense of efficacy), then students will be more likely to be intrinsically motivated to engage in meaningful participation in physical education. The HPSS Physical Education 10 course incorporated autonomy (e.g., choice of group members, choice of activities taught within the course), relatedness (e.g., class team building activities), and competence (e.g., knowledge of their current physical activity level both in and out of class) within physical education lessons. Teachers were asked to implement at least one action from each SDT construct (autonomy, relatedness, competence) in every physical education lesson, promote enrolment in elective physical education programs, and keep track of their actions in the HPSS Physical Education tracking tool. It was anticipated and also strongly encouraged that teachers use existing activities and resources that they may have, which coincided with a given HPSS action and the SDT constructs. Appendix D includes sample actions and tracking tool for HPSS Physical Education 10.

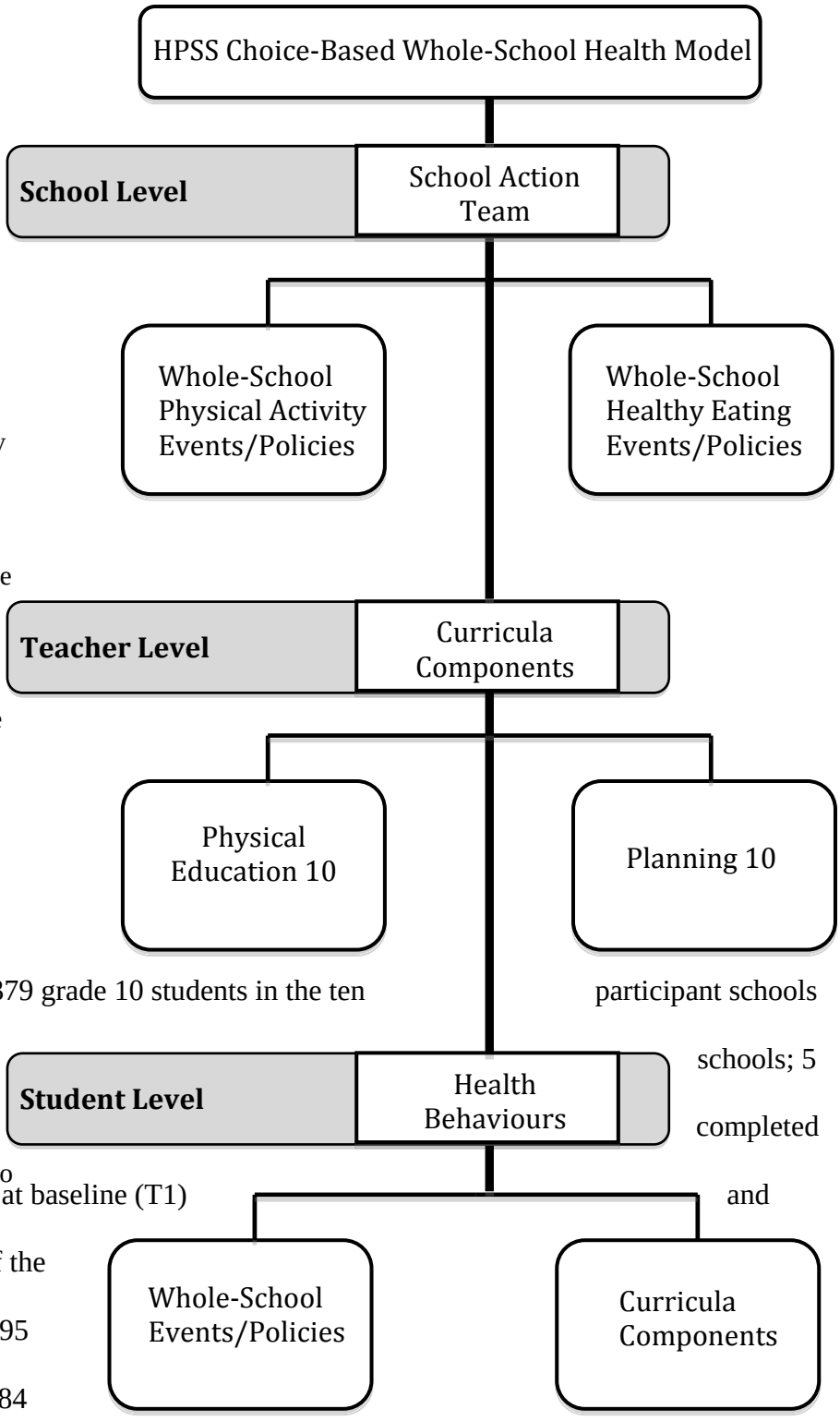
Table 30

Self-Determination Theory Constructs Targeted in Teaching & Learning Action Zone

SDT Construct	Teaching & Learning Action Zone
Autonomy	▪ Planning 10 teachers were given six adaptable health lessons. Planning 10 teachers were able to choose when and how these lessons are implemented into their courses. ▪ Physical education teachers were given a resource with numerous adaptable examples of activities and instructional strategies. Physical Education 10 teachers were able to choose when and how these

	activities and/or instructional strategies are implemented into their courses. ▪ In Planning 10 students were able to choose which healthy lifestyle behaviour (physical activity, healthy eating, sugar-sweetened beverages, screen time) they want to improve. Once students choose a behaviour, they set and monitored personal goals regarding the chosen health behaviour. ▪ Within the HPSS Physical Education 10 students were provided with choices within their physical education classes.
Relatedness	▪ Within the HPSS Planning 10 and Physical Education 10 students participated in activities that created connection and belonging towards their peers and teacher.
Competence	▪ Students in Planning 10 classes developed goal setting and behavioural monitoring skills. ▪ Students in Planning 10 classes became aware of their personal health behaviours through goal setting and monitoring. ▪ Students in Physical Education 10 gained the skills and knowledge needed to live an active healthy lifestyle.

Choice-based model. Health Promoting Secondary Schools was a choice-based model that allowed schools and students to create individualized action plans that facilitated change at the school and individual levels (Wharf-Higgins et al., 2013). While previous whole-school models have relied upon a prescriptive 'one size-fits all' approach, HPSS followed the recommendations in the literature (Cale & Harris, 2006; De Bourdeaudhuij et al., 2011; Langille & Rodgers, 2010; Naylor & McKay, 2009) and considered the activity needs, interests and preferences of the students within individual schools when designing the intervention. That is, HPSS followed a choice-base model at the school level, teachers level, and student level. Figure 5 provides a visual representation of the choice-based model. This meant that schools were required to deliver a minimal threshold (Glasgow & Emmons, 2007) of HPSS intervention components, while specific intervention pieces and implementation details were tailored to meet the needs of schools, teachers, and students.



- Based on school needs, the school Action Team chose to implement whole-school events/policies that promoted physical activity and/or healthy eating.
- Teachers were able to choose which PE 10 resources to implement and were able to adapt PE 10 and Planning 10 resources/lessons to meet the needs of their students.
- Students were able to choose to participate in whole-school events. Students were also provided choices within PE 10 and Planning 10 curricula and could choose which health behaviour(s) to focus on based on their individual needs (i.e., fruit & vegetable intake, sugar-sweetened beverage consumption, physical activity and/or screen time).

Participants

A total of 379 grade 10 students in the ten participant schools (5 intervention schools; 5 control schools) completed the questionnaires at baseline (T1) and follow-up (T2). Of the 379 participants, 195 were female and 184 were male students. The mean age of the participant sample was 13.52 years (*SD* = 0.37, range = 14.7 – 16.8 years).

Figure 5. HPSS Choice-Based Model

Following the choice-based framework of HPSS, participant school Action Teams may have chose to implemented both physical activity events/policies and healthy eating events/policies or focused solely on physical activity or healthy eating events/policies, based on the needs of their school. Due to this differential choice (i.e., Action Teams decision to focus on physical activity, healthy eating, or both), the intervention schools were further divided into intervention conditions based on the events and policies implemented. For the physical activity condition, three groups were formed: (a) "intervention group with physical activity events/policies" (n = 4), schools in this group implemented at least one physical activity event or policy during the intervention year; (b) "intervention group with no physical activity events/policies" (n = 1), schools in this group did not implement physical activity events or policies during the intervention year; (c) "usual practice group" (n = 5), these schools served as the control condition. For healthy eating condition, three groups were formed: (a) "intervention group with healthy eating events/policies" (n = 3), schools in this group implemented at least one healthy eating event or policy during the intervention year; (b) "intervention group with no healthy eating events/policies" (n = 2), schools in this group did not implement healthy eating events or policies during the intervention year; (c) usual practice group (n = 5), these schools served as the control condition. To view the schools in each group based on events/policies implemented see Table 31 and Table 32. Appendix P includes a description of the events and policies that each school developed and implemented during the intervention year.

Table 31
Physical Activity Conditions

Physical Activity Conditions		
Intervention Group with	Intervention Group with	Usual Practice Group

Physical Activity Events/Policies (n = 4)	No Physical Activity Events/Policies (n = 1)	(n = 5)
School 1	School 5*	School 6
School 2		School 7
School 3		School 8
School 4		School 9
		School 10

*School 5 did not implement physical activity events/policies due to teacher job action

Table 32
Healthy Eating Conditions

Healthy Eating Conditions		
Intervention Group with Healthy Eating Events/Policies (n = 3)	Intervention Group with No Healthy Eating Events/Policies (n = 2)	Usual Practice Group (n = 5)
School 1	School 3	School 6
School 2	School 5*	School 7
School 4		School 8
		School 9
		School 10

*School 5 did not implement healthy eating events/policies due to teacher job action

Physical activity groups. The intervention group with physical activity events/policies was comprised of 177 participants (105 females and 72 males), the intervention group with no physical activity events/policies consisted of 17 participants (6 females and 11 males), and the usual practice group consisted of 185 participating students (84 females and 101 males). Table 33 includes the demographic characteristics of participants at baseline among physical activity groups.

Healthy eating groups. The intervention group with healthy eating events/policies consisted of 132 participants (74 females and 58 males), the intervention group with no healthy eating events/policies was comprised of 62 participants (37 females and 25 males), and the usual practice group consisted of 185 participating students (84 females and 101 males). Refer to Table 34 for demographic characteristics

of participants at baseline among healthy eating groups and Table 35 for school demographic characteristics of all participants at baseline.

Table 33

Participants' Gender and Age by Physical Activity Condition

	Total (N = 379)	Intervention Group with PA Events/Policies* (n = 177)	Intervention Group with no PA Events/Policies** (n = 17)	Usual Practice (n = 185)
Gender				
Female (%)	195 (51.5)	105 (59.3)	6 (35.3)	84 (45.4)
Male (%)	184 (48.5)	72 (40.7)	11 (64.7)	101 (54.6)
Age, M age (SD)	15.32 (0.37)	15.26 (0.36)	15.27 (0.31)	15.38 (0.38)
(Range years)	(14.7-16.8)	(14.7 – 16.6)	(14.8 – 15.7)	(14.7 – 16.8)

PA = Physical Activity

** Intervention schools in this group: School 1, School 2, School 3, School 4*

*** Intervention schools in this group: School 5*

Table 34

Participants' Gender and Age By Healthy Eating Condition

	Total (N = 379)	Intervention Group with HE Events/Policies* (n = 132)	Intervention Group with no HE Events/Policies** (n = 62)	Usual Practice (n = 185)
Gender				
Female (%)	195 (51.5)	74 (56.1)	37 (59.7)	84 (45.4)
Male (%)	184 (48.5)	58 (43.9)	25 (40.3)	101 (54.6)
Age, M age (SD)	15.32 (0.37)	15.25 (0.36)	15.28 (0.32)	15.38 (0.38)
(Range years)	(14.7-16.8)	(14.7 – 16.6)	(14.7 – 15.9)	(14.7 – 16.8)

HE = Healthy Eating

**Intervention schools in this group: School 1, School 2, School 4*

*** Intervention schools in this group: School 3, School 5*

Table 35
Participants' Gender and Age by School

School (Location)	Total (%) (N = 379)	Gender		M Age (SD) (Range yrs)
		Female (%) (n = 194)	Male (%) (n = 185)	
School 1*^	22 (5.8)	10 (45.5)	12 (54.5)	15.39 (0.45) 14.8 – 16.6
School 2*^	86 (22.7)	42 (48.8)	44 (51.2)	15.20 (0.33) 14.7 – 16.4
School 3*^^	45 (11.9)	31 (68.9)	14 (31.1)	15.29 (0.33) 14.7 – 15.9
School 4*^	24 (6.3)	22 (91.7)	2 (8.3)	15.29 (0.36) 14.7 – 15.9
School 5**^^	17 (4.5)	6 (35.3)	11 (64.7)	15.27 (0.31) 14.8 – 15.7
School 6[UP]	39 (10.3)	21 (53.8)	18 (46.2)	15.41 (0.43) 14.8 – 16.8
School 7[UP]	13 (3.4)	6 (46.2)	7 (53.8)	15.47 (0.33) 15.0 – 16.1
School 8[UP]	36 (9.5)	19 (52.8)	17 (47.2)	15.24 (0.36) 14.8 – 16.3
School 9[UP]	46 (12.1)	15 (32.6)	31 (67.4)	15.45 (0.40) 14.8 – 16.5
School 10[UP]	51 (13.4)	22 (43.1)	29 (56.9)	15.33 (0.34) 14.7 – 15.9

Note. Only participants who completed both baseline and follow-up questionnaires are shown in the above table and were used in the analysis.
* Indicates HPSS intervention school with physical activity events/policies
** Indicates HPSS intervention school with no physical activity events/policies
^ Indicates HPSS intervention school with healthy eating events/policies
^^ Indicates HPSS intervention school with no healthy eating events/policies
[UP] Indicates usual practice school

Measures

The following measurement tools were used to evaluate students' motivation to engage in health-related behaviours.

Behavioural Regulations Exercise Questionnaire – 2 (BREQ-2). To determine if HPSS had an impact on students' motivation to engage in physical activity, students completed

the BREQ-2. The BREQ-2 is a 19-item self-report measure that assesses exercise regulations according to the SDT framework. The BREQ-2 is an expansion of the Behavioural Regulation in Exercise Questionnaire (BREQ; Mullan et al., 1997), which contains four subscales that measure external regulation, introjected regulation, identified regulation, and intrinsic motivation of exercise behaviour. The BREQ-2 contains an additional subscale that measures amotivation. The wording of the BREQ-2 was adapted in this study to apply to physical activity settings by changing the word "exercise" to "physical activity". The questionnaire contains five subscales assessing intrinsic motivation – four items (e.g., "I enjoy participating in physical activity"), identified regulation – four items (e.g., "It's important to me to participate regularly in physical activity"), introjected regulation – four items (e.g., "I feel guilty when I don't participate in physical activity"), external regulation – four items (e.g., "I feel under pressure from my friends/family to participate in physical activity), and amotivation – three items (e.g., "I don't see why I should have to participate in physical activity"). Participants respond to each item, following the stem, "Why do you engage in physical activity?" on a 5-point Likert-type scale ranging from 0 = "not true for me" to 5 = "very true for me". This questionnaire provides an overall mean score of each of the five subscales to examine the extent of each motivation level individually and an overall Relative Autonomy Index. A Relative Autonomy Index is a single score derived from the subscales that gives an index of the degree to which respondents feel self-determined. Weighting each subscale and summing the weighted scores calculate the Relative Autonomy Index: (amotivation multiplied by -3) + (external regulation multiplied by -2) + (introjected regulation multiplied by -1) + (identified regulation multiplied by 2) + (intrinsic regulation multiplied by 3). The minimum score for the Relative Autonomy Index is -24 and the

maximum score is +20. Higher positive scores for the Relative Autonomy Index indicate more autonomous motivation whereas lower negative scores indicate less autonomous motivation. In short, the Relative Autonomy Index is the composite score of self-determined motivation. Previous research has supported adequate factorial validity and reliability of the BREQ-2 scores in both European youth (Gillison & Standage, 2005) and Canadian youth (Wilson & Rodgers, 2004). Cronbach alpha's for all BREQ-2 subscales have been shown to exceed .75 (Wilson & Rodgers, 2004). Appendix Q includes a copy of the BREQ-2.

Healthy Eating Motivation Scale. To determine if HPSS significantly increased students' level of motivation towards healthy eating, students in intervention and usual practice schools completed the Healthy Eating Motivation Scale. Given that no tool currently exists to measure one's level of self-determined motivation towards healthy eating among adolescents, the Healthy Eating Motivation Scale was developed for this study. The Healthy Eating Motivation Scale is a self-report questionnaire that measures one's level of motivation towards healthy eating on a 7-point likert scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". The questionnaire contains three subscales assessing intrinsic motivation (e.g., "I eat healthy for the pleasure of eating food that is good for me"), extrinsic motivation (e.g., "I try to eat healthy so others won't be disappointed in me"), amotivation (e.g., "eating healthy foods is a waste of my time"). An exploratory factor analysis was conducted on the 26-item scale to identify underlying factors. Employing multiple iterations with the criteria set out by Stevens (2001) and Tabachnick and Fidell (2007) and being consistent with the theoretical framework of SDT, an acceptable fit model was determined with a 3-factor 17-item solution: 7- intrinsic motivation items, 4- extrinsic motivation items, and 6- amotivation items. The final 3-factor 17-item model resulted in 69.19%

of the variance accounted for. See Appendix R for the Healthy Eating Motivational Scale and Appendix S for the factor items and corresponding cross loadings.

Physical Activity Motivation Scale. To determine if HPSS significantly increased students' perceptions of autonomy, relatedness, and competence towards physical activity, students in intervention and usual practice schools completed the Physical Activity Motivation Scale. Given that no tool currently exists to measure perceived autonomy, relatedness, and competence towards physical activity among adolescents, the Physical Activity Motivational Scale was developed based on the Physical Education- Autonomy, Relatedness, Competence Scale (Sulz et al., 2011). The Physical Activity Motivational Scale is a 20-item self-report questionnaire that measures one's degree of autonomy (7-items), relatedness (6-items), and competence (7-items) towards physical activity on a 7-point likert scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". Students respond to the stem question "When I participate in physical activity…" followed by items representing autonomy (e.g., "I participate because I have to"), relatedness (e.g., "I really like the people I am with"), and competence (e.g., "I am good at the things I do"). An exploratory factor analysis was conducted on the Physical Education Motivation Scale. After employing multiple iterations with the criteria set out by Stevens (2001) and Tabachnick and Fidell (2007) and being consistent with the theoretical framework, the results of the analysis showed that items did not load on the SDT constructs as expected based on the SDT. For example, autonomy items were loading with competence and relatedness items. Therefore, the Physical Education Motivation Scale did not display adequate loadings based on the theoretical framework and was removed from any further analysis. Appendix T includes a copy of the Physical Activity Motivational Scale.

Procedures

The three questionnaires were administered to participating students in both the intervention and usual practice schools two times during the school year – once at the beginning of the intervention year (i.e., baseline [T1] – September/October) and once at the end of the intervention (i.e., post-intervention [T2]– April/May/June). Questionnaires were administered during school hours by myself and/or a HPSS research team member and took approximately 20 minutes to complete. The students were told that there were no right or wrong answers, no trick questions and asked to answer the questions honestly. Participants were also informed that their identity would remain confidential as all individual records and results would be analyzed and referred to by number code only.

Analysis

Analyses were performed with the Statistical package for the Social Science 20.0 (SPSS Inc., Chicago, IL, USA). Data was entered into excel by question for each participant student then uploaded into SPSS. To check for accurate entry I randomly checked 5% of the data and data was scanned for descriptive and frequency statistics for accurate ranges of each variable.

Students' level of self-determined motivation towards physical activity. A multivariate analysis of covariance (MANCOVA) was performed to determine differences between conditions over time on students' level of motivation towards physical activity. The Behavioural Regulation in Exercise Questionnaire-2 was scored by compiling separate subscale scores and computing the Relative Autonomy Index. Each subscale on the Behavioural Regulation in Exercise Questionnaire-2 was comprised of the combined responses from a series of questions related to the specific level of motivation. The mean score of the combined

questions from each subscale was computed for baseline (T1) and follow-up (T2) and used for analysis. For example, intrinsic motivation was measured based on the mean score of four questions related to students' intrinsic motivation towards physical activity. The Relative Autonomy index was also computed for each time point (i.e., baseline and follow-up) and used for analysis. Follow-up subscale scores and Relative Autonomy Index scores served as the dependent variables, condition as the independent variable, and baseline scores as covariates. Effect size (partial eta squared, η^2) was calculated to determine the relative magnitude of the experimental treatment using the following formula: Partial η^2= SS (effect) SS (effect) + SS (error for that effect). Partial eta squared was interpreted as small (.01), medium (.06), and large (.14) (Cohen, 1988).

Students' level of self-determined motivation towards healthy eating. To determine differences between conditions over time on students' level of motivation towards healthy eating, a MANCOVA was conducted. Each subscale on the Healthy Eating Motivation Scale was comprised of the combined responses from a series of questions related to the specific level. The mean score of the combined questions from each subscale was computed and used for analysis. For example, intrinsic motivation was measured based on the mean score of seven questions related to students' intrinsic motivation towards healthy eating. Follow-up subscale scores served as the dependent variables, condition as the independent variable, and baseline scores as covariates. Effect size (partial eta squared, η^2) was calculated to determine the relative magnitude of the experimental treatment using the following formula: Partial η^2= SS (effect) SS (effect) + SS (error for that effect). Partial eta squared was interpreted as small (.01), medium (.06), and large (.14) (Cohen, 1988).

Student's perceived autonomy, relatedness, and competence towards physical activity. No analysis was conducted because the Physical Activity Motivation Scale did not display adequate loadings based on the theoretical framework, as such was removed from any further analysis.

Relationship between SDT constructs and motivational state. No analysis was conducted because the Physical Activity Motivation Scale did not display adequate loadings based on the theoretical framework, as such was removed from any further analysis.

Results

Descriptive statistics for level of self-determined motivation towards physical activity by condition are shown in Table 36. Descriptive statistics for level of self-determined motivation towards healthy eating by condition are shown in Table 37. The tables are followed by baseline differences between groups, and outcome measures for motivation towards physical activity and motivation towards healthy eating.

Table 36.
Descriptive Statistics for Level of Self-Determined Motivation Towards Physical Activity by Condition

Dependent Variable	Condition	Baseline (T1) (Mean ± SD)	Follow-up (T2) (Mean ± SD)	Mean Change
Intrinsic Motivation	Intervention Group with PA Events/Policies	4.04 ± .85	4.14 ± .78	+ .10
	Intervention Group with no PA Events/Policies	3.94 ± .97	3.76 ± .93	- .18
	Usual Practice	4.07 ± .88	4.08 ± .82	+ .01
Identified Regulation	Intervention Group with PA Events/Policies	3.80 ± .85	3.88 ± .83	+ .08
	Intervention Group with no PA Events/Policies	3.84 ± 1.06	3.59 ± .94	- .25
	Usual Practice	3.92 ± .80	3.86 ± .82	- .06
Introjected Regulation	Intervention Group with PA Events/Policies	2.66 ± 1.14	2.52 ± 1.05	- .14
	Intervention Group with no PA Events/Policies	2.69 ± 1.22	2.55 ± .88	- .14
	Usual Practice	2.63 ± 1.05	2.65 ± .98	+ .02
External Regulation	Intervention Group with PA Events/Policies	1.89 ± .76	1.87 ± .74	- .02
	Intervention Group with no PA Events/Policies	2.19 ± .85	2.25 ± .76	+ .06
	Usual Practice	1.94 ± .80	1.90 ± .76	- .04
Amotivation	Intervention Group with PA Events/Policies	1.37 ± .62	1.30 ± .51	- .07
	Intervention Group with no PA Events/Policies	1.56 ± .79	1.62 ± .88	+ .06
	Usual Practice	1.41 ± .66	1.43 ± .59	+ .02
Relative Autonomy Index	Intervention Group with PA Events/Policies	9.19 ± .5.51	10.02 ± 5.01	+ .83
	Intervention Group with no PA Events/Policies	7.75 ± 6.88	6.57 ± 7.40	- 1.18
	Usual Practice	9.31 ± 6.02	9.23 ± 5.34	- .08

Note. Physical activity motivation scores were on a 5-point scale

Table 37

Descriptive Statistics for Level of Self-Determined Motivation Towards Healthy Eating by Condition

Dependent Variable	Condition	Baseline (T1) (Mean ± SD)	Follow-up (T2) (Mean ± SD)	Mean Change
Intrinsic Motivation	Intervention Group with HE Events/Policies	5.33 ± 1.31	5.59 ± 1.14	+ .26
	Intervention Group with no HE Events/Policies	5.56 ± 1.28	5.49 ± 1.33	- .07
	Usual Practice	5.37 ± 1.35	5.44 ± 1.28	+ .07
Extrinsic Motivation	Intervention Group with HE Events/Policies	2.53 ± 1.32	2.42 ± 1.18	- .11
	Intervention Group with no HE Events/Policies	2.57 ± 1.35	2.30 ± 1.29	- .27
	Usual Practice	2.51 ± 1.35	2.44 ± 1.28	- .07
Amotivation	Intervention Group with HE Events/Policies	1.70 ± 0.69	1.48 ± 0.70	- .22
	Intervention Group with no HE Events/Policies	1.65 ± 0.91	1.56 ± 0.85	- .09
	Usual Practice	1.76 ± 1.06	1.71 ± 0.91	- .05

Note. Healthy eating motivation scores were on a 7-point scale

Baseline Differences

Physical activity groups. A multivariate analysis (MANOVA) was performed to examine baseline differences among the three physical activity groups on level of motivation towards physical activity. The results showed that there were no significant differences among the three groups on level of motivation pre-intervention (Wilks' Λ = .94, F [10, 744] = .812, p = .617, η^2 = .011), meaning there were three homogenous groups prior to the intervention on level of motivation towards physical activity.

Healthy eating groups. To examine baseline differences among the three healthy eating groups in level of motivation towards healthy eating a MANOVA was conducted. The results showed that there were no significant differences among the three groups (Wilks' Λ = .991, F [10, 870] = .590, p = .736, η^2 = .005), meaning there were three homogenous groups prior to the intervention on level of motivation towards healthy eating.

Outcome Measures

Motivation towards physical activity. To determine differences between conditions over time on students' level of motivation towards physical activity, a MANCOVA was performed. The results showed that there were no significant differences among the three groups (Wilks' Λ = .96, F [10, 732] = 1.47, p =. 146, η^2 = .020).

Motivation towards healthy eating. To determine differences between conditions over time on motivation towards healthy eating a MANCOVA was performed. The results showed significant differences among the three groups (Wilks' Λ = .97, F [6, 742] = 2.196 p = .042, η^2 = .017). The univariate tests (Table 38) demonstrated

significant differences in the mean scores on amotivation towards healthy eating (*F* [2, 373] = 4.79, *p* =. 009, η^2 = .025). Tukey's post hoc tests (Table 39) showed that students in the intervention schools with healthy eating events/policies scored significantly lower on amotivation post intervention compared to students in usual practice schools (*p* = .003).

Table 38
Univariate analysis for healthy eating scores

Dependent Variable	F	P-Value	Partial η^2
Intrinsic Motivation	2.09	.125	.011
Extrinsic Motivation	1.08	.342	.006
Amotivation	4.79	.009**	.025

** significant at $p < .01$

Table 39

Differences Between Groups on Level of Self-Determined Motivation Towards Healthy Eating By Condition

Dependent Variable	Condition		P - Value
Intrinsic Motivation	HPSS Intervention with HE Events/Policies	HPSS Intervention with No HE Events/Policies	.096
		Usual Practice	.074
	HPSS Intervention with No HE Events/Policies	Usual Practice	.716
Extrinsic Motivation	HPSS Intervention with HE Events/Policies	HPSS Intervention with No HE Events/Policies	.232
		Usual Practice	.805
	HPSS Intervention with No HE Events/Policies	Usual Practice	.148
Amotivation	HPSS Intervention with HE Events/Policies	HPSS Intervention with No HE Events/Policies	.477
		Usual Practice	.003**
	HPSS Intervention with No HE Events/Policies	Usual Practice	.111

Note. HE = Healthy Eating

** significant at $p < .01$

In sum, the HPSS intervention significantly decreased students' amotivation towards healthy eating compared to usual practice schools. There were no significant differences between groups on level of motivation towards physical activity. Further, no significant differences were found between intervention schools and control schools on intrinsic motivation and extrinsic motivation towards healthy eating.

Discussion

This study was conducted to evaluate the effectiveness of a choice-based whole-school health approach on increasing high school students' motivation towards physical activity and healthy eating. Schools have been identified as an important setting for the promotion of health among children and youth (Cale & Harris, 2013; Fairclough & Stratton, 2005; Slingerland & Borghouts, 2011; van Sluijs et al., 2008). An overview of the literature has shown that multi-component school-based intervention strategies have primarily been focused on elementary and middle year students (Stone, McKenzie, Welk, & Booth, 1998; van Sluijs et al., 2008). Further, the majority of previous whole-school health approaches have been framed in social cognitive theory (e.g., Dzewaltowski et al., 2009; Jones et al., 2008; Lubans et al., 2010) and/or socio-ecological models (e.g., McKenzie et al., 2004; Pate et al., 2005; Simon et al., 2004; Webber et al., 2008), with little or no focus on students' motivational processes. The present investigation demonstrated that a whole-school health approach, which utilized methods central to Deci and Ryan (1985, 2000) SDT, has potential to positively influence high school students' motivation towards healthy eating.

It was hypothesized that students in HPSS intervention schools would report significantly higher levels of self-determined motivation towards physical activity and healthy eating than students in usual practice schools. Study results showed success in decreasing amotivation towards healthy eating in the intervention condition. As stated earlier, limited school-based intervention work utilizing SDT underpinnings has been conducted in the high school setting, yet a few intervention studies have aimed to increase motivation towards health behaviours among elementary aged students. For

example, Gorely et al. (2009) implemented a multi-component school-based intervention to promote physical activity and healthy eating among elementary aged children. The results of the intervention revealed greater decreases in extrinsic motivation towards physical activity and fruit and vegetable consumption in the intervention group than the control group. Intervention research has also been conducted to increase motivation towards physical activity and healthy eating among adolescents through other intervention settings (e.g., after school programs, Wilson et al., 2005; health care settings, Fortier et al., 2010; physical education contexts, Chatzisarantis & Hagger, 2009). For instance, Wilson et al. (2005) examined the effects of an afterschool intervention framed in social cognitive theory and SDT on increasing physical activity levels and theoretically related psychosocial factors specific to physical activity. Adolescents in the intervention group displayed significantly greater increases in physical activity motivation post intervention compared to the control group (Wilson et al., 2005). The results of the Project 2 add to the literature by showing support that amotivation towards healthy eating behaviours among high school students can be decreased through whole-school interventions, which target tenants of SDT.

According to Ryan and Deci (2000) amotivation is a relatively aimless or purposeless behaviour or simply the absence of motivation. Amotivation occurs when an individual lacks the intent to act, does not perceive contingencies between one's behaviours and the associated outcomes, and sees no value in the activity or feels incompetent to engage in the activity (Deci & Ryan, 1985; Ryan & Deci, 2000). Deci and Ryan (2000) stated that amotivated behaviours are the least self-determined because there is no sense of purpose, no expectations of rewards, and no belief that there is a possibility

of changing the behaviour. Deci and Ryan (2000) argued that amotivation stems from the lack of need satisfaction or environments that undermine the need of autonomy, relatedness, and competence. Deci and Ryan (2000) further contend environments which block the need for autonomy will promote extrinsic forms of motivation but when environments also block the psychological needs for competence and relatedness an individual will experience amotivation. Barkoukis, Tsorbatzoudis, Grouios, and Sideridis (2008) described four different types of amotivation: (a) the belief concerning the lack of ability to perform and activity; (b) the belief that the adopted strategies will not produce the desired outcomes, (c) the belief that the activity is too demanding for the individual; and (d) the belief that high effort is not adequate for successful task performance. Ryan et al. (2009) stated one major reason identified within the SDT for an individual being amotivated is the person does not feel a sense of competence to carry out a certain activity. The authors suggest this may be because they lack certain skills or knowledge necessary to act or perhaps the individual does not want to act because they find no value or interest in the behaviour. Although this study did not examine participants' satisfaction of autonomy, competence, and relatedness, it appears based on the findings that participants' psychological needs towards healthy eating were met, at least to some degree, as findings showed decreases in amotivation towards healthy eating among students in intervention schools. The HPSS program aimed to address the identified reasons for amotivation stated by Barkoukis et al. (2008) and Ryan et al. (2009). For example, at the curricula level the HPSS Planning 10 program focused on providing students with the necessary skills and knowledge needed to engage in physical activity and healthy eating behaviours and developing individualized behaviour change programs

to help students set goals towards health behaviours. Based on the results of this study, the HPSS program was effective at decreasing amotivation towards healthy eating.

Although amotivation has not specifically been studied in health curricula, such as Planning 10, or multi-component school-based intervention research, amotivation has been examined in physical education contexts (Ntoumanis, Pensgaard, Martin, & Pipe, 2004; Perlman, 2010; Shen, Li, Sun, & Rukavina, 2010). Ntoumanis, Pensgaard, Martin, & Pipe (2004) explored students' perceptions of amotivation in compulsory high school physical education through semi-structured interviews. Results revealed three main perceived causes of amotivation: learned helplessness beliefs, low need satisfaction, and contextual factors. Learned helplessness stemmed from students not valuing physical education and therefore exerting little to no effort. The authors noted the devaluation of physical education and the associated lack of effort might be a tactic to protect one's perceptions of low competence. In addition to low perceptions of competence, students also reported lack of need satisfaction for autonomy and relatedness. Students described lack of choices within their physical education classes and suggested a wider range of individual activities (e.g., aerobics, dancing) with a reduced competitive focus. Further, some students reported conflicts with other students during class time and concerns of social comparison and evaluation (Ntoumanis et al., 2004). Lastly, Ntoumanis et al. (2004) found that poor teaching practice and poor physical environment were strong contextual factors that caused amotivation. Specifically, students described that poor teaching practice (e.g., using exercise as punishment, inappropriate comments about students' ability) resulted in poor student teacher relationships (i.e., low satisfaction of the need for relatedness) and low mastery climate with little emphasis on individual

student learning and improvement. The authors concluded that intervention programs should focus on the above noted suggestions and theoretical underpinnings of SDT. A central aspect of the HPSS Physical Education 10 component was to satisfy the posited needs of SDT by providing students with choices, enhancing connection and belonging between other students and teachers, and enhancing students' competence to engage in health related behaviours. Specifically, HPSS Physical Education 10 focused on providing students with choices, offering a wide range of activities, setting and monitoring personal goals towards physical activity, and building relationships within physical education classes. Although the HPSS Physical Education 10 program followed suggestions in the literature to increase motivation towards physical education and physical activity results showed no significant differences on motivation towards physical activity between conditions. This may be partially explained by the barriers faced among physical education teachers in the planning and implementation of the HPSS Physical Education 10 program, as discussed in Project 1. These barriers resulted in low levels of implementation rate among some physical education teachers. As such, the dose of the HPSS Physical Education 10 program that students received was low and might help explain the non-significant results on motivation towards physical activity.

A few limitations need to be considered when interpreting the results of this project. This intervention relied on self-report questionnaires; therefore it is unknown whether the HPSS intervention improved actual physical activity and healthy eating behaviours among students. It would be of interest to incorporate objectively measured behaviours in future research. Further, the newly developed measure, the Physical Activity Motivation Scale did not display adequate loadings based on the theoretical

framework and was removed from any further analysis. The assumption is that any improvements in level of motivation among participants was due to the satisfaction of psychological needs posited by SDT but this could not be determined due to the inadequate loadings of the newly developed questionnaire. Lastly, this study failed to recruit the target sample size and therefore was not powered to provide statistically significant results.

In conclusion, this study contributes to existing knowledge by examining a whole-school health model framed in Deci and Ryan's (1985; 2000) SDT framework. Other studies have reported positive outcomes from whole-school health models (e.g., Pate et al., 2005; Sing et al., 2009) and motivation towards health behaviours (e.g., Wilson et al., 2005; Wilson et al., 2002; Yli-Piipari et al., 2009) and investigators have suggested whole-school models take into account the motivational processes of students to improve health behaviours (Cale & Harris, 2006; Wallhead & Buckworth, 2004); however, this, to my knowledge has yet to be investigated. The findings of this study suggest that a whole-school health model framed in SDT can reduce amotivation towards healthy eating among adolescents. While findings showed decreases in amotivation scores among intervention students, a longer duration of the intervention may be necessary to improve intrinsic forms of motivation. Given that amotivation is the complete absence of motivation (Deci & Ryan, 2000) and is considered the lowest form of self-determined motivation on the motivational continuum, it may be expected that improvements in amotivation be observed over a shorter intervention period. Future research should examine the effects of a longer school-based intervention on students' level of motivation towards physical activity and healthy eating. The knowledge gained from this project will

add to existing knowledge regarding strategies to enhance students' level of self-determined motivation towards physical activity and healthy eating. Additionally, the study findings imply that a whole-school health model, which involve teachers and students in development and implementation and allow choices at all intervention levels (i.e., school, teacher, student), can be a successful model for the promotion of healthy eating behaviours.

Chapter 6. Project 3

Evaluation of a School-Based Intervention to Increase Student Motivation and Enrolment in High School Physical Education Programs

Abstract

The purpose of this project was to examine the impact of a physical education program framed in self-determination theory (SDT) of motivation on students' basic psychological need satisfaction and enrolment in grade 11 elective physical education programs. Health Promoting Secondary Schools Physical Education 10 (HPSS Physical Education 10) was a choice-based model that allowed teachers' flexibility and choices in regard to specific intervention components. Teachers (n = 15) were asked to implement a minimum threshold of actions designed to enhance students' psychological need satisfaction towards physical education and to promote elective physical education programs. A matched comparison pre-post design was used with 10 high schools (five intervention; five usual practice). A sample of 373 grade 10 students completed self-report questionnaires to assess their perceptions of autonomy, relatedness, and competence towards grade 10 physical education and school personnel provided enrolment information. Multilevel analysis showed no significant differences between conditions post intervention on overall psychological need satisfaction or individual SDT constructs (p = .484). In intervention schools, students' perceived autonomy significantly increased from baseline to follow-up (p = .010). For enrolment in elective physical education, chi-square analysis showed a significant difference in proportion of female students (p = .013) in HPSS intervention schools enrolled in grade 11 elective physical education. Meaning a greater proportion of female students chose to enroll in grade 11

elective physical education after participating in the HPSS intervention (48%) compared to female students in usual practice schools (30%).

Introduction

Adolescence is a period of life that is characterized by a decline in physical activity (Colley et al., 2011; Hallal et al., 2012; Tremblay et al., 2010). Recent data in Canada indicated that adolescents are not meeting the recommended physical activity guidelines and consequently not receiving the numerous benefits associated with an active lifestyle (Colley et al., 2011; Janssen & LeBlanc, 2010; Tremblay et al., 2010). Professional organizations such as Physical and Health Education Canada (2010) and the National Association for Sport and Physical Education (USA; 2010) have supported the role physical education can play in improving the physical activity levels, experiences, and behaviours of students. Researchers have reiterated this support and acknowledged that school-based physical education programs present a tremendous opportunity to positively influence the attitudes and patterns of physical activity participation among adolescents (Alderman, Benham-Deal, Beighl, & Erwin, 2012; Basset et al., 2013; Chen, Kim, & Gao, 2014; Trudeau & Shephard, 2005). The primary objective of physical education programs is to help students develop the knowledge, movement skills, and positive attitudes and behaviours that are needed to partake in an active healthy lifestyle (British Columbia Ministry of Education, 2008; Cale, 2000; Gibbons & Gaul, 2004; Trudeau & Shephard, 2005).

Students' experiences in physical education play a role in one's engagement in physical activity outside of class time (Haerens et al., 2010; Shephard & Trudeau, 2000). Shephard and Trudeau (2000) stated that young people attaining positive experiences in physical education will more likely engage in physical activity outside of school and are more prone to continue this involvement throughout life. However, it is reported that

students are active less than 50% of physical education class time (McKenzie et al., 2006; Fairclough & Stratton, 2006; Sallis et al., 2012) and many youth have negative experiences in physical education (Sallis et al., 1996; van Daalen, 2005). This coupled with students' lack of motivation to participate in physical education (Mowling et al., 2004; Ntoumanis, 2001; Ntoumanis et al., 2004) and low enrolment rate in elective physical education courses (Gibbons et al., 1999; Grunbaum et al., 2004), may suggest that physical education programs need assistance in attaining their primary objective.

One strategy gaining interest and attention among researchers are the motivational processes influencing the participation and experiences of students in physical education programs. Haerens et al. (2010) argued that physical education teachers should focus on enhancing students' motivation during class time, as student motivation in physical education could influence the adoption of physically active lifestyles. A theoretical framework commonly used to study motivation among youth, given that its major propositions and constructs are pertinent to the adolescent developmental period, is Deci and Ryan's (1985) Self-Determination Theory (SDT). According to SDT, behaviours can be broadly categorized as intrinsically motivated, extrinsically motivated or amotivated based on the different reasons or goals that accompany an action (Deci & Ryan, 2000; Ryan & Deci, 1985). Hagger and Chatzisarantis (2007) and Ryan and Deci (2000) define intrinsic motivation as doing something because it is inherently interesting or enjoyable and for rewards innate in the activity (e.g., feelings of accomplishment, learning, interest). For example, an intrinsically motivated physical education student would participate in a lesson because of feelings of pleasure, enjoyment, and satisfaction that stem directly from the activities being taught and the environment in which one

participates. Whereas, extrinsic motivation refers to doing something for a reason outside the activity itself, a separable outcome, such as external rewards (e.g., grades), pleasurable psychological states (e.g., pride, recognition) or even avoidance of unpleasant psychological states (e.g., external punishment) (Hagger & Chatzisarantis, 2007; Ryan & Deci, 2000). Amotivation is defined as relatively aimless or purposeless behaviour or simply the absence of motivation. Ntoumanis et al. (2004) suggested an amotivated student perceives no contingencies between their actions and outcomes, in turn; a physical education student would lack willingness to participate and contribute passively or not at all. An individual's state of motivation (intrinsic motivation, extrinsic motivation, or amotivation) influences behaviour, affect, and cognition. As one's motivational state moves toward intrinsic motivation, positive increases in cognition (e.g., efficacy), behaviour (e.g., physical activity level) and affect (e.g., enjoyment) will result (Deci & Ryan, 1985; Deci & Ryan, 2000).

Self-determination theory posits that three basic psychological needs – autonomy (i.e., a sense of choice), relatedness (i.e., a sense of social connection), and competence (i.e., a sense of efficacy), determine one's psychological need satisfaction and the state of an individual's motivation to engage in a specific behaviour. Specifically, Deci and Ryan (2000) suggested that if students' need for autonomy, relatedness, and competence were met they would experience elevated levels of intrinsic motivation. In contrast, when these basic psychological needs are thwarted, the associated benefits are diminished and low motivation or avoidance will result. As argued by Ntoumanis (2001), it is imperative to understand the motivational processes that can influence whether students are motivated in physical education and will regard physical education as a valuable, enjoyable, and

rewarding experience, or are unmotivated in physical education and will regard physical education as worthless and boring. This suggests that students' basic psychological needs (i.e., autonomy, relatedness, and competence) need to be fostered within physical education settings in order to generate intrinsic motivation and help physical education programs better attain their primary objective (Fairclough & Stratton, 2005).

In physical education settings, a large portion of the literature has focused on the correlation and/or mediation of the theoretical propositions of SDT on students' motivational state and associated outcomes. For example, numerous studies have documented that students' perceived autonomy support from their physical education teachers positively predicted intrinsic motivation in physical education settings (e.g., Lim & Wang, 2009; Standage et al. 2003). Further, a study conducted by Ntoumanis (2001) found the emphasis physical education teachers place on students' improvement and the reduction of interpersonal ability comparisons can result in satisfaction of students' need for competence. Moreover, Cox and Williams (2008) and Shen et al. (2009) reported that physical education teachers' relatedness support was directly associated to students' state of motivation. Ferriz, Sicilia, and Saenz-Alvarez (2013) also found the satisfaction of the need for relatedness to be a significant predictor of intrinsic motivation and student satisfaction in physical education. In addition, an abundance of research has linked intrinsic motivation to positive behavioural and affective outcomes. Intrinsic motivation has been associated to greater effort (Ntoumanis, 2001; Taylor, Ntoumanis, Standage, & Spray, 2010), higher levels of physical activity during class time (Cox et al., 2008), the intensity of one's involvement (Biddle & Mutrie, 2008), one's intention to engage in physical activity during their leisure time (Lim & Wang, 2008; Ntoumanis, 2001;

Standage et al., 2003) and students' enjoyment and interest (Grasten, Jaakkola, Liukkonen, Watt, & Yli-Piipari, 2012; Zhang, 2009).

In addition, a few studies have examined the relationship between students' psychological need satisfaction and their participation in optional physical education programs. Research by Ntoumanis (2005) showed teachers' support of students' autonomy, competence, and relatedness in compulsory physical education courses predicted students psychological need satisfaction which was related to students' enrolment in elective physical education courses the following year. Further, Ferrer-Caja & Weiss (2002) examined the relationships underlying intrinsic motivation in a group of high school students in compulsory courses and elective courses. Findings showed that high school students in elective physical education courses reported higher levels of self-determination. Suggesting that students in elective courses might have decided to enroll in optional physical education for intrinsic reasons. However, causal inferences cannot be drawn from these studies.

While the above noted studies, and others, have contributed much to the literature and have informed the associations between the basic psychological needs posited by SDT on one's motivational state, the majority of research has been cross-sectional investigations and correlational in nature. A few short-term researcher-controlled studies have attempted to manipulate the psychological need of autonomy to increase a specific targeted behaviour in physical education settings (e.g., Lonsdale et al., 2013; Lonsdale et al. 2009; Ward, Wilkinson, Graser, & Prusak, 2008). For instance, in a study conducted by Ward et al. (2008) the authors examined the effects of increased autonomy on self-determination and physical activity levels of 7th and 8th grade girls during a fitness unit.

Students participated in two 7-day fitness units taught by the primary researcher. One fitness unit provided students with a choice of cardiovascular activity and in the other fitness unit the activity was chosen for the students. Results revealed that self-determination was higher in the choice unit but no significant differences were found between units in step count. The authors concluded that autonomy-supportive environments might yield higher levels of self-determination. However, the authors recognized the limitation of having the primary researcher as the teacher due to potential biases and suggested future research should evaluate autonomy-supportive environments in other activity units with the usual practice teacher (Ward et al. 2008).

In a subsequent study, Lonsdale et al. (2009) examined the relationships between high school students' self-determined motivation and their physical activity behaviours during two 20-minute lesson conditions: a structured physical education basketball lesson led by the teacher (low autonomy supportive environment) and an unsupervised free-choice condition (high autonomy-supportive environment). In the structured teacher-led lesson, students participated in shooting drills and game play. In the free-choice condition basketballs were made available for students and the teacher remained in the vicinity but no instructions or interactions were given. Findings concluded that students' self-determined motivation and step count was higher during the free-choice period. This study emphasized the importance of allowing students choices in physical education to help increase student physical activity during physical education class time. However, as pointed out by the authors, it is important to recognize that physical education classes have multiple objectives beyond physical fitness, including skill development and general health education (Lonsdale et al., 2009). Therefore, this type of autonomy-supportive

environment, in which students are given equipment in an “open-gym” concept, may not be practical or an often repeatable lesson format due to curricula demands. In addition, Lonsdale et al. (2013) conducted a cluster-randomized controlled trial to examine the effects of three choice-based lesson strategies on physical activity, sedentary behaviour, and student motivation. Students were assigned to one of four strategy conditions: (a) explaining relevance; (b) providing choice; (c) complete free choice; or (d) usual practice. Similar to Lonsdale et al. (2009), results showed the free-choice lesson significantly increased students physical activity levels. Additionally, in the free-choice and providing choice strategy conditions, significant increases in autonomy were observed, however, no significant increases in motivation were found. Further, the providing free-choice condition significantly decreased sedentary behaviour. This study highlights that providing structured choice from a limited number of options will enhance students’ perceptions of autonomy and plausibly a more viable teaching strategy given the multiple outcomes of physical education.

Although these studies have enhanced our understanding of how meeting students’ psychological need of autonomy can increase intrinsic forms of motivation, SDT posits that the degree in which self-determined motivation is achieved is dependent on three psychological needs. Hence, leaving a paucity of knowledge regarding how to foster students’ perceived competence and relatedness to enhance students’ motivation in physical education contexts and more importantly, all three needs together, as intended by SDT. Bryan and Solmon (2007) and Taylor et al. (2010) suggested that the constructs within SDT appear to be a fitting framework for structuring an intervention to enhance student psychological need satisfaction. However, there is little information on physical

education interventions that use SDT as a theoretical foundation. Bryan and Solmon (2007) identified strategies for creating physical education environments, which promote intrinsic forms of motivation by fostering the posited constructs of SDT while controlling or eliminating factors that may weaken the constructs. The authors suggested autonomy-supportive instructional environments where offering choices such as activity selection, difficulty of task, and partner or equipment choices are everyday teacher practices. To enhance student competence the authors recommended teachers create learning environments where individual self-improvements are emphasized over social comparisons and competitive play is minimized. Lastly, physical education settings have high social interaction, therefore teachers should strive to establish meaningful connections and acceptance in which support and encouragement underpin teacher philosophies and activities are implemented to enhance relationships among classmates (Bryan & Solmon, 2007).

It appears evident that there is little known about how teachers can manipulate the motivational climate in physical education contexts. Limited information is available on ways to intervene in existing physical education classes to satisfy students' basic psychological needs proposed by SDT to enhance students' self-determined motivation and possibly their continued participation. Further, intervention studies that can be implemented by regular classroom teachers, flexible enough to be applied to diverse physical education context and activity units, and one that is consistent with the physical education curricula objectives is warranted. It is necessary to develop and implement a physical education program, which all three psychological needs are fostered to increase motivation of students and provide researchers with a greater breadth of knowledge

regarding the motivational processes of students in physical education classes. Therefore, the purpose of this investigation was to examine the impact of a physical education program framed in SDT of motivation on students' basic psychological need satisfaction and enrolment in grade 11 elective physical education programs.

Research Questions and Hypotheses

The following research questions were addressed in Project 3:

1. Did HPSS Physical Education 10 significantly increase students' level of self-determined motivation in physical education compared to students in comparison/usual practice schools?

   Hypothesis: It was hypothesized that students in HPSS Physical Education 10 would report significantly higher levels of self-determined motivation in physical education than students in comparison/usual practice schools.

2. Did students in HPSS Physical Education 10 significantly increase their perceptions of autonomy, relatedness, and competence towards physical education compared to a comparison/usual practice school?

   Hypothesis: It was hypothesized that students in HPSS Physical Education 10 would report significantly higher levels of perceived autonomy, relatedness, and competence than students in comparison/usual practice schools.

3. Did the HPSS Physical Education 10 program impact students enrolment in grade 11 elective physical education?

   Hypothesis: It was hypothesized that students in HPSS Physical Education 10 would have significantly higher enrolment rates in grade 11 physical education than students in comparison/usual practice schools.

Method

Health Promoting Secondary School Physical Education 10 Intervention

The HPSS Physical Education 10 intervention was based on the theoretical foundations of Deci and Ryan's (1985) SDT. In accordance to the foundation of the theory, the intervention sought to positively affect student's level of motivation towards grade 10 physical education by creating an environment that supported students' need for autonomy, relatedness, and competence. Health Promoting Secondary Schools Physical Education 10 was a choice-based model that allowed physical education teachers to implement actions that promote the enhancement of the psychological needs posited by SDT. Specifically, HPSS Physical Education 10 teachers received a resource that included instructional strategies, ready to use lessons and examples of effective activities to increase students' intrinsic motivation toward physical activity and physical education, enhance students' perceptions of autonomy, relatedness, and competence, and promote enrolment in grade 11 elective physical education programs. The resource was adapted from the work of Gibbons, Humbert, and Temple (2010). Concepts drawn from Deci and Ryan's (1985) SDT of motivation provided the theoretical framework for these actions. The HPSS Physical Education 10 course incorporated autonomy (e.g., choice of group members, choice of activities taught within the course), relatedness (e.g., class team building activities), and competence (e.g., knowledge of their current physical activity level both in and out of class) within physical education lessons. Teachers were asked to implement at least one action from each SDT construct (autonomy, relatedness, competence) in every physical education lesson. In addition, teachers were asked to promote grade 11 elective physical education programs to their grade 10 students. Ideas

for elective course promotion were included in the HPSS Physical Education10 resource binder (e.g., have students in grade 11 elective physical education talk to grade 10 physical education class about the program; personally approach students who may not be enrolling and encourage enrolment; offer one week experience of grade 11 physical education during grade 10 physical education).

Participants

A total of 373 grade 10 students completed the questionnaires at baseline (T1) and follow-up (T2). Of the 373 participants, 182 were female and 191 were male students. The intervention group (n = 194) consisted of 103 females and 91 males and the usual practice group (n = 179) consisted of 79 females and 100 males. The mean age of the participant sample was 15.32 years (*SD* = 0.37, range = 14.7 – 16.8 years). Participants were enrolled in 39 physical education classes from the ten participant high schools (22 classes from intervention schools; 17 classes from usual practice schools). Of the 22 grade 10 physical education classes receiving the HPSS Physical Education 10 intervention five were gender-segregated (3 all girls; 2 all boys) and 17 were co-educational classes. The HPSS Physical Education 10 program was taught by 15 high school physical education teachers across the five intervention schools (5 females; 10 males) with an average of 11.2 years teaching experience (*SD* = 5.14; range = 4 – 20 years) and 7.2 years experience teaching grade 10 physical education (*SD* = 4.81; range = 1 – 16 years) (see Appendix U for teacher experience summary by school). Demographic characteristics of participants at baseline according to condition are shown in Table 40. The demographic characteristics of participants at baseline for each school are included in Table 41.

Table 40

Participants' Gender and Age by Condition

	Total (N = 373)	Intervention (n = 194)	Usual Practice (n = 179)
Gender			
Female (%)	182 (48.8)	103 (56.6)	79 (43.4)
Male (%)	191 (51.2)	91 (47.9)	100 (52.4)
Age, M age (SD)	15.32 (0.37)	15.25 (0.34)	15.39 (0.38)
(Range years)	(14.7-16.8)	(14.7 – 16.6)	(14.7 – 16.8)

Table 41

Participants' Gender and Age by School

School (Location)	Total (%) (N = 373)	Gender		M Age (SD) (Range yrs)
		Female (%)	Male (%)	
School 1*	27 (7.2)	11 (40.7)	16 (59.3)	15.38 (0.43) 14.7 – 16.6
School 2*	88 (23.6)	41 (46.6)	47 (53.4)	15.19 (0.33) 14.7 – 16.4
School 3*	49 (13.1)	32 (65.3)	17 (34.7)	15.28 (0.32) 14.7 – 15.9
School 4*	13 (3.5)	10 (76.9)	3 (23.1)	15.19 (0.40) 14.7 – 15.9
School 5*	17 (4.6)	9 (52.9)	8 (47.1)	15.21 (0.29) 14.7 – 15.7
School 6	37 (9.9)	20 (54.1)	17 (45.9)	15.46 (0.47) 14.8 – 16.8
School 7	12 (3.2)	6 (50.0)	6 (50.0)	15.51 (0.31) 15.0 – 16.1
School 8	31 (8.3)	15 (48.4)	16 (51.6)	15.29 (0.35) 14.9 – 16.3
School 9	46 (12.3)	16 (34.8)	30 (65.2)	15.45 (0.39) 14.8 – 16.5
School 10	53 (14.2)	22 (41.5)	31 (58.5)	15.36 (0.32) 14.7 – 15.4

* Indicates HPSS intervention school

Note. Only participants who completed both baseline and follow-up questionnaires were used in the analysis.

Measures

Physical education motivation scale. Students completed the Physical Education Motivation Scale (Sulz et al., 2011). The scale is a self-report questionnaire, which measures one's level of motivation (i.e., intrinsic motivation, extrinsic motivation,

amotivation) towards high school physical education. Students respond on a 7-point likert scale (1 = “strongly disagree” to 7 = “strongly agree”) to items representing intrinsic motivation (e.g., “I participate in physical education because it is interesting”), extrinsic motivation (e.g., “I try to do well in physical education so my teacher will think I am a good student”) and amotivation (e.g., “I try to do as little as possible in physical education”). The questionnaire was specifically developed for this study and an exploratory factor analysis was conducted on the Physical Education Motivation Scale (Sulz et al., 2011) to identify underlying factors. After employing multiple iterations with the criteria set out by Stevens (2001) and Tabachnick and Fidell (2007) and being consistent with the theoretical framework, the results of the analysis showed that items did not load on the SDT constructs as expected based on the SDT. For example, intrinsic motivation items were loading with amotivation items. Therefore, the Physical Education Motivation Scale did not display adequate loadings based on the theoretical framework and was removed from any further analysis. The Physical Education Motivational Scale is included in Appendix V.

Physical education – autonomy, relatedness, and competence scale. The Physical Education – Autonomy, Relatedness, Competence Scale (Sulz et al., 2011) was used to measure autonomy, relatedness, and competence of students in high school physical education classes. Students responded on a 7-point likert scale (1 = “strongly disagree” to 7 = “strongly agree”) to the stem question “When I am in physical education…” followed by items representing autonomy (e.g., “I am doing the activities I want”), relatedness (e.g., “my classmates seem to like me”) and competence (e.g., “I am good at the things we do”). The questionnaire was specifically developed for this study

and an exploratory factor analysis was conducted on the 20-item scale to identify underlying factors. Employing multiple iterations with the criteria set out by Stevens (2001) and Tabachnick and Fidell (2007) and being consistent with the theoretical framework of SDT, an acceptable fit model was determined with a 3-factor 14-item solution: 5- autonomy items, 4- relatedness items, and 5- competence items. The final 3-factor 14-item model resulted in 67.4% of the variance accounted for. This questionnaire provides an overall psychological need satisfaction score (i.e., the degree in which students' psychological needs of autonomy, relatedness, and competence are satisfied) and the degree to which the person experiences satisfaction of each of the three needs. Appendix W includes The Physical Education – Autonomy, Relatedness, Competence Scale. The factor items and corresponding cross loadings are included in Appendix X.

Enrolment in elective physical education. To assess whether HPSS Physical Education 10 influenced student enrolment in optional physical education in grade 11 in the following school year (2012/2013) data were collected in two ways: (a) to assess whether HPSS participants in intervention schools increased their enrolment in grade 11 elective physical education compared to HPSS participants in usual practice schools, grade 11 elective physical education enrolment statuses of the participants (i.e., enrolling or not enrolling) was collected from each of the participant schools; (b) to assess if HPSS intervention schools increased overall enrolment in grade 11 elective physical education (i.e., enrolment in grade 11 physical education among all students in the school, not only HPSS participants) compared to usual practice schools, enrolment rates were collected from each of the participant schools for the current school year (i.e., intervention year, 2011/2012) and the following year (i.e., 2012/2013). Appendix Y includes enrolment

information sheets given to participant schools. Appendix Z includes a description on how enrolment in grade 11 elective physical education was promoted in each intervention school.

Procedures

The two questionnaires were administered to students in both the intervention and usual practice schools during physical education class time in the first semester of the school year – once at the beginning of the semester (i.e., baseline – September) and once at the end of the semester (i.e., post-intervention – December/January). The questionnaires were administered by myself and/or an HPSS research team member and took approximately 20 minutes to complete. The students were told that there were no right or wrong answers, no trick questions and were asked to answer the questions honestly.

Enrolment data were collected at the end of the school year (i.e., May/June, 2012) with the help of the HPSS school contact person and school personnel at each participant school. For enrolment of HPSS participants, the school contact person was provided with a list of the names of the participants and was asked to indicate whether each student was enrolled in grade 11 physical education in the following school year (2012/2013) by selecting yes or no. To compare enrolment rates of all students in HPSS intervention schools and usual practice schools, the contact person was given two forms asking for numbers of students enrolled in grade 11 elective physical education during the intervention year and the year following the intervention.

Analyses

Analyses were performed with the Statistical package for the Social Science 20.0 (SPSS Inc, Chicago, IL, USA). Data was entered into excel by question for each participant student then uploaded into SPSS. I entered all questionnaire data. To check for accurate entry I randomly checked 5% of the data and data was scanned for descriptive and frequency statistics for accurate ranges of each variable.

Perceived autonomy, relatedness, competence in physical education. A multivariate analysis of covariance (MANCOVA) was performed to determine if HPSS Physical Education 10 increased students' psychological need satisfaction toward grade 10 physical education. To measure students' overall psychological need satisfaction scores each subscale (autonomy, relatedness, competence) were summed together and a single score was used as an indicator of students' overall psychological need satisfaction toward grade 10 physical education. The Physical Education – Autonomy, Relatedness, Competence Scale was comprised of 14-items responded to on a 7-point scale, therefore, students' psychological need satisfaction could range from a score of 14 (lowest need satisfaction) to 98 (highest need satisfaction). To measure students' need satisfaction for each individual SDT construct, the mean score of the series of questions from each construct was taken and used for analysis. For example, autonomy was measured based on the mean score of four questions related to students' perceptions of autonomy in their grade 10 physical education class. A multivariate analysis of covariance (MANCOVA) was used to determine if there were significant differences on psychological need satisfaction between conditions overtime. Post intervention (T2) scores served as the dependent variables, condition as the independent variable, and baseline (T1) scores as

covariates. Effect size (partial eta squared, η^2) was calculated to determine the relative magnitude of the experimental treatment using the following formula: Partial η^2= SS(effect)SS(effect) + SS(error for that effect). Partial eta squared was interpreted as small (.01), medium (.06), and large (.14) (Cohen, 1988).

Enrolment in elective physical education 10. To compare HPSS participants' enrolment in grade 11 elective physical education between intervention and control schools chi-square analyses were used. Three separate chi-square analyses were conducted. The first focused on overall HPSS participant enrolment (i.e., female and male participants), whereas, the second and third analysis focused on gender differences in enrolment rates. To compare overall enrolment rates of HPSS schools and usual practice schools (i.e., enrolment in grade 11 physical education among all students in the school, not only HPSS participants) from intervention year (2011/2012) to post-intervention year (2012/2013) chi-square analyses were used. Six separate chi-square analysis were conducted. Three analyses focused on grade 11 elective physical education enrolment rates during the intervention year (i.e., baseline) and three analyses focused on enrolment rates in the school year following the intervention (i.e., follow-up).

Results

Psychological Need Satisfaction and Perceptions of Autonomy, Relatedness, and Competence

Baseline differences. Baseline differences between the intervention and usual practice groups were examined using a MANOVA. No significant differences between the conditions were observed, Wilks' $\Lambda = .983$, $F[4, 369] = 1.596$, $p = .175$, $\eta^2 = .017$.

Outcome measures. To determine differences between conditions over time, a MANCOVA was performed in which the condition was the fixed factor, the post

intervention score for psychological need satisfaction and for individual SDT constructs (autonomy, relatedness, and competence) were the dependent variables, and scores at baseline served as the covariates. The time by condition interaction was not significant, Wilks' $\Lambda = .991$, $F[4, 369] = .867$, $p = .484$, $\eta^2 = .009$. Please refer to Table 42 for the descriptive Statistics for Psychological Need Satisfaction (PNS Score) and perceived autonomy, relatedness, and competence by condition.

Table 42.
Descriptive Statistics for Psychological Need Satisfaction (PNS Score) and Perceived Autonomy, Relatedness, and Competence by Condition

Dependent Variable	Condition	Baseline (T1) Sum ± SD (Range for PNS)	Follow-up (T2) Sum ± SD (Range for PNS)	Change
PNS Score	Intervention	71.80 ± 11.94 (20.00 – 96.00)	73.24 ± 11.89 (24.00 – 97.00)	+ 1.44
	Usual Practice	74.44 ± 12.74 (40.00 – 98.00)	74.06 ± 11.75 (25.00 – 98.00)	- .38
Perceived Autonomy	Intervention	4.29 ± 1.06	4.51 ± 1.10	+ .22
	Usual Practice	4.50 ± 1.33	4.49 ± 1.26	- .01
Perceived Relatedness	Intervention	5.49 ± 1.07	5.54 ± 1.06	+ .05
	Usual Practice	5.66 ± 1.06	5.68 ± 1.00	+ .02
Perceived Competence	Intervention	5.43 ± 1.02	5.52 ± 1.02	+ .09
	Usual Practice	5.61 ± 1.07	5.66 ± .92	+ .05

Note. Psychological need satisfaction (PNS Score) could range from a score of 14 (lowest need satisfaction) to 98 (highest need satisfaction). Perceived autonomy, relatedness, and competence scores were on a 7-point scale (1 = lowest need satisfaction; 7 = highest need satisfaction).

Enrolment in Grade 11 Elective Physical Education Programs

Baseline difference for overall student enrolment. For overall enrolment in grade 11 elective physical education (i.e., enrolment in grade 11 physical education among all students in school), baseline differences between the intervention schools and usual practice schools were compared using chi-square tests. Significant differences in proportion of enrolment between intervention and usual practice schools were observed (p = .000). Results obtained showed that a significantly greater proportion of students in usual practice schools (52%) were enrolled in grade 11 elective physical education compared to intervention schools (42%) in 2011/2012 (HPSS intervention year). Results also demonstrated a significantly (p = .003) greater portion of female students in usual practice schools (38%) enrolled in elective physical education compared to female students in intervention schools (29%). Similarly, usual practice schools had a significantly greater proportion of males enrolled in elective physical education (66%) compared to male students in HPSS intervention schools (55%) during the 2011/2012 school year. Refer to Table 43 for chi-square analyses for enrolment in grade 11 elective physical education by condition at baseline.

Table 43

Enrolment in Grade 11 Elective Physical Education By Condition at Baseline

	Total Participants N = 2031					Female Participants n = 992					Male Participants n = 1039				
	Enrolled		Not Enrolled			Enrolled		Not Enrolled			Enrolled		Not Enrolled		
	n	%	n	%	*p*	n	%	n	%	*p*	n	%	n	%	*p*
Intervention	467	43	609	57	.000	149	29	358	71	.003	312	55	257	45	.000
Usual Practice	492	52	463	48		186	38	299	62		312	66	158	34	

Outcome measures. No significant differences were observed in the proportion of enrolment between intervention and usual practice schools for all participants (p = .272). For female students, a significant difference in proportion of HPSS female participants enrolling in grade 11 elective physical education across condition was found (p = .013) A greater proportion of female students in HPSS intervention schools chose to enroll in grade 11 elective physical education (48%) compared to usual practice schools (30%). Refer to Table 44 for chi-square analyses of HPSS participant enrolment. To view enrolment rates of HPSS participants for each individual school please refer to Appendix AA.

For enrolment in grade 11 elective physical education among all students in the school, results showed the baseline differences among students (female and male) were negated at follow-up. No significant difference was found between conditions on total student enrolment in elective physical education (p = .117). Similarly, the difference at baseline among female students was also negated at follow-up (p = .407). However, a significant difference in the proportion of male students enrolled in grade 11 elective physical education between conditions was found (p = .001). Similar to baseline differences, a greater portion of male students in usual practice schools (69%) were enrolled in grade 11 elective physical education compared to HPSS intervention schools (59%). Refer to Table 45 for chi-square analyses for enrolment in grade 11 elective physical education by condition at follow-up.

Table 44

Enrolment of HPSS Participants in Grade 11 Elective Physical Education By Condition

	Total Participants N = 373					Female Participants n = 182					Male Participants n = 191				
	Enrolled		Not Enrolled			Enrolled		Not Enrolled			Enrolled		Not Enrolled		
	n	%	n	%	*p*	n	%	n	%	*p*	n	%	n	%	*p*
Intervention	101	52	93	48	.272	50	48	53	52	.013	47	52	44	48	.245
Usual Practice	83	46	96	54		24	30	55	70		60	60	40	40	

Table 45

Enrolment in Grade 11 Elective Physical Education By Condition at Follow-up

	Total Participants N = 2046					Female Participants n = 988					Male Participants n = 1058				
	Enrolled		Not Enrolled			Enrolled		Not Enrolled			Enrolled		Not Enrolled		
	n	%	n	%	*p*	n	%	n	%	*p*	n	%	n	%	*p*
Intervention	535	51	514	49	.117	214	41	304	59	.407	316	59	215	41	.001
Usual Practice	543	54	454	46		182	39	288	61		366	69	161	31	

In sum, investigations of the significant main effect of condition by time showed that taking part in the HPSS Physical Education 10 intervention did not significantly increase participants' psychological need satisfaction or perceptions of the individual SDT constructs of autonomy, relatedness, and competence in comparison to usual practice schools. For enrolment in grade 11 elective physical education among HPSS participants, a significantly greater proportion HPSS female participants enrolled in elective physical education in comparison to female participants in usual practice schools. For overall enrolment in grade 11 elective physical education (i.e., enrolment in grade 11 physical education among all students in the school), differences at baseline for total students (female and male students) and female students between HPSS intervention schools and usual practice schools were negated at follow-up. Specifically, the 9% difference between enrolment in HPSS intervention schools (43%) and usual practice schools (52%) at baseline was negated to 3% at follow-up. Similarly for female student enrolment, the 9% difference between enrolment in HPSS intervention schools (29%) and usual practice schools (38%) at baseline was negated to a 2% higher enrolment rate for female students in HPSS intervention schools post-intervention. For male student enrolment, a significantly greater proportion of male students in usual practice schools enrolled in elective physical education compared to HPSS intervention schools at baseline and follow-up.

Discussion

The HPSS Physical Education 10 intervention aimed to increase grade 10 students' perceptions of autonomy, relatedness, and competence, and to improve enrolment in grade 11 elective physical education through a choice-based intervention design. Specifically, HPSS Physical Education 10 altered features of existing physical education environments (e.g., activities, teacher practices, lesson delivery) to meet the basic psychological needs posited by SDT. Overall, the results showed minimal support for the impact of a SDT-based physical education intervention. Regarding enrolment in elective physical education programs, the HPSS Physical Education 10 program appeared to have a positive effect on enrolment among female participants.

Deci and Ryan (1985, 2000) suggested that one's level of motivation is dependent on whether their environment supports their need for autonomy, relatedness, and competence and other researchers have stated that student's motivational process plays an imperative role in their present and future physical activity behaviours (Cale & Harris, 2006, Lim & Wang, 2009; Moreno et al., 2009; Ntoumanis, 2001). It is, therefore, important to understand how students' basic psychological needs can be met in school-based physical education programs. The literature to date has primarily focused on the enhancement of autonomy-supportive physical education contexts. Past research (e.g., Ha & Sum, 2009; Lonsdale et al., 2013; Lonsdale et al., 2009; Ward et al., 2008) has shown that developing autonomy-supportive physical education environments increased students' perceptions of autonomy towards physical education. These studies, however, have been short-term researcher controlled interventions, with a primary focus on free-choice periods (e.g., Lonsdale et al., 2013; Lonsdale et al., 2009) and activity selection

(e.g., Ward et al., 2008) and little focus on curricula objectives. A unique aspect of the HPSS Physical Education 10 intervention was the choice-based design in which emphasis was placed on developing sustainable programs based on the specific needs and preferences of the participant students and teachers. This meant that teachers delivered a minimum threshold of HPSS Physical Education 10 actions into their grade 10 physical education classes. Perceptions of autonomy did not show significant differences from baseline to follow-up between conditions. However, of the three SDT constructs (autonomy, relatedness, competence), perceptions of autonomy showed the greatest increases from baseline to follow-up among intervention students (+.22). A likely explanation for these findings was the high implementation rate of the autonomy component of the HPSS Physical Education 10 intervention. Several teachers reported that autonomy was the easiest and most frequently implemented component of the three psychological needs (see Project 1). As choice can be integrated easily into existing lessons (e.g., choose a warm-up activity, choose 8 of 10 stations, choice of competitive or non-competitive games) teachers indicated that they frequently provided students with options in their physical education course. The higher dose of the autonomy component compared to relatedness and competence (discussed in Project 1) may explain the increase in students' autonomy scores in intervention schools. The present finding of positive outcomes for students' perceptions of autonomy in HPSS intervention schools demonstrates the potential for a choice-based context specific program that is easily implemented into existing physical education courses.

For perceptions of competence, no significant group differences were observed from baseline to follow-up. Following recommendations in the literature, HPSS Physical

Education 10 specifically targeted salient sources of information that adolescents use to assess their competence, including the enhancement of self-comparison, constructive evaluations from their teacher and goal achievement, optimally challenging activities, and internalized standards such as improvement, effort and enjoyment. Stuntz and Weiss (2010) stated that age-related differences emerge in sources of competence information used and in order to improve one's perceptions of competence relevant age-specific sources should be targeted. According to Weiss and Amorose (2005) understanding how one judges their physical capabilities is critical in knowing how to influence an individual's perceptions and behaviours. For instance, children (age 5 – 9) display preferences towards parental feedback, mastery of simple tasks, and enjoyment of activity (Horn & Amorose, 1999; Horn & Harris, 2002), whereas adolescents (age 10 – 15 years) consider comparisons with and evaluations from peers and feedback from respected adults such as parents and teachers (Stuntz & Weiss, 2010). When adolescents get older (16+ years) self-referenced sources such as improvement, effort, enjoyment, goal achievement become important sources of competence information (Stuntz & Weiss, 2010). Despite the efforts of the HPSS Physical Education 10 program to target age salient sources of competence no significant differences were found between study conditions.

One plausible explanation for this non-significant group differences in competence scores might be that by the time students enter grade 10 physical education their perceptions of competence towards the subject may already be established. The perceived competence scores in both the intervention and the usual practice groups remained relatively constant from baseline to follow-up. Students in intervention schools

had high baseline competence scores (*Mcompetence* = 5.43) with scores remaining relatively stable post intervention (*Mcompetence* = 5.52). In a similar manner, students in usual practice schools had high baseline competence scores (*Mcompetence* = 5.61) with stable post intervention scores (*Mcompetence* = 5.66). Studies aimed to enhance younger children's perceptions of competence in physical activity settings have been effective (e.g., Fu & Gao, 2013; Valentini & Rudisill, 2004). However, at the high school level, limited intervention studies have been conducted to enhance students' perceptions of competence. One study conducted by Wallhead and Ntoumanis (2004) examined the influence of a Sport Education intervention program on students' motivational responses in high school physical education (*Mage* = 14.3 years). Results showed no significant differences in perceptions of competence between instructional groups. This provides support for the notion that perceptions of competence towards physical education seem to be somewhat established by the time students enter high school physical education. Moreover, Li, Lee, and Solmon (2005) and Bryan and Solmon (2007) stated that past experiences could influence perceptions of competence. Longitudinal studies tracking students' perceptions of competence towards physical education over the school years could not be located; however a study conducted by Barnett, Morgan, van Beurden, and Beard (2009) found that being physically competent during childhood was influential in positive perceptions of sport competence in adolescence. This suggests that one's perceptions of competence during childhood influence their perceptions of competence during adolescence. Furthermore, Deci and Ryan (1985) proposed that motivation is not solely experienced at situational levels (i.e., physical education class) but also experienced at global levels (i.e., across various life contexts). Based on this, students'

motivation in physical education course (i.e., one's situational motivation) may be influenced by their global motivation in different contexts (e.g., previous physical activity experience). Although this is a plausible explanation for the non-significant findings of this investigation, more research is needed to evaluate whether students' perceptions of competence towards physical education is established and perhaps unalterable by adolescence.

The outcomes of the present investigation also revealed that students' perceptions of relatedness did not differ significantly by condition. There is limited information on interventions that target the enhancement of social connection and relationships in physical activity and physical education settings. Ntoumanis (2001) and Deci and Ryan (2000) stated in physical activity settings relatedness was viewed as a lesser consequence on one's motivational processes than autonomy and competence. However, physical education is a unique context in which students interact with other students regularly and where their physical abilities are placed on display. It is, therefore, important that social connectedness is established between students, their peers, and their teacher in order to intrinsically motivate students in physical education settings. Cox et al. (2009) and Cox and Williams (2008) found that student relationships with their teachers and classmates played an imperative role in students' perceptions of relatedness. For example, Cox et al. (2009) found that perceptions of support and acceptance among adolescent students during physical education class time contributed to students' feelings of social connectedness within the physical education setting. The authors further contend that creating a physical education environment of acceptance and mutual respect and allow for opportunities to interact and form relationships were effective strategies to increase

relatedness perceptions in class. The HPSS Physical Education 10 program was designed to enhance students' perceptions of relatedness by implementing the above recommendations. With this said, the relatedness portion of the HPSS Physical Education 10 program, as indicated in Project 1, was discussed by teachers as having a low implementation level. The low implementation of relatedness component might explain the non-significant findings.

In order to achieve the primary goal of the HPSS Physical Education 10 intervention – to increase perceptions of autonomy, relatedness, and competence – the intervention components needed to be implemented by the physical education teachers in the intervention schools in order to reach the participant students. Physical education teachers were required to deliver a minimal threshold of the HPSS Physical Education 10 intervention components with choices regarding which actions they implemented into their courses allowing for flexibility and a context specific program. However, as shown in the discussions with the teachers and the collected field notes in Project 1, the teachers did not implement the program as intended. It is, therefore, difficult to evaluate the success of HPSS Physical Education 10.

Treatment integrity or commonly referred to as "treatment fidelity" is characterized as the degree to which an intervention is implemented as intended (Power et al., 2005; Schulte, Easton, & Parker, 2009). Power et al. (2005) stated that treatment integrity is an essential element of an intervention program due to the strong relationship shown between the level of integrity and the magnitude of treatment effects. Therefore, intervention integrity is a critical component in understanding and evaluating an intervention's success. According to Leff, Hoffman, and Gullan (2009) intervention

integrity can conclude if a program was ineffective because it was not a strong program or because it was not implemented as intended. Durlak and DuPre (2008) noted that negative intervention results could occur if a program was not implemented sufficiently. In a similar manner, Dane and Schneider (1998) stated that negative intervention effects might be misinterpreted as indications of an inadequate program rather than inadequacies in the delivery of the program. The HPSS Physical Education 10 program was not implemented by some teachers as designed; therefore the program did not reach the students as intended, making it difficult to assess the program's effectiveness. Based on this, it is difficult to determine if HPSS Physical Education 10 was an inadequate program or if the results were due to inadequacies in the implementation of the program.

Several factors may have influenced the implementation rate of the HPSS Physical Education 10 intervention. A novel aspect of this study was the choice-based program at the teacher level. The choice-based design of HPSS Physical Education 10 followed recommendations in the literature to achieve effective programs. Several authors suggest that the most effective programs involve a participatory bottom-up perspective with program development based on individual school and teacher needs and priorities (Dzewaltowski et al., 2009; Naylor et al., 2008). Fullan (2007) also suggested that school-based interventions are more likely to be effective if they provide possibilities for participation in and ownership of the intervention. Further, Viig and Wold (2007) stated that in order to optimize program implementation expected changes should be familiar with some degree of flexibility. However, the choice-based design may have created greater program complexity and greater amounts of time required by the teachers. For example, Physical Education 10 teachers had to familiarize themselves with a large

amount of resources and choose resources that they believed were suitable for their needs. Lane, Bocian, MacMillan, and Gresham (2004) stated that as the intervention complexity and time requirements from those responsible for implementation increases, the level of treatment integrity decreases. The authors further proposed that the more resources and materials needed to implement the program the lower the treatment integrity. The participating Physical Education 10 teachers, as expressed in Project 1, found the degree of choice within the HPSS Physical Education 10 program to be difficult to manage, as they were required to choose actions from the resource binder, as opposed to delivering a pre-set program. The choice-based program may have allowed participatory program development and ownership of the intervention but may have also enhanced the complexity of the intervention implementation. This complexity may have negatively impacted treatment integrity and in turn contributed to the outcomes of the study.

Adding to the above noted complexity was the duration of the intervention and the enhancement of all three SDT constructs. Previous school-based motivational studies have been primarily short-term (one lesson or one unit) highly controlled programs focused on the manipulation of the autonomy construct. That is, teachers were given a short pre-set program developed by researchers and students' motivation was assessed prior to and following the program (e.g. Lonsdale et al., 2009; Lonsdale et al., 2013; Ward et al., 2008). Viig and Wold (2007) stated that implementation was usually less successful if the desired program change was large and ambitious. Although researchers (e.g., Bryan & Solmon, 2007; Taylor et al., 2010) have suggested physical education settings would be an ideal setting for intervention studies to target all three SDT

constructs, perhaps asking teachers to create an environment that supports all three psychological needs was too demanding for the participant teachers. In sum, the choice-based program design, the length of the intervention, and the complexity of targeting all three SDT constructs may have negatively impacted the implementation level of HPSS Physical Education 10. As such, the lack of intervention effects might be the result of the low level of implementation.

In addition to the low level of implementation, high baseline scores for the participant students may have made it difficult to increase their perceptions of the basic psychological needs proposed by SDT. The participants had a high psychological need satisfaction score (71.80 out of 98) as well as high SDT construct subscale scores (*Mautonomy* = 4.29; *Mrelatedness* = 5.49; *Mcompetence* = 5.43 on a 7-point scale) at baseline. Within the literature, cross-sectional studies conducted with high school students revealed lower baseline means than the present sample (e.g., Standage, Duda, & Ntoumanis, 2005; Standage, Gillison, Ntoumanis, & Treasure, 2012; Taylor, Ntoumanis, Standgae, & Spray, 2010). For example, Standage et al. (2005) administered questionnaires to 950 high school students (*Mage* = 12.14, *SD* = .91, range 11 – 14 years) to assess their perceptions of autonomy, relatedness, and competence to examine the model proposed by SDT. Results revealed that students' mean autonomy, relatedness and competence scores were 3.89, 4.71, and 5.01, respectively on a 7-point scale. In a similar manner, Taylor et al. (2010) administered questionnaires to high school students (*Mage* = 12.58, *SD* = 1.29, range = 11 - 16 years) to assess the motivational process of students in physical education. Results from questionnaires found the means for perceived autonomy (3.81), relatedness (4.47), competence (4.89) were lower in comparison to the present

sample and the authors reported these students "to be relatively high in self-determined forms of motivation towards physical education" (p. 115). Fortier, Duda, Guerin, & Teixeira (2010) stated that one of the challenges in SDT-based randomized controlled trials concerns the characteristics of the participants. The authors reviewed three SDT-based physical activity interventions (Duda et al., 2009; Fortier et al., 2007; Silva et al., 2008) and found that the participants who volunteered for these studies possessed elevated initial levels of motivation. The authors concluded that perhaps in SDT-based physical activity interventions participants who volunteer to take part already have elevated levels of self-determined motivation than non-participants. Due to high baseline scores, Fortier et al. (2010) stated that this might prevent significant findings in intervention studies. The participants in the present investigation possessed high perceptions of autonomy, relatedness, and competence towards physical education prior to the HPSS Physical Education 10 intervention making it difficult to improve their already high perceptions of the basic psychological need proposed by SDT.

In a similar manner, the high scores at baseline might suggest that the percent of potentially eligible students in the target population who participated in the HPSS Physical Education 10 study may not have been representative of the population of which they were drawn from. The larger portion of the study required students to complete the 20-meter shuttle run and anthropometric measures (i.e., weight, height, waist circumference, hip circumference), which may attract students with higher levels of motivation towards physical education volunteering to participate. Research (e.g., Cox et al., 2008; Ntoumanis, 2001; Standage et al., 2003) has found that adolescent students with high motivation towards physical education also possess high levels of motivation

towards leisure-time physical activity. This may imply that students who are willing to have their physical measurements taken and complete a 20-meter shuttle run may be the students with high levels of motivation towards physical education and greater levels of leisure time physical activity. Whereas non-participants may have lower perceptions of autonomy, relatedness, and competence towards physical education and low physical activity levels.

Corresponding with the high baseline scores on perceptions of the SDT constructs were the grade 11 elective physical education enrolment rates of the participant schools and the enrolment rates of the HPSS participants. The mean percentage for enrolment in intervention schools during the year of the intervention (2011/2012) was 43% and usual practice schools showing higher enrolment rates with a mean percent enrolment of 52%. The gender breakdown showed that in intervention schools male students had a higher enrolment rate than female students (55% vs. 29%). In a similar manner, male students in control school also had higher enrolment rates than female students (66% vs. 38%). The mean percentage for enrolment in elective physical education programs in British Columbia is approximately 28% with 18% of female students and 38% of male students electing to enroll in grade 11 physical education (N. Poeschek, personal communication, July 16, 2012). This suggests that the participant schools, both intervention and control, have much higher enrolment rates in elective physical education in comparison to the British Columbia average. As well, the higher than average enrolment rates of the HPSS participants (52% in intervention schools and 46% in control schools) further supports the notion that the percent of potentially eligible students in the target population who participated in the HPSS Physical Education 10 study might not have been representative

of the population of which they were drawn from.

In addition, it appeared, based on the high psychological need satisfaction scores of the usual practice schools, that the physical education programs offered to students in the usual practice condition were meeting their basic psychological needs. Fortier et al. (2010) acknowledged that in real-world settings differences between intervention and usual practice conditions might be weakened by difficulties in creating non-need-supportive control conditions. It is likely, that the individuals delivering the intervention (i.e., physical education teachers) innately have the participants' best interest in mind. That is, physical education teachers in the HPSS usual practice conditions were most likely providing a physical education 10 program that met the needs of their students. Fortier and colleagues (2010) concluded that this natural occurring need support in the control conditions, will likely result in smaller intervention effects. Furthermore, in the HPSS Physical Education 10 intervention, one of the recruitment criteria was that participant schools were offering innovative grade 11 physical education programs. An assumption might be that if a physical education department offers innovative physical education programs at the grade 11 level, a well-constructed program is also being offered at the grade 10 level. Fortier et al. (2010) stated that this issue merits assessment of treatment integrity in the control conditions. The HPSS program did not assess treatment integrity in the usual practice conditions. Therefore, information regarding the degree of need support provided by physical education teachers in usual practice schools is unknown.

One of the goals of the HPSS Physical Education 10 intervention was to increase students' enrolment rates in grade 11 physical education by enhancing students'

psychological need satisfaction proposed by SDT and promoting enrolment in elective physical education programs. Based on the results, enrolment rates improved among students in the intervention schools, particularly among females. Several factors influence one's decision to enroll in elective physical education programs. Two commonly cited reasons for students choosing not to enroll in elective physical education courses include: not enough time in course schedule (i.e., concerns with meeting college entrance requirements) (Shen, 2010; Sulz et al., 2010) and the dislike of previous physical education classes (Gibbons et al., 1999; Sulz et al., 2010). Particularly among female students, a common reason not to enroll in elective programs, according to Gibbons et al. (1999) and Sulz et al. (2010) was negative past experiences in physical education courses. Sulz et al. (2010) conducted a qualitative study exploring factors that influence enrolment in grade 11 elective physical education courses and reported that female students not enrolling in physical education in their grade 11 year described their experiences in past physical education courses as negative. Research has found that female students prefer physical education to focus on lifelong activities (Sulz et al., 2010), provide choices and student input (Gibbons et al., 1999; Pfaeffli & Gibbons, 2010; Shen, 2010), focus on participation and improvement rather than skill and ability (Gibbons et al., 1999; Pfaeffli & Gibbons, 2010) and are conducted in a positive accepting learning environment (Gibbons et al., 1999; Pfaeffli & Gibbons, 2010). A study conducted by Pfaeffli & Gibbons (2010) examined a newly developed high school physical education elective course that had attracted and maintained high enrolment rates of female students. Results showed that features of the course paralleled the antecedents of the SDT. The authors concluded that providing a physical education environment that is supportive of students'

choices and interests, that enhances students' personal skills and confidence, and promotes a sense of belonging could result in increases in participation in elective physical education programs. Likewise, a study conducted by Shen (2010) aimed to examine the influence of high school students' perceived autonomy support in mandatory physical education on their enrolment in elective physical education. The author concluded that to promote enrolment in elective physical education programs, physical education teachers should offer choice in activity selection, task difficulty, and other alternatives that will support the need of autonomy and foster students' positive attitudes toward physical education.

These finding suggest that improving students experiences in physical education courses and meeting the needs posited by SDT will positively influence students enrolment in elective physical education programs. However, the results of present study showed no significant differences between conditions on students' psychological need satisfaction or SDT constructs. As such, perhaps the increase in enrolment rates in intervention schools was due to the promotion of the elective courses. As a component of the HPSS Physical Education 10 intervention, physical education teachers in intervention schools promoted grade 11 physical education courses to their students in their grade 10 courses to increase student enrolment rates. Sulz et al. (2010) reported that students who were not enrolling in elective programs were unaware and uniformed about the grade 11 physical education course. This highlights the importance of physical education teachers promoting elective courses to their students during mandatory physical education.

There are several strengths in the present study, which include the randomized controlled design and the strong theoretical framework and theoretically based

intervention strategies. In addition, schools in this study were diverse in characteristics and geographical location. The inclusion of diverse schools may allow for the program to be generalizable to other settings. Further, HPSS Physical Education 10, to my knowledge, was the first physical education program at the high school level aimed to enhance students' motivation during physical education classes by targeting all three psychological needs proposed by SDT. The HPSS Physical Education 10 program contributes to the motivational literature in that it examined students' motivational processes over the duration of one high school physical education course. Moreover, HPSS Physical Education 10 was specifically designed to be integrated into the existing practices of school-based physical education programs. Most uniquely to HPSS Physical Education 10, teachers were given choices and flexibility within the framework of the intervention. This allowed for a sustainable program that could be adapted by the teachers to meet the specific needs of their school and their students.

This study was constrained by a few limitations that should be noted. First, participant schools volunteered for this study and were not randomly selected from a population of schools. Due to this, schools might have had greater motivation prior to the onset of the intervention, which may explain the high baseline scores and enrolment rates of the intervention and usual practice schools. Second, student participants who volunteered for the present study also consented to the larger portion of HPSS. This larger aspect of the study involved more rigorous measurements (i.e., physical measurements, 20-meter shuttle run). This may have limited the scope of participants who volunteered to take part in the current investigation. Third, the participating students represented a highly motivated group. However, this was exceedingly unavoidable due to

the reality that only interested, and perhaps already motivated, students will participate in studies with the measurement requirement such as HPSS. Lastly, the lack of process evaluation data in the usual practice schools limited the understanding of the need-supportive environment that usual practice schools were providing their students.

In conclusion, the HPSS Physical Education 10 program was designed to support a choice-based framework to promote perceptions of autonomy, relatedness, and competence in high school physical education settings and the promotion of elective physical education programs. Although the intervention lacked significant results, the program displayed improvements that may be enhanced over time as teachers become more familiar with the HPSS Physical Education 10 program. The complexity of the program made it difficult for teachers to implement the program as intended, however, teachers' experience with the HPSS Physical Education 10 resource binder will be enhanced overtime and therefore more components of the program may be delivered to students. Attaining significant results on all three psychological needs posited by SDT over the short duration of HPSS Physical Education 10 may be dependent upon a more structured pre-set program. A primary underpinning of the HPSS program was the choice-based framework in order to attain a flexible sustainable school-based program. To attain significant findings in this type of study design, a longer duration intervention might be necessary (i.e., over the course of several semesters). The insights gained from this study will build on the knowledge and understanding of developing need-supportive environments in high school physical education programs and improving enrolment rates in elective programming, by making changes to existing practices and staying aligned with curricula objectives.

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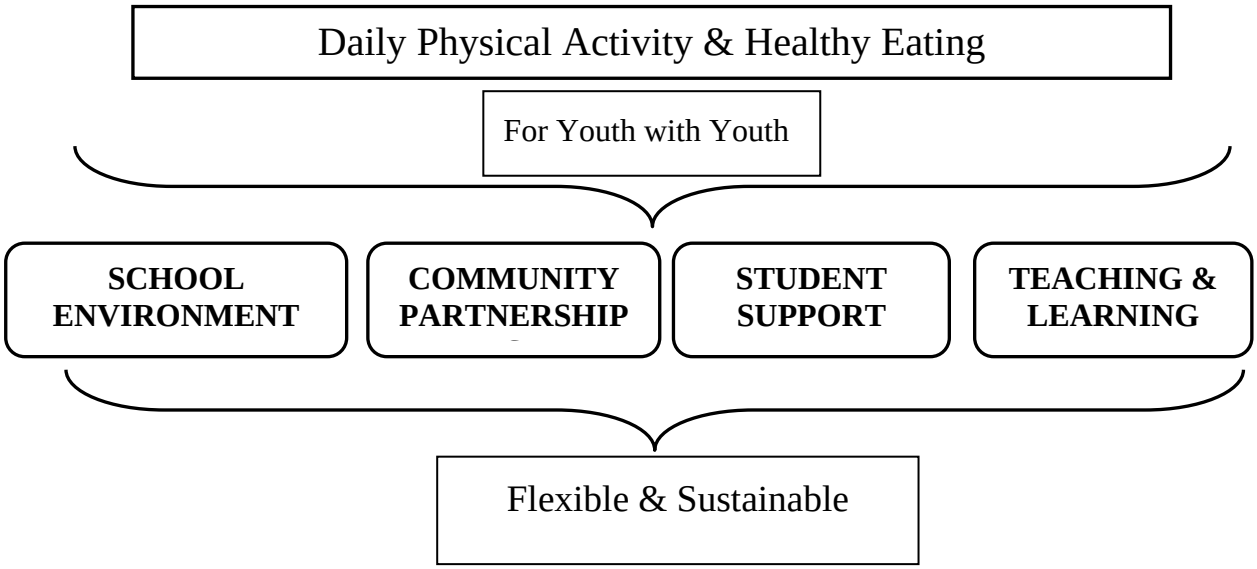
Appendix A

Overview of HPSS

Health Promoting Secondary Schools is a health promoting, 'whole-school' health approach that uses a "For Youth with Youth" planning strategy designed to change school environments (culture, policy and practices) to help high school students become more physically active and eat more healthful diets. The approach integrates the efforts and actions of teachers, school administrators, students and community practitioners across four zones:



- **School Environment/Culture**: Makes healthy choices the easy choices by creating safe and inclusive school environments, supporting healthy living policy development and celebrating and encouraging a whole-school approach to healthy living.

- **Community Partnerships:** Connecting with the community to increase extra-curricular opportunities for physical activity, healthy eating and positive partnerships.

- **Student Support:** Providing personalized support tools to encourage youth to make and maintain behavioural changes relating to physical activity and healthy eating.

- **Teaching and Learning:** Implementing enhanced healthy living curriculum in Planning 10 and Physical Education 10 to support a whole-school approach to an active, healthy lifestyle.

The ***vision*** of the HPSS whole-school health approach is to integrate healthy living into the fabric of BC secondary schools and intrinsically motivate students to make healthy food choices and participate in regular physical activity. The ***goal*** is to:

Increase:

- Physical activity levels
- Enrolment in physical education in Grades 11 and 12
- Vegetable and fruit consumption

Decrease:

- Screen time
- Consumption of sugar-sweetened beverages

HPSS Intervention Research Questions:

(1) Does a 'For Youth with Youth' whole-school health approach (HPSS) increase students' health behaviours; specifically, raise physical activity levels and consumption of fruits and vegetables, and decrease screen time and consumption of sugar-sweetened beverages in the intervention school population?

(2a) Does HPSS significantly increase the intrinsic motivation (that is, autonomy, relatedness, and competence) for youth to engage in health-related behaviours (physical education, physical activity, fruit and vegetable consumption, decrease screen time and SSB consumption) compared to a comparison / usual practice school?

(2b) What is the relationship, if any, between the mediator variables of autonomy, relatedness, competence, motivation and behaviour?

(3) What is the implementation experience of HPSS in schools' efforts to change culture, policy and practice? Specifically, a) how do schools adopt and/or adapt the HPSS whole-school health approach and its components, if at all, to meet their own needs? b) Is implementation of a whole-school health approach with a 'For Youth with Youth' orientation feasible? That is, what components of the approach are essential and/or problematic? What are the facilitators and barriers to implementation? c) How satisfied are schools with their experience? Are students and staff more intrinsically motivated to plan, implement and sustain health promoting policies and practices in their school?

Appendix B

Description of Purchases Made by HPSS Intervention Schools

	Items Purchased for Healthy School Bins ($2500)	TOC Time or Equivalent ($600)	Classroom Grant Activities ($500)	School Wide Events Grant ($500)
School 1	• "Fit Thursday" running club, Terry Fox run and Milk Run Prizes and refreshments • Sun Run charter transport • "Wild Play" Tree Climb Adventure • Ninja blenders, supplies, and ingredients for smoothie day • Smoothie supplies (fruit, juice, yogurt, cups and lids) • "Jet Boil" for hiking and snowshoe trips	• Fall hike with grades 9s and 10s – two TOCs	• Zumba • Bootcamp (x2) • Fitness Center Passes (40) • Supplements & Nutrition Speaker • Food Guide Nutritionist	• Fall Activity Day • Winter Activity Day (postponed due to strike) • Fall Activity Day (scheduled for Sept. 2012)
School 2	• Exercise programs, DVDs and manuals • Portion towards a school water machine	• No Purchases	• Zumba instructors • Gift certificates for fitness presenters • Race entry fee for student leaders	• Terry Fox Foundation T-Shirts for student leaders and winners • Incentive gifts for school-wide activities • Nutritious food items for event rewards
School 3	• Equipment for students to use at lunch/after school in weight rooms • Volleyballs, basketballs, soccer	• No Purchases	• African dance teacher • Zumba instructor • 2 guest speakers	• Cycle-a-Betes (Spin Instructor, food and prizes) • Jump Rope for Heart

	balls, Frisbees, hockey nets etc. • Bosus, med balls, new exercise mats, and an exercise bike			(food and prizes)
School 4	• Blender and Smoothie Machine • Body Composition Assessment Scale (TBF-300WA) • Scale shipping charges • Flu Arrows	• No Purchases	• No Purchases	Water bottles
School 5	• Fitness equipment including spin bikes, medicine balls, resistance tubing, weights, kettlebells and exercise balls	• Four half-day TOCs for HPSS training	• Registration and transportation for field trips including rock climbing, bowling, hiking Goldstream Park, and kayaking, DVD resource activities	• EMCS Olympics including prizes for winners and supplies for events

Appendix C

HPSS Planning 10 Lessons and Planning 10 Tracking Tool

Lesson 1: The HPSS Goals – What Are You Eating and How Are You Moving?

General Overview

Students will be introduced to the HPSS module and begin an assessment of their physical activity and healthy eating habits.

Learning Outcomes

Students will be able to:

- Track their physical activity and healthy eating habits
- Identify the types of physical activity

Preparation

- Copy the 7 day journal templates **OR** send the students online
- Copy Tips to be Active handout
- Familiarize yourself with the website
- Ask students to bring in examples of sugar sweetened beverages

Learner Engagement

A. ***Introduce*** to the class what HPSS is, the four target areas and what they will do over the course of the module:

- Assess their physical activity and screen time, and their consumption of sugar sweetened beverages and vegetables and fruits.
- Set short term goals with an action plan
- Examine what influences us, identify motivators and avoid excuses
- Progress check in
- Set longer term goals

B. ***Review*** key concepts for each of the four target areas:

1. **Physical activity -** the types of physical activity and intensities (see teacher backgrounder and Tips to be Active handout)
   ** this can be made interactive by having students act out various activities (Charades)

2. What constitutes recreational **screen time?** television; computer (non homework time); hand held devices

3. Examples of **Sugar sweetened beverages –** students bring in example drinks such as Gatorade; pop; energy drinks; iced tea
4. **Vegetables and fruit** – students brain storm different vegetables and fruit and ways they can be eaten - raw; cooked; incorporated into a complex meal i.e. vegetarian lasagna

Learner Activity – Recording Activity and Eating Habits

- Introduce students to the concept of a Daily Journal. This will be used to complete an assessment of their health habits for 3 days (related to physical activity, screen time and vegetable and fruit and sugar sweetened beverages consumption).
- Introduce the HPSS website to students and let them know they have a choice of doing their Daily Journal online or pen and paper (see teacher backgrounder for information on website; 3 day journal template handout)
- Walk the students through the website and/or distribute the journal handouts and lead the class through the exercise. Remind the students to record at least 1 weekend day during their 3-day journal activity.

Lesson 2: Am I Meeting the Guidelines?

General Overview

In this lesson, students are provided with a forum to discuss the benefits of eating well and being physically active every day and assess their own personal health as it relates to healthy eating and physical activity.

Learning Outcomes

Students will be able to:

- Determine the attributes of healthy living (related to physical activity, screen time and vegetable and fruit and sugar sweetened beverages consumption)
- Assess their own eating and physical activity habits
- Compare their physical activity, screen time and eating habits (vegetables and fruit and sugar sweetened beverages) to current guidelines

Preparation

- Obtain copies of Canada`s Food Guide, Canadian Physical Activity Guidelines for Youth, Canadian Sedentary Behaviour Guidelines
- Familiarize yourself with the Guidelines
- Review the Teacher Backgrounder
- Make copies of the self reflection handout

Learner Engagement

Ask students to bring a photo or other memento that symbolizes why eating well and being physically active is important to them. Have participants share with the group. Create a collage or list of reasons and benefits of eating well and being physically active.

***Key Message*:** there are many benefits of eating well and being physically active – like fighting disease, having more energy and maintaining independence, as we get older.

Learner Activity – Recommendations

- Review ***Canada's Food Guide and Canada's Physical Activity Guide to Healthy***
- ***Active Living***
    - Before displaying the Guides (or distributing copies) ask students if they know what the recommendations are for their age group

Learner Reflection

- Remind students of their Daily Journal. Then, lead a discussion on the following questions:
    - On average how many minutes are you exercising? Were you surprised by how much or how little you exercise?
    - What type of exercise do you do most often? Is there a type that you do not do or do very seldom?
    - On average how many minutes of screen time do you have? Were you surprised by how much or how little you are in front of a screen?
    - On average how many Sugar Sweetened beverages do you drink? Is this higher or lower than you thought?
    - On average how many vegetables and fruit do you consume? Is this higher or lower than you thought?
- Distribute the self reflection handout and ask students to identify one thing they do well and one thing they would like to improve in each of the areas: physical activity; screen time; vegetable and fruit consumption; sugar sweetened beverage consumption
- Collect self reflection sheets for use in next class.

Lesson 3: Goal Setting and Action plan

General Overview

In this lesson, students will set personal healthy eating and physical activity goals and develop a personal action plan to meet those goals.

Learning Outcomes

Students will be able to:

- Set personal goals for attaining and maintaining a healthy lifestyle.
- Create a personalized action plan to help achieve the goals set by the student.
- Track their personal health behaviour

Preparation

- Compile Self Reflection Responses from previous Lesson
- Copy the handout Making a Change: My Personal Plan (enough for 2 copies per student) **OR** send the students online
- Make copies of the tracking cards **OR** send the students online

Learner Engagement

How hard are you working?
This experiment will help the students identify their target heart rate for cardiovascular exercise and determine if they are working moderately, vigorously or lightly.

- Ask students to find their pulse (either on their wrist or neck)
- Tell them to count the number of beats in a 10 second period (you can time the 10 seconds)
- Ask them to multiply this number by 6 to get their resting heart rate. Ask the students to write this number down.
- Now, ask them to run on the spot for 3 minutes
- Immediately after they stop running on the stop, ask the students to take their heart rate again using the formula used previously. Ask the students to write this number down.
- Have them wait 1mintue and then take their heart rate again and write the number down.
- Now, ask them to work out the following formula: 220- their age= (e.g. 220-15=195)
- Ask them to multiply the answer by 60% and 80% (e.g. 156 and 117)
- Tell the students that they should aim to have their heart rate in between these two numbers when they are doing cardiovascular activities to ensure they are working at a moderate or vigorous level.

- Tell students that another mechanism to determine how hard you are working is the "Talk Test". Basically, if they are able to comfortably carry on a light conversation while exercising then they are in a good intensity range. Once their speech starts to break, slur, slow or cause discomfort they are working too hard.

Learner Activity – Goal Specificity

Write the following sentence stems on the board and ask each student to complete them in their notebooks or on paper:

1. This weekend I am going to…
2. This afternoon, I have decided to…
3. In the summer, I am planning to…
4. During Spring Break my family and I are going to…

- Underline the phrases (e.g. this weekend, in the summer etc.)
- Ask students to work in pairs and make their goals statements more specific by answering the following questions:
    - Why do they want to do the specific activity?
    - How they will do it (e.g. break it down into small steps)?
    - What might stop them from doing the particular activity?
    - How will they stay on track?
- Have students share some of their revised goals with the class
- Tell students that one of the important strategies for setting personal goals is being as specific as possible.

Learner Activity – Goal Setting

- Tell the students that today they are going to focus on setting personal goals for healthy eating and physical activity (related to physical activity, screen time and vegetable and fruit and sugar sweetened beverages consumption)
- Ask students to review their self reflection sheets from Lesson 2
- Distribute copies of the Making a Change: My Personal Plan Handout to each student and work through an example related to either healthy eating of physical activity (see handout) **OR** go online.
- Tell them that this process can help them set goals for almost everything they do
- Have students complete the worksheet using the areas identified in their self-reflection sheets completed in Lesson 2. Ask them to set a goal in each of the four target areas – note that a goal could be to "Maintain" – i.e. if they are already getting less than 2 hrs. of recreational screen time per day then their goal could be to maintain that.
- As a class review the goals. Explain to the students that they can provide support to one another, by sharing experiences throughout the behaviour change process.
- Collect the forms from the students and tell them you will return the forms next class. You will need to keep copies for lesson 4 at 6 weeks.

Learner Activity – Tracking

- Distribute and explain the tracking cards **(OR go online)** and tell the students that they will be expected to submit the tracking cards each week. Explain to the student's that they will not be assessed on their personal progress toward their goal but rather on whether or not they are working toward their goal.

- Explain to the students that you would like them to track their behaviour in all 4 areas, even though they may have only set a goal in two areas.

Learner Reflection

Engage students in a discussion about their past and current thoughts, beliefs and attitudes regarding the act of goal setting. Ask them to predict their success in achieving the goals they set today. (See goal setting success handout)

Lesson 4: Who and What Influences Us

From ***Healthy Eating and Physical Activity Learning Resource (Lesson 3 – sociogram)***

General Overview

In this lesson, students will visually illustrate the impact of their personal health decisions on themselves, their family and they community and vice versa and relate this to the goals identified in Lesson 3.

Learning Outcomes

Students will be able to:

- Analyze factors that influence their health regarding physical activity, screen time, and consumption of sugar sweetened beverages and vegetables and fruits
- Evaluate the potential effects of an individual's health-related decisions on self, family and community and vice-versa.

Preparation

- Gather large sheets of white drawing paper for each student
- Gather coloured marking pens for each student
- Find and read the Health Decisions Socio-gram instructions
- Find and read the Health Decisions Sample Student Responses
- Find Health Decisions handout
- Copy Health Decisions handout for each student
- Find the sample of a completed Health Decisions Socio-gram for the teacher

Learner Engagement

- Ask the students to consider who or what influences their physical activity, screen time, and consumption of sugar sweetened beverages and vegetables and fruits.
- Ask students to consider what impact their decisions related to physical activity, screen time and vegetable and fruit and sugar sweetened beverages consumption had on themselves, their family and their community (see handout for suggestions).
- Lead a discussion about the far-reaching effects of one's healthy decisions on self, family and community and vice-versa.

Learner Activity - Health Decisions

- Distribute and ask students to complete the Health Decisions handout. Students should consider how family, friends, and community affect their health decisions and conversely, how their health decisions affect family, friends, and community. See *Health Decisions Sample Student Responses.*
- Share and record responses for class viewing
- Ask student's to review their personal plan to review their responses to the Watch out For, Support and Stay on Track sections of their personal health plan.
- Collect the student's Personal Health Plan, copy and return to students in next class.

Learner Activity - Socio-gram

- Carefully review the *Health Decisions Socio-gram instructions* with students
- Have students illustrate the interconnectedness between their personal health goals established in lesson 2 and family, friends, and community using the socio-gram learning strategy.
- Ask students to look at the goals identified in lesson 2 and identify a minimum of 2 areas per goal where they would like to improve their relationship between themselves and family, friends and/or community to help them achieve their goals
- Ask students for permission to post their socio-gram for class viewing.

Learner Reflection

Students will identify their top two influences regarding their choices in what they eat and drink, and how they spend their time. They will describe how these influences take place and whether or not they would like to see changes in this area of their lives.

Lesson 5: Progress Check-How are Things Going?

General Overview

Change takes time and the student will likely face some challenges along the way. This lesson will help students to realize that setbacks are a natural part of the behaviour change process. It will also help them understand the importance of reassessment and reconfiguration of goals where needed.

Learning Outcomes

Students will be able to:

- Assess their progress so far in the four areas.
- Recognize the "ups" and "downs" of behaviour change.
- Evaluate their goals and revise them if necessary.
- Adjust their plan for continued improvements in the four areas.
- Recognize the need for additional support and/or help to stay on track.

Preparation

- Copy Graphing Activity sheets for each student
- Marked copies of each students Personal Health Plan completed in Lesson 2
- Completed Tracking cards from the last 4-6 weeks.

Learner Engagement

Ask the students for general feedback on how their progress has been so far.
Set them up in a "Think- Pair- Share" activity.

Lesson 6: Three-Month Celebration

General Overview

This final wrap-up session will provide the students with an opportunity to reflect on what they have learnt and acknowledge the behaviour changes they have worked on. This session will take place when all tracking is complete, approximately 3 months after starting the module.

Learner Engagement

- Work with the students to plan a celebration around healthy eating and/or physical activity. Ideas include:
    - Host a potluck or use classroom grant money for catering.
    - Arrange a class physical activity
    - Short hike to picnic type area
    - Class baseball or soccer game

Learner Activity

- Students create a power point presentation addressing the following:
- Why eating well and being physically active is important to them (benefits)
- How “I” am physically active
- Activities I could do to be more physically active
- How I incorporate healthy eating
- How I manage screen time
- Positive influences that have helped me
- How I’ve dealt with barriers

Learner Reflection

Have students set goals for the next semester or over the summer.

HPSS Planning 10 Teacher Tracking Tool

Lesson	# of sessions	Duration of each session	Comments
Lesson #1 – The HPSS goals: What are you eating and how are you moving?			
Lesson #2 – Am I meeting the Guidelines?			
Lesson #3- Goal setting and Action Plan			
Lesson #4 –Who and what influences us			
Lesson #5 – Progress check: How are things going			

Tracking challenges:

Other relevant activities:

Appendix D

HPSS Physical Education 10 Outline and Example of Resource Guide and Tracking Tool

Choice Action Guide (Autonomy)

In this section, we would like you to incorporate the following into your physical education classes:

1. ***Utilize Student Input***
   - Allow student input and choice regarding the activities offered in physical education

2. ***Incorporate Choices Within Teaching Practices***
   - Incorporate choice in:
     - Instructional Practices
     - Practice and Play Opportunities
     - Student Assessment
     - Physical Activity Attire

3. ***Utilize Community Resources***
   - Expose students to new lifelong physical activities

4. ***Promote Elective Physical Education Programs***
   - Promote the grade 11 physical education course early and often

Actions	Choices/Examples
1. Utilize Student Input	
a. Allow student input and choice regarding activities offered in physical education	❖ ***Ask students about their physical activity preferences***
	Your Choices: • Find out what the students are interested in, what they've done before, what they want to do more of/less of and incorporate this into your physical education class – *show the students that you used their feedback.* **C1 – Personal Profile** • Have students select from a list organized in curriculum categories, allow students to add to the list. Ensure choices involve a range of types of activities (i.e. not only major games). Use this information to develop your physical education class schedule – *show the students that you used their feedback.* **C2 – You Choose; C3 – Past Activity Participation and Activity Preferences** • Administer your own physical education course questionnaire to gather information from students and use this information to make changes – *show the students that you use their feedback:* ▪ Provide choice within movement categories "choice within a choice" e.g. badminton or tennis, choice of dance – hip-hop, jazz, line dance etc. ▪ Have students identify their top 3 activities from grade 9 physical education and their 3 least favorite activities in grade 9 physical education. Try to implement at least one favorite activity identified from each student. Try to limit the least favorite activities.

Choice Actions Tracking Tool

Actions								
1. Utilize Student Input	**Yes**		**No**	**N/A**	**HPSS Resource**			**Describe your actions here ⇓**
a. Allow student input and choice regarding activities offered in physical education	**Old**	**New**			**Yes**	**No**	**N/A**	
❖ Ask students about physical activity preferences **C1 – Personal Profile** **C2 – You Choose** **C3 – Past Activity Participation and Activity Preferences**								

Skill, Knowledge, & Leadership Action Guide (Competence)

In this section, we would like you to incorporate the following into your physical education classes:

1. ***Promote In-Class Physical Activity***
   - Increase students' activity levels during PE class time
   - Include activities to improve health-related fitness

2. ***Promote Out-of-Class Physical Activity***
   - Increase students' activity levels outside PE class time

3. ***Skill Development***
   - Enhance students' confidence in their skill and ability

4. ***Opportunity for Student Leadership***
   - Develop students' skill and confidence through leadership opportunities

Actions	Choices/Examples
1. Promote in Class Physical Activity	
a. Increase students' activity levels <u>in physical education class</u>	❖ ***Enhance students' understanding of personal activity level during physical education class time***
	Examples: ▪ Have students become familiar with what type of physical education activities which result in the greatest amount of steps **SL1 – Pedometer Prediction Stations** ▪ Have students become familiar the amount of steps taken during one physical education class **SL2 – Physical Education Pedometer Estimation**
	❖ ***Increase students' activity level during physical education class time***
	Examples: ▪ Set individual student in-class step goals based on their understanding of their personal activity level during physical education class time. Set weekly or bi-monthly goals. **SL3 – In Class Physical Activity Log** ▪ Set class step goals. Compete with other grade 10 classes. Set a weekly class step goal or a monthly class step goal. Have prizes for the winning class. Post your daily/weekly results where students can see it and monitor their class's progress.

Skill & Leadership Actions Tracking Tool (Competence)

Actions								
1. Promote In Class Physical Activity	**Yes**		**No**	**N/A**	**HPSS Resource**			**Describe your actions here ⇓**
a. Increase students' activity levels <u>in physical education class</u>	**Old**	**New**			**Yes**	**No**	**N/A**	
❖ Enhance students' understanding of personal activity level during physical education class time **SL1- Pedometer Prediction Stations** **SL2- Physical Education Pedometer Estimation**								

Connection & Belonging Action Guide (Relatedness)

In this section, we would like you to incorporate the following into your physical education classes:

1. ***Community Building Inside the Classroom***
   - Create a Safe and Supportive Physical Education Environment
   - Learn About Self and Others

2. ***Taking Physical Education to the Community***
   - Involve Students in Volunteer Activities (in school and out of school)

Actions	Choices/Examples
1. Community Building Inside the Classroom	
a. Create a safe and supportive physical education environment	❖ ***Include activities that develop in-class peer relationships throughout the course***
	Examples: ▪ Name Games **CB1 – Name Games** ▪ Ice Breakers, Cooperative and Team Building Games **CB2 – Ice Breakers, Cooperative, and Team Building Games** ▪ Administer your own Cooperative Games and Team Building Activities: o Intersperse teambuilding and/or cooperative games throughout the course o Include game creation activities e.g. invent-a-game o Explicitly emphasize the major teambuilding concepts when using team building activities e.g. trust, cooperation, communication, risk o Encourage students to cheer each other on as they complete fitness challenges o Create an atmosphere where congratulation and support is given regularly (high fives)

Connection & Belonging Actions Tracking Tool

Actions								
1. Community Building Inside the Classroom								
a. Create a safe and supportive physical education environment	**Yes**		**No**	**N/A**	**HPSS Resource**			**Describe your actions here ⇓**
	Old	**New**			**Yes**	**No**	**N/A**	
▪ Include activities that develop in-class peer relationships throughout the course **CB1 – Name Games** **CB2 – Ice Breakers, Cooperative, and Team Building Games**								

Appendix E

HPSS School Action Plan Form

School Year: _____School name: _____
Completed by: _____ Date completed: _____

Goal statement	**Actions**	**Resources/Equipment/ Tools Required**	**Month/Date(s) or Timing for Action**									
			S	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**
Zone: School Environment												
Policy Development, Maintenance or Enhancement												
I.												
II.												

Appendix F

Action Team Meeting Minutes Form

School Name

Action Team Meeting

Date:

Time:

Student Attendees
Teacher Attendees

Regrets:

Agenda Topics

Speaker	Topic	Discussion

Meeting Conclusions

Decisions Made

Action Items

Action	Person Responsible

Next Meeting:

Appendix G

School Visit Observation Sheet

School Component (e.g., environment; curricula)	**Evidence of HPSS….**	**General Observations**

Appendix H

Action Team Meeting Observation Sheet

Speaker	Description: I = idea; O = opinion; F = facilitative; S = summary

Motivation/3 SDT Constructs:

Engagement/For Youth with Youth:

Overall Observations:

Appendix I

Action Team Focus Group Interviews
Semi-structured Interview Guide

1. Tell us a bit about how your Action Team worked together – what happened, who did what, and how did decisions get made?

2. Tell us about your experiences with HPSS this year – what, if anything was good/bad about planning and implementing HPSS related activities, events etc.?

3. What factors do you think helped you to implement HPSS?

4. What factors do you think made it difficult for you to implement HPSS?

5. What impact (+/-) has HPSS had in your school? How do you know?

6. Are there milestones or achievements in the past year that you think are particularly important or that stick out in your mind as being positive?

7. What is the likelihood that your school will continue implementing HPSS next year?

8. What improvements could be made to the HPSS - initiative and resources to enhance its chances of success in other schools?

Appendix J

Planning 10 and Physical Education 10 Teacher Focus Group Interviews
Semi-structured Interview Guide

1. What factors do you think helped you to implement HPSS?

2. What factors do you think made it difficult for you to implement HPSS?

3. What impact (+/-) has HPSS had in the school?

4. Are there milestones or achievements in the past year that you think are particularly important?

5. What are the major lessons you learned this year through participating in HPSS?

6. If you taught PE 10 or Planning 10 last semester, can you tell us about your experience second term versus first term? Were there any changes you made? If so, what were they, and did it make a difference in your class and for your students? Please explain.

7. What is the likelihood that your school will continue implementing HPSS?

8. What improvements could be made to the HPSS - initiative and resources to enhance its chances of success in other schools?

9. What factors do you think will facilitate the long-term sustainability of HPSS?

10. What factors do you think will be a challenge to the long-term sustainability of HPSS?

Appendix K

Additional Evidence Supporting Theme 1: Competing Responsibilities, Technical Difficulties, and Lack of Computer Access

Theme 1: Competing Responsibilities, Technical Difficulties, and Lack of Computer Access

Focus Group Interviews	School Visit Observations	Action Team Meeting Minutes/Observations
"It might be better for the study if there was another year. One year is only like a test pilot, right? Another year and it would be more smooth." (Male PE Teacher – PE 1) "One of the downfalls I think is because it is a school that's got a lot of clubs, so despite the fact that we're not supposed to be doing clubs this year (due to strike), there are a lot of clubs and there's a lot of activities going on. So I think the students really get pulled because they're told to volunteer, volunteer, do this do that, and you've got their hands in like 8 different clubs. They can't really give themselves 100% right? And so where we want kids to come in and participate in things, they are like I can't do this at this time I have to be with the environmental club or I have to be busy with the global this of the internet club and they've got their own little thing and its hard to make sure they get the time." (Female Student – AT 1) "Pretty much just time." (when asked what barriers they faced for implementation) (Female PE Teacher – PE 2) "Ya and also for me it was the beginning of the year and with all the other stuff happening it was pretty hectic. I think come second semester I will give it a bit more focus. I will have a prep for one and I can actually look at the book and of, ok."	The PE teachers said they were trying to implement HPSS actions into their courses but something always came up making it difficult to implement the actions and lessons in the HPSS binder. (School Visit Observation 2) Today the PE office was extremely busy. It was hard to discuss the progress with HPSS PE 10 with the PE teachers. They were too busy to have a solid conversation with me. (School Visit Observation 8) Teachers need more time to look through PE binder. I think all the resources are overwhelming teachers. They don't seem to know where to start. (School Visit Observation 9)	Teachers are going to check school calendar to see when other events are taking place to determine the best time to host an event. The calendar is full especially in early fall. May have to find a time later in the year. (AT Meeting Minutes 2) The Action Team seemed flustered finding time to meet and plan events as well as a good time in the school year to host an event. (Action Team Observation 4)

(Male PE Teacher – PE 1)

"Having the time to go through the binder on a regular basis is difficult." (Male PE Teacher – PE 3)

"You barely have any time to eat and then if your coaching, you're racing home to get stuff done, I know it's no excuse but I did find it a bit of a rat race" (Female PE Teacher – PE 3)

"I would say high (level of implementation) but using HPSS website, I would say low (level of implementation) because I wasn't able to get my class onto the website" (Male Planning 10 Teacher – Plan 2)

I think the biggest obstacle is kind of connected with the time, just sitting down and opening the book...so it's just having the time regularly to go through instead of just sitting down at the beginning of the semester and opening up the binder and say 'oh this would be really good for my football unit'. That is two and a half months away and hopefully I remember it. But having time to go through the binder on a regular basis. (Male PE Teacher – PE 3).

Appendix L

Additional Evidence Supporting Theme 2: Resources, Reminders, Workshops, and Collaboration

Theme 2: Resources, Reminders, Workshops, and Collaboration.

Focus Group Interviews	School Visit Observations	Action Team Meeting Minutes/Observations
"With HPSS it's like here you go, it's almost like a handbook to go with your teaching. And it would be fantastic if every PE teacher could be given one. And use it, like you said, use from it what you want, here is something that has resources for you. If you need a lesson, right? Like, "oh god, I had a horrible night last night…whatever…."I have a newborn baby who was up all nigh, I didn't get a change to get stuff together, umm, boom! There it is! I am going to do a pedometer lesson, I'm going to do a fitness challenge, I'm going to do whatever. So it's got the one off lessons but at the same time it adapts." (Male PE Teacher – PE 3) "And its (binder) is not patronizing. Right, like its not like, here's how you run a PE class. Not a step by step thing, like where a teacher would look at it and be put off because it's like all "oh they think I don't know what I'm doing." It's more, "here's an idea for this unit, here's a one off lesson you can do. Here are some ideas to build off what you're already doing." (Male PE Teacher – PE 3) "Plus they were made by PE Teachers. One sheet here one sheet there, they were great, not just long three class projects. It was quick, you can just grab it." (Male PE Teacher – PE 4)	Teachers had self-evaluation sheets photocopied in the PE office. (School Visit Observation 9) Physical education teachers explained they would have good intentions to implement actions into their classes but never could seem to execute it. This was due to the business of their job or something always coming up. They would then resort back to their usual practices. When asked what would help with this, they asked for more reminder emails from me. (School Visit Observation 6)	Everyone seems to be working together nicely. Seems like a nice group. (AT Meeting Minute 4) Students are interacting with each other. Planning to meet up after school to further discuss actions. (AT Meeting Minute 5) Students divided up the work evenly and seem to be working well with one another. (AT Meeting Observation 7)

"I've been telling people that any new PE teacher they should just give them that binder and they can be ready to go." (Male PE Teacher – PE 4)

With academic classes they have the teacher handbooks, right. Like you're teaching Math, you get the textbook but you also get the teachers handbooks. Same thing with Science you get the Science Probe 9, Science Probe 10, whatever grade the science is and you get the corresponding teacher book. For Socials there is a binder, a 3-inch binder, just filled completely for Socials 9, with resources and suggestions and all this kinds of stuff and you don't get that for PE. And that's what this binder serves as. (Male PE Teacher – PE3)

"Actually what would probably keep everyone on track might be a reminder focusing people on a certain part of the book." (Male PE 10 Teacher – PE 1)

"I just found remembering to do it. I would think I was going to use it (HPSS Physical Education 10 resource binder) and then ahhh! It was like I would have to write myself a note that says, 'Use Pedometer.'" (Female PE Teacher – PE 5)

"I think it was useful to get the word out to the staff. And it did get us motivated to look through and plan it. In the end it fell in perfectly with my health unit. The screen time was a huge hit to introduce that into our planning unit. It was motivating to have you come in for that workshop. If you hadn't come in I don't know how much motivation we would have had to look through all that material." (Female Planning 10 Teacher – Plan 2)

"The workshop was a bit too fast. A half day in the middle of the

semester would be helpful." (Male PE 10 Teacher – PE 1)

"Yes we met and then didn't do anything for like three weeks. Ya that gap was no good. It would be better to come and give us an intro and then come back. It would have even been nice to have the intro, and then later just us teachers sit down and hash it out, talking about it, asking what we've used in the past." (Male PE Teacher – PE 3)

"And having more than one person" (Things that helped implement events/activities). (Male student AT member– AT 2)

"Ya a little bit we would be like 'hey lets have the [pedometer] challenge'" (when asked about collaboration). (Female PE Teacher – PE 2)

"It would be fantastic if we could work with them (other PE teachers from other HPSS schools). Even if there was a moodle of something where all teachers implementing HPSS could do and discuss it. A discussion board online. (Male PE Teacher – PE 3)

"Two heads are better than one and if there is 200 heads so you're getting ideas from other people and ways to do things in ways you normally wouldn't think of. So I like the collaboration of it."(Male PE Teacher – PE 3)

"Photocopy the self-assessment cards and we have a stack and its like hey I need your cards." (Male PE Teacher – PE 2)

"We designed the whole program together as a group." (Female Planning 10 Teacher – Plan 2)

Appendix M

Additional Evidence Supporting Theme 3: Choice-Based Design Impacts Participants' Experiences

Theme 3: Choice-Based Design Impacts Participants' Experiences

Focus Group Interviews	School Visit Observations	Action Team Meeting Minutes/Observations
"I mean it's doable, but if you would have come in here with us and just said let's try and do this with some kind of base idea that you said now we should try and do this because this would be a good starter. It would have been a lot easier to build from there." (Male Action Team Member – AT 3)	Physical education teachers need more time to go through the binder. Some of them flagged activities from the workshop to use but said they need to go back and look at what they flagged. (School Visit Observation 3)	This school is behind other schools with their Action Plan. They have yet to decide what events and policies they would like to implement. (Action Team Observation 5)
"We got to pick and choose the activities we wanted to do the most. If it was just like, oh you have to do theses ones then I don't think I would have enjoyed it as much." (Male PE Teacher – PE 4)	A Planning 10 teacher enjoyed that his students were able to choose which health behavior to set goals for (physical activity, screen time, fruit and vegetable consumption, and/or sugar-sweetened beverage consumption). He felt the students were able to personalize their goals and focusing on improving all four would be too much for the students. (School Visit Observation 6)	Team struggling agreeing on an idea. Lots of ideas flying around. Have not completed school assessment yet. (Action Team Observation 3)
"The fact that it was all there in the book. So we could actually take it out and go, 'ok I've done this part and we could take the lessons apart. I like how it was segmented so I could just take out what we needed." (Female Planning 10 Teacher – Plan 2)		Team will choose one of the three ideas presented for next meeting. (Action Team Meeting Minute 6)

Appendix N

Additional Evidence Supporting Theme 4: Teacher Control Impacts Student Engagement

Theme 4: Teacher Control Impacts Student Engagement

Focus Group Interviews	Action Team Meeting Minutes/Observations
"Well, I think we (teachers) brought forward ideas that we thought would help the school and what we needed and then we kinds had a few ideas and then from that we would channel it down to one idea." (Female Teacher – AT 4) "I guess if we had more power in those conversation we would have more say." (Female Student – AT 5) "I think maybe more of a democratic approach and everyone votes (Female Student – AT 5)	Youth seem hesitant to talk, even when prompted. (AT Meeting Observation 4) Sometimes the youth ideas were shut down by the teachers. Yet, their ideas were large and at times not practical. (AT Meeting Observation 7) Teachers provided students with choices of activities to do but didn't let students come up with their own ideas. (AT Meeting Observation 9) The students are going to create a survey for the students in their Planning 10 classes to ask them what types of activities they want to have for Fit Fridays (AT Meeting Minutes 3)

Appendix O

Additional Evidence Supporting Theme 5: Teacher Job Action Inhibited Implementation of HPSS Action Plans

Theme 5: Teacher Job Action Inhibited Implementation of HPSS Action Plans

Focus Group Interviews	Action Team Meeting Minutes/Observations
"I think it was just the nature of the year unfortunately." (Teacher AT Member – AT 1) "I think the negative thing about it would be probably the amount of work it put on outside of your actual job description….maybe if more teachers had been on board, it wouldn't have been as time consuming….maybe a different year when there's a little bit more support" (Teacher AT Member – AT 1) "Maybe this year wasn't the best year, but next year for sure. Yeah, we could be giving 100% to something that we're committed to. That's how it should be and we won't be doing that." (Student AT Member – AT 1) "It (HPSS) would have been better if the teachers strike wasn't happening." (Student AT Member –AT 3)	Was still unable to get HPSS items in school newsletter. Will try again next month. (AT Meeting 4)

Appendix P

Events and Policies Implemented in Each HPSS Intervention School

School 1							
Physical Activity Events – Semester 1							
Event Title	**Date of Event**	**New Event (did this event bec. of HPSS) OR Old Event (did this event last year)**	**Who the Event Targeted (e.g., students, staff, grade 10s)**	**Description of Event**	**Approximately how many people participated? (# of students, # of staff, etc.)**	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Fit Thursdays	Every Thursday – On going throughout the year	New Event	Students and Staff	Running/Walking club Thursday's afterschool. Participated in numerous community runs throughout the year (Sun/Milk Run, etc.)	Varied.	Yes. A lot of people were active that would normally not be.	Yes. Participated in community runs
Terry Fox Run	Fall	Old Event – but enhanced by HPSS – more transportation and more prizes	Students and Staff	Participated in Terry Fox Run	Majority of the school Body	Yes. Almost everyone participated.	Yes.
Fall Activity Day	Fall	Old Event – but enhanced by HPSS – more activities and prizes	Students and Staff	Day of various activities for the entire school to participate in.	Majority of the school body	Yes. Almost everyone participated	Yes. Provided prizes and food.

School 1							
Healthy Eating Events – Semester 1							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR** **Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Smoothies and Deli Sandwiches	Every Tuesday - On going throughout the year	New Event	All Students and Staff	Make smoothies and bring in deli sandwiches to sell Tuesdays at lunch.	Sell out almost every lunch.	Yes. We don't have a cafeteria and no healthy options for students. This has been a convenient and easily accessible options for students to have a healthy lunch	Yes. We get deli sandwiches from our local grocer.

* No policies implemented in Semester 1

School 1							
Physical Activity Events – Semester 2							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR** **Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Fit Thursdays	Every Thursday – On going throughout the year	New Event	Students and Staff	Running/Walking club Thursday's afterschool. Also participated in numerous community runs throughout the year (e.g., Sun Run, Milk Run, etc.)	Varied.	Yes. A lot of people were active that would normally not be.	Yes. Participated in community runs
Sun Run & Milk Run	Spring	Old Event – but enhanced by HPSS – more transportation and more prizes	Students and Staff	Participated in Sun Run and Milk Run	Majority of the school Body	Yes. Almost everyone participated.	Yes.
Winter Activity Day	Winter	Old Event – but enhanced by HPSS – more activities and prizes	Students and Staff	Day of various activities for the entire school to participate in.	Majority of the school body	Yes. Almost everyone participated	Yes. Provided prizes and food.

School 1							
Healthy Eating Events – Semester 2							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR** **Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Smoothies and Deli Sandwiches	Every Tuesday - On going throughout the year	New Event	All Students and Staff	Make smoothies and bring in deli sandwiches to sell Tuesdays at lunch.	Sell out almost every lunch.	Yes. We don't have a cafeteria and no healthy options for students. This has been a convenient and easily accessible options for students to have a healthy lunch	Yes. We get deli sandwiches from our local grocer.

* No policies implemented in Semester 2

School 2							
Physical Activity Events – Semester 1							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Terry Fox Run	Thursday, September 29th, 2011	New	Whole school: Staff & Students	Entire school participated in a 3km walk, jog, run the period prior to lunch.	1400	Yes, although we had hoped more would run. The majority walked.	Only in that we advertised to our neighbours that we'd be on their streets. Some came out to cheer us on.
iWalk	October 3rd – 7th. International Walk to School Day: Wednesday, October 5th, 2011	New	Whole school: Staff & Students	Staff & students were encouraged to walk, bike, rollerblade, skateboard to school for the whole week.	Approximately 300	Yes & no. The weather was dismal the whole week, which really discouraged kids from walking.	Fruiticana gave us apples (discounted) to give to all the students who walked on Wednesday.
Fitness Buffet	On-going on Collaboration Wednesdays: January 18th – Zumba February 1st - Yoga	New	All students	Bring in specialty fitness instructors for a session in something new and fun.	35	Yes & no. We could easily have more students come out. The time may be an issue. It's before	Yes. We bring in community fitness instructors and then after the session

						school.	we provide the students with a list of all the facilities that offer that type of fitness class
Sun Run Training Clinics	Tuesdays. Started January 16th, 2011	New	Staff & Students	We've provided a Sun Run Training Schedule to everyone. But we offered a group running session on Tuesdays afterschool	Unknown – we've handed out approximately 50 training schedules but only 4 or 5 people run on Tuesdays…they may be running on other days.	Don't know. The run itself doesn't happen until Sunday April 15th. We hope that people are running on their own time.	No

School 2							
Healthy Eating Events – Semester 1							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR** **Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Fit Facts Monthly Newsletter	Third week of each month	New	Staff, students, families at home reading the newsletter	A healthy tip is discussed and an easy healthy recipe is included each month in the newsletter under the title of "Fit Facts"	3 home economics teachers	Yes. According to the Foods department, the Foods students looked forward to the monthly newsletter	To some extent. If the healthy eating idea required going to specialty foods stores, they were mentioned.

School 2						
Policies – Semester 1						
Policy	**Policy Start Date**	**New Policy (did this event bec. of HPSS) OR Old Policy (did this event last year)**	**Who the Policy Targeted (e.g., students, staff, grade 10s)**	**Description of Policy**	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
All girls PE classes Grade 11 & 12 level	September 2011	New	Girls	Offer all girls PE classes as an elective in the senior grades (grade 11 & 12)	Yes. We ran 4 classes this year	Yes! The girls participate in many activities that require them to venture out into the community and use various facilities

School 2							
Physical Activity Events – Semester 2							
Event Title	**Date of Event**	**New Event (did this event bec. of HPSS) OR Old Event (did this event last year)**	**Who the Event Targeted (e.g., students, staff, grade 10s)**	**Description of Event**	**Approximately how many people participated? (# of students, # of staff, etc.)**	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Fitness Buffet Zumba	April 04	New	Students and staff	Introduce Zumba as a new fitness activity	50	Yes	Through school newsletter
Fitness Buffet Yoga	February 15	new	Staff and students	Introduce Yoga to staff and students	40	Not as much interest first thing in the morning	
Girls only senior PE	February - June	New Event to encourage PE for girls	Female students	Fitness classes and introduction to community events.	33	yes	Yes – participated in the sun run and hired community instructors for specialized fitness activities
Sun Run	April 21	new	Staff and students	Community 10K run	50	Due to nature of year, there was little extra curricular	yes

School 2							
Healthy Eating Events – Semester 2							
Event Title	**Date of Event**	**New Event (did this event bec. of HPSS) OR Old Event (did this event last year)**	**Who the Event Targeted (e.g., students, staff, grade 10s)**	**Description of Event**	**Approximately how many people participated? (# of students, # of staff, etc.)**	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
March Nutrition month	March	old	Staff and students – newsletter awareness	Nutrition facts and information	2000	Newsletter information and on line – wide access to readers	no

* No policies implemented in Semester 2

School 3							
Physical Activity Events – Semester 1							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR** **Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Cylce 'A' Betes	November	Old Event – but enhanced with HPSS. More bikes = more students participating	Students (all grades) Staff & Administration Community Ex Grads	Bike Spinning in teams for three hours to realize awareness & funding for Juvenile diabetes	200 (more than last year)	Absolutely Great enthusiasm and team spirit. Raised over $3000 and had a lot of people active	Yes. Parents as volunteers, ex grads participated, 2 spin instructors, wind trainers were donated, food donations from Thrifty's.

* No Healthy Eating Events and no policies implemented in Semester 1

School 3							
Physical Activity Events – Semester 2							
Event Title	**Date of Event**	**New Event (did this event bec. of HPSS) OR Old Event (did this event last year)**	**Who the Event Targeted (e.g., students, staff, grade 10s)**	**Description of Event**	**Approximately how many people participated? (# of students, # of staff, etc.)**	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Jump Rope for Heart	May 31st	New Event	All students in semester 2 PE classes (grade 9 - 12)	Students in each block fundraised for the heart and stroke foundation. Students were expected to jump for 1 hour and 15 minutes a team	Approximately 315 students	Yes. Awesome, fun and energetic. Minimal planning needed. Great prizes and demonstration. Students really enjoyed it.	No.

* No Healthy Eating Events and no policies implemented in Semester 2

School 4							
Physical Activity Events – Semester 1							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR** **Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Wednesday Walkers	First Wednesday of every month	New event	Students	Walk, bike, blade to school	Shooting for 50%, but probably 25%	Yes, we receive lots of ballots	No

School 4						
Policies – Semester 1						
Policy	**Policy Start Date**	**New Policy** (did this event bec. of HPSS) **OR** **Old Policy** (did this event last year)	**Who the Policy Targeted** (e.g., students, staff, grade 10s)	**Description of Policy**	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Free Weight Room Club	Sept. 2011	New Policy	All students	Before school, lunch time and after school – weight room use is free for all students	Yes, students are coming to the weight room on a consistent basis during those times.	No
Water bottle policy during PE	Feb. 2012	New Policy	All PE students	Encourage/enforce water bottle usage during PE class and hopefully it carries over throughout the school day	Initial usage is up, but it is too early to tell.	No
Bonus Marks for PE students	Sept. 2011	New Policy	All PE students	Encourage extra curricular activities in the school (weight room, outsides on fields, lunch time open gym)	No because of the job action	No

School 4							
Healthy Eating Events – Semester 1							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
School Fruit & Vegetable Nutritional Program	Once every 2 to 3 weeks	New event	Whole school	Exposing students to different fruits and vegetables in hopes that they continue eating more healthy	Entire school	Yes, it is on going	Yes, BC Agriculture in the Classroom
Smoothie Drinks	Sold in school store on specific days of the week	New event	Whole school	Providing healthy drink alternatives for students	Anyone that purchases it	Yes, it is on going, people are purchasing smoothies versus pop from the vending machines	No

School 4						
Policies – Semester 1						
Policy	**Policy Start Date**	**New Policy** (did this event bec. of HPSS) **OR** **Old Policy** (did this event last year)	**Who the Policy Targeted** (e.g., students, staff, grade 10s)	**Description of Policy**	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Free Weight Room Club	Sept. 2011	New Policy	All students	Before school, lunch time and after school – weight room use is free for all students	Yes, students are coming to the weight room on a consistent basis during those times.	No
Water bottle policy during PE	Feb. 2012	New Policy	All PE students	Encourage/enforce water bottle usage during PE class and hopefully it carries over throughout the school day	Initial usage is up, but it is too early to tell.	No
Bonus Marks for PE students	Sept. 2011	New Policy	All PE students	Encourage extra curricular activities in the school (weight room, outsides on fields, lunch time open gym)	No because of the job action	No

School 4							
Physical Activity Events – Semester 2							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Yoga	Every Thursday after school	New event	All students & staff	A yoga instructor would come in and run a yoga class	On average, 25 per week	Yes, high turn out and enjoyment	Yes, instructor is from the community
Women's Weight Training Club	Every Tuesday after school	New event	All female students & staff	A female personal trainer comes in to provide students & staff with workout information & runs them through a workout.	On average, 4 students per week	No, because of the low turn out	Yes, instructor is from the community
Martial Arts Club	Every Thursday after school	New event	All students & staff	Students are taught different martial arts techniques (karate, jujitsu, wrestling) for personal defense, self confidence, physical exercise	On average, 7 students per week	Yes, steady commitment from students	No, teacher lead
Women's Kick boxing	Every Tuesday after school	New event	All female students & staff	Students are taught kick boxing for personal defense, self confidence, physical exercise	On average, 20 students and teachers per week	Yes, consistent turnout	No, school support staff runs it

Running club	Tuesday & Thursday morning before school starts	New event	All students & staff	School support staff organizes and runs the club	On average 5, students and staff per week	Yes, they enjoy it, but low numbers	No, school support staff runs it
Wednesday Walkers	First Wednesday of the Month	New event	All female students & staff	Students and teachers encourage the school to be active and get to school via any means other than a car or bus.	It varies, estimated 400 per month	Yes, it was successful: many participants, increased physical activity & awareness. No, because it has decreased in participation since the first semester.	No, teacher lead

School 4							
Healthy Eating Events – Semester 2							
Event Title	**Date of Event**	**New Event** (did this event bec. of HPSS) **OR** **Old Event** (did this event last year)	**Who the Event Targeted** (e.g., students, staff, grade 10s)	**Description of Event**	**Approximately how many people participated?** (# of students, # of staff, etc.)	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
School Fruit & Vegetable Nutritional Program	Once every 2 to 3 weeks	New event	Whole school	Exposing students to different fruits and vegetables in hopes that they continue eating more healthy	Entire school	Yes, it is on going	Yes, BC Agriculture in the Classroom
Smoothie Drinks	Sold in school store on specific days of the week	New event	Whole school	Providing healthy drink alternatives for students	Anyone that purchases it	Yes, it is on going, people are purchasing smoothies versus pop from the vending machines	No

School 4						
Policies – Semester 2						
Policy	**Policy Start Date**	**New Policy** (did this event bec. of HPSS) **OR** **Old Policy** (did this event last year)	**Who the Policy Targeted** (e.g., students, staff, grade 10s)	**Description of Policy**	**Was this event a success? Why or why not**	**Involve Community YES or NO - if yes how?**
Free Weight Room Club	Sept. 2011	New Policy	All students	Before school, lunch time and after school – weight room use is free for all students	Yes, students are coming to the weight room on a consistent basis during those times.	No
Water bottle policy during PE	Feb. 2012	New Policy	All PE students	Encourage/enforce water bottle usage during PE class and hopefully it carries over throughout the school day	Initial usage is up, but it is too early to tell.	No

Appendix Q

Behavioural Regulation in Exercise Questionnaire-2 (BREQ-2)

Date: _____dd _____mm _____yy

WHY DO YOU ENGAGE IN PHYSICAL ACTIVITY?

We are interested in the reasons underlying peoples' decisions to engage, or not engage in physical activity. Using the scale below, please indicate to what extent each of the following items is true for you. Please note that there are no right or wrong answers and no trick questions. We simply want to know how you personally feel about physical activity. Your responses will be held in confidence and only used for our research purposes.

	Not true for me		**Sometimes true for me**		**Very true for me**
1. I participate in physical activity because other people say I should	0	1	2	3	4
2. I feel guilty when I don't participate in physical activity	0	1	2	3	4
3. I value the benefits of physical activity	0	1	2	3	4
4. I participate in physical activity because it's fun	0	1	2	3	4
5. I don't see why I should have to participate in physical activity	0	1	2	3	4
6. I take part in physical activity because my friends/family say I should	0	1	2	3	4
7. I feel ashamed when I miss a physical activity session	0	1	2	3	4
8. It's important to me to participate regularly in physical activity	0	1	2	3	4

	Not true for me		Sometimes true for me		Very true for me
9. I can't see why I should bother participating in physical activity	0	1	2	3	4
10. I enjoy participating in physical activity	0	1	2	3	4
11. I participate in physical activity because others will others will not be pleased with me if I don't	0	1	2	3	4
12. I don't see the point in participating in physical activity	0	1	2	3	4
13. I feel like a failure when I haven't participated in physical activity in a while	0	1	2	3	4
14. I think it is important to make the effort to participate in physical activity regularly	0	1	2	3	4
15. I find physical activity pleasurable	0	1	2	3	4
16. I feel under pressure from my friends/family to participate in physical activity	0	1	2	3	4
17. I get restless if I don't participate in physical activity regularly	0	1	2	3	4
18. I get pleasure and satisfaction from participating in physical activity	0	1	2	3	4
19. I think participating in physical activity is a waste of my time	0	1	2	3	4

Thank you for taking part in our research

Appendix R

Healthy Eating Motivation Scale (HEMS)

Date: _____dd _____mm _____yy

We are interested in your experiences with **HEALTHY EATING**. Eating healthy refers to eating foods that contribute to good health, like fruits and vegetables, whole grain breads and rice and low fat meats, fish, and dairy. Eating healthy also means **not** eating too many foods with empty calories and lots of chemicals, such as sugar-sweetened beverages (e.g., pop, energy drinks) and processed foods (e.g., pepperoni). Please keep in mind, for this survey the term 'healthy eating' refers to **both** foods and beverages.

Using the scale below, please indicate by circling, to what extent each of the following statements is true for you. Please only circle **one** answer.

Remember: There are no right or wrong answers and no trick questions. We simply want to know how you personally feel about **HEALTHY EATING**. Please answer all the questions as honestly and accurately as you can – this is very important.

	Strongly Disagree			Neutral			Strongly Agree
1. I eat healthy because I feel better when I do	1	2	3	4	5	6	7
2. I don't see the point of eating healthy foods	1	2	3	4	5	6	7
3. I eat healthy because it's good for me	1	2	3	4	5	6	7
4. I don't see why I have to eat healthy	1	2	3	4	5	6	7
5. I eat healthy so others won't be disappointed in me	1	2	3	4	5	6	7
6. I eat healthy for the pleasure of eating food that is good for me	1	2	3	4	5	6	7
7. Eating healthy is a waste of my time	1	2	3	4	5	6	7
8. I don't see what I am getting out of eating healthy	1	2	3	4	5	6	7
9. I do my best to eat healthy foods so others will like me	1	2	3	4	5	6	7

	Strongly Disagree			Neutral			Strongly Agree
10. I enjoy seeing my own improvement in my eating habits	1	2	3	4	5	6	7
11. I eat healthy but I don't see the purpose	1	2	3	4	5	6	7
12. I eat healthy so other people don't judge my eating habits	1	2	3	4	5	6	7
13. I eat healthy because it is important to me	1	2	3	4	5	6	7
14. I have no desire to eat healthy foods	1	2	3	4	5	6	7
15. I enjoy eating healthy foods	1	2	3	4	5	6	7
16. I eat healthy because I value my health	1	2	3	4	5	6	7
17. I try hard to eat healthy so others won't be disappointed in me	1	2	3	4	5	6	7

Thank You For Participating!

Appendix S

Healthy Eating Motivation Scale Items and Corresponding Factor Loadings

Items	Factor 1: Intrinsic Motivation	Factor 2: Extrinsic Motivation	Factor 3: Amotivation
I eat healthy because I feel better when I do	.82		
I don't see the point of eating healthy foods			.76
I eat healthy because it's good for me	.79		
I don't see why I have to eat healthy			.82
I eat healthy so others won't be disappointed in me		.78	
I eat healthy for the pleasure of eating food that is good for me	.82		
Eating healthy is a waste of my time			.83
I don't see what I am getting out of eating healthy			.84
I do my best to eat healthy foods so others will like me		.78	
I enjoy seeing my own improvement in my eating habits	.76		
I eat healthy but I don't see the purpose			.71
I eat healthy so other people don't judge my eating habits		.79	
I eat healthy because it is important to me	.77		
I have no desire to eat healthy foods			.70
I enjoy eating healthy foods	.78		
I eat healthy because I value my health	.78		
I try hard to eat healthy so others won't be disappointed in me		.83	
Explained Variance	28.69%	16.03%	24.47%

Appendix T

Physical Activity Motivation Scale (PAMS)

Date: _____dd _____mm _____yy
We are interested in your experiences participating in **Physical Activity (PA)**. This includes any type of body movement including activities like walking, jogging, skipping, climbing, and other activities such as sports or dance.
Using the scale below, please indicate by circling, to what extent each of the following statements is true for you. Please only circle **<u>one</u>** answer.
Remember: There are no right or wrong answers and no trick questions. We simply want to know how you personally feel about **PA**. Please answer all the questions as honestly and accurately as you can – this is very important.

	When I participate in PA…	Strongly Disagree			Neutral			Strongly Agree
1.	…I participate because I have to	1	2	3	4	5	6	7
2.	…I am good at the things I do	1	2	3	4	5	6	7
3.	…other people seem to like me	1	2	3	4	5	6	7
4.	…I participate because I want to rather than because I feel like I have too	1	2	3	4	5	6	7
5.	…I feel a sense of accomplishment	1	2	3	4	5	6	7
6.	…I enjoy the time I spend with the other people participating	1	2	3	4	5	6	7
7.	…I can choose which activities I want to participate in	1	2	3	4	5	6	7
8.	…I am able to perform well	1	2	3	4	5	6	7
9.	…I really like the people I am with	1	2	3	4	5	6	7
10.	…I make a lot of my own decisions	1	2	3	4	5	6	7

	When I participate in PA…	Strongly Disagree			Neutral			Strongly Agree
11.	…I feel skilled	1	2	3	4	5	6	7
12.	…I feel that others accept me	1	2	3	4	5	6	7
13.	…I can choose who I participate with	1	2	3	4	5	6	7
14.	…I understand how to participate	1	2	3	4	5	6	7
15.	…I pretty much keep to myself	1	2	3	4	5	6	7
16.	…I have input in which activities I want to participate in	1	2	3	4	5	6	7
17.	…I feel like a capable person	1	2	3	4	5	6	7
18.	…I feel connected to the other people participating	1	2	3	4	5	6	7
19.	…I am doing what I want	1	2	3	4	5	6	7
20.	…I am confident in my ability	1	2	3	4	5	6	7

Thank You For Participating!

Appendix U

Physical Education Teacher Teaching Experience

School	Teacher	Teaching Experience	Experience Teaching PE	Experience Teaching PE 10	Years Teaching PE 10 at Participant School
School 1	Female Teacher 1	17 years	17 years	14 years	17 years
	Male Teacher 1	4 years	3 years	3 years	3 years
School 2	Male Teacher 1	8 years	7 years	4 years	2 years
	Male Teacher 2	15 years	15 years	10 years	5 years
	Male Teacher 3	4 years	2 years	1 year	1 year
School 3	Female Teacher 1	20 years	20 years	8 years	8 years
	Female Teacher 2	15 years	15 years	15 years	5 years
	Female Teacher 3	16 years	16 years	16 years	16 years
School 4	Female Teacher 1	9 years	6 years	6 years	5 years
	Male Teacher 1	5 years	3 years	2 years	2 years
	Male Teacher 2	12 years	7 years	6 years	5 years
	Male Teacher 3	14 years	3 years	5 years	3 years
	Male Teacher 4	11 years	4 years	3 years	2 years
School 5	Female Teacher 1	13 years	13 years	10 years	10 years
	Male Teacher 1	5 years	5 years	5 years	5 years
Mean		11.2 years	9.1 years	7.2 years	5.9 years

Appendix V

Physical Education Motivation Scale (PEMS)

We are interested in your experiences in **physical education (PE)** class. We would like to know about your experiences in your current PE class. OR, if you are just starting a new PE class (i.e., start of a semester), please think back to your experiences during the last (most recent) PE class you participated in.

Using the scale below, please indicate by circling (from 'Strongly Disagree' to 'Strongly Agree') to what extent each of the following statements are true for you. Please only circle **one** answer.

Remember: There are no right or wrong answers and no trick questions. We simply want to know how you personally feel about **PE**. Please answer all the questions as honestly and accurately as you can – this is very important.

	Strongly Disagree			Neutral			Strongly Agree
1. I try to do well in PE so my teacher will think I am a good student	1	2	3	4	5	6	7
2. I participate in PE because it's fun	1	2	3	4	5	6	7
3. I don't see the point in participating in PE	1	2	3	4	5	6	7
4. I participate in PE because that is what I have to do	1	2	3	4	5	6	7
5. I participate in PE because it's interesting	1	2	3	4	5	6	7
6. I don't see why I have to take PE	1	2	3	4	5	6	7
7. I participate in PE so others won't be disappointed in me	1	2	3	4	5	6	7
8. I find PE enjoyable	1	2	3	4	5	6	7
9. I try to do as little as possible in PE	1	2	3	4	5	6	7
10. I feel pressure to participate in PE	1	2	3	4	5	6	7
11. I participate in PE for the pleasure of learning new skills	1	2	3	4	5	6	7

	Strongly Disagree			Neutral			Strongly Agree
12. PE is a waste of my time	1	2	3	4	5	6	7
13. I try hard in PE because I want a good grade	1	2	3	4	5	6	7
14. I participate in PE because I have to	1	2	3	4	5	6	7
15. I can't see what I am getting out of PE	1	2	3	4	5	6	7
16. I do my best so my PE teacher will like me	1	2	3	4	5	6	7
17. I enjoy seeing my own improvement in PE	1	2	3	4	5	6	7
18. I participate in PE but I don't see the purpose	1	2	3	4	5	6	7
19. I do my best in PE so my classmates will like me	1	2	3	4	5	6	7
20. Being with other students in PE is enjoyable	1	2	3	4	5	6	7
21. I have no desire to participate in PE	1	2	3	4	5	6	7
22. I want my classmates to see how good I am in PE	1	2	3	4	5	6	7
23. I enjoy interacting with my PE teacher	1	2	3	4	5	6	7
24. I put forth no effort during PE	1	2	3	4	5	6	7
25. I want others to see me as physically fit in PE	1	2	3	4	5	6	7
26. I enjoy working with the other students in PE	1	2	3	4	5	6	7
27. I try hard in PE so others won't be disappointed in me	1	2	3	4	5	6	7

Appendix W

The Physical Education – Autonomy, Relatedness, Competence Scale (PE-ARCS)

Date: _____dd _____mm _____yy

We are interested in your experiences in **PHYSICAL EDUCATION (PE)** class. We would like to know about your experiences in your current PE class. OR, if you are just starting a new PE class (i.e., start of a semester), please think back to your experiences during the last (most recent) PE class you participated in.

Using the scale below, please indicate by circling to what extent (from 'Strongly Disagree' to 'Strongly Agree') each of the following statements are true for you. Please only circle **one** answer.

Remember: There are no right or wrong answers and no trick questions. We simply want to know how you personally feel about **PE**. Please answer all the questions as honestly and accurately as you can – this is very important.

When I am in PE…	Strongly Disagree			Neutral			Strongly Agree
1. … I am good at the things we do	1	2	3	4	5	6	7
2. … my classmates seem to like me	1	2	3	4	5	6	7
3. … I enjoy the time I spend with my classmates	1	2	3	4	5	6	7
4. … I can choose which activities I want to practice	1	2	3	4	5	6	7
5. … I am able to perform well	1	2	3	4	5	6	7
6. … I really like the people I am with	1	2	3	4	5	6	7
7. … I feel skilled	1	2	3	4	5	6	7
8. … I feel that my classmates accept me	1	2	3	4	5	6	7
9. … I can choose which students I participate with	1	2	3	4	5	6	7

10. … I have input in which skills I want to practice	1	2	3	4	5	6	7
11. … I feel like a capable person	1	2	3	4	5	6	7
12. … I feel connected to my classmates	1	2	3	4	5	6	7
13. … I am doing the activities I want	1	2	3	4	5	6	7
14. … I am confident in my ability to learn	1	2	3	4	5	6	7

Appendix X

Physical Education – Autonomy, Relatedness, Competence Items and Corresponding Factor Loadings

Items	Factor 1: Autonomy	Factor 2: Relatedness	Factor 3: Competence
… I am good at the things we do			.82
… my classmates seem to like me		.76	
… I enjoy the time I spend with my classmates		.77	
… I can choose which activities I want to practice	.78		
… I am able to perform well			.81
… I really like the people I am with		.82	
… I feel skilled			.85
… I feel that my classmates accept me		.79	
… I can choose which students I participate with	.59		
… I have input in which skills I want to practice	.75		
… I feel like a capable person			.76
… I feel connected to my classmates		.78	
… I am doing the activities I want	.72		
… I am confident in my ability to learn			.71
Explained Variance (%)	16.36	25.49	25.59

Appendix Y

Enrolment Information Sheet Provided to Participant Schools

School Name					
2011/2012 School Year					
Total # of **grade 11's** at your school	Total # of **grade 11 boys** at your school	Total # of **grade 11 girls** at your school	**Total** # of grade **11's** enrolled in elective PE	Total # of **grade 11 boys** enrolled in elective PE	Total # of **grade 11 girls** enrolled in elective PE

School Name					
2012/2013 School Year					
Total # of **grade 11's** at your school	Total # of **grade 11 boys** at your school	Total # of **grade 11 girls** at your school	**Total** # of grade **11's** enrolled in elective PE	Total # of **grade 11 boys** enrolled in elective PE	Total # of **grade 11 girls** enrolled in elective PE

Appendix Z

Description of Promotion of Enrolment in Grade 11 Elective Physical Education Programs by School

	Description of Grade 11 Elective PE Promotion
School 1	▪ Encouraged students to continue with PE in grade 11 throughout the course/year*
School 2	▪ Talked to students about all the available grade 11PE classes during class time. ▪ Senior PE teachers came in to grade 10 PE classes and gave a presentation to students about senior elective classes to promote their course and explain the course to the students. ▪ Senior PE teachers came in before course selection and let PE 10 students know about courses offered.
School 3	▪ Throughout the course mention when PE 11 student going to do special activities off school grounds ▪ Go through senior PE courses just before course selections ▪ Suggest PE courses to students we think they would enjoy
School 4	▪ PE department head went into all the Planning 10 classes and the PE 10 classes about taking PE 11 next year. ▪ Leadership 10 PE class went on the Sr. cross-country field trip to give them a taste of field trips in PE 11.
School 5	▪ Continually promoted grade 11 PE throughout the grade 10 PE course ▪ Promoted the continuation of the Women's Active Living class to the grade 10 female students**

* Grade 10 physical education course was combined with grade 11 and grade 12 physical education courses – grade 10 -12 students were all in the same physical education class.
** Women's Active Living is a female only physical education class that was comprised of grade 10 – 12 female students

Appendix AA

Enrolment Rates By School and Condition

Enrolment in Grade 11 Elective Physical Education in Intervention Schools and Percent Change from 2011/2012 to 2012/2013

School	2011/2012 School Year			2012/2013 School Year			% Change		
	Total (%)	Females (%)	Males (%)	Total (%)	Females (%)	Males (%)	Total	Females	Males
School 1	30/66 (45.4)	7/29 (24.1)	23/37 (62.2)	32/55 (58.2)	14/28 (50.0)	18/27 (66.7)	+12.8%	+25.9%	+4.5%
School 2	157/306 (51.3)	65/149 (43.6)	92/157 (58.6)	163/303 (53.8)	70/153 (45.7)	93/150 (62.0)	+2.5%	+2.1%	+3.4%
School 3	169/284 (59.5)	67/141 (47.5)	102/143 (71.3)	175/268 (65.3)	80/140 (57.8)	92/128 (71.9)	+5.8%	+10.3%	+.70%
School 4	82/258 (31.7)	10/113 (8.8)	72/145 (49.6)	101/245 (41.2)	20/108 (18.5)	81/137 (59.1)	+9.5%	+9.7%	+9.5%
School 5	47/161 (29.2)	17/74 (22.9)	29/87 (33.3)	65/178 (36.5)	31/89 (34.8)	34/89 (38.2)	+7.3	+11.9	+4.9
Total (%)	485/1075 (45.1)	166/506 (32.8)	318/569 (55.9)	536/1049 (51.1)	215/518 (41.5)	318/531 (59.9)	+6.0%	+8.7%	+4.0%

Note. This table represents the whole student population at each school; even students who did not volunteer to participate in the study.

Enrolment in Grade 11 Elective Physical Education in Usual Practice Schools and Percent Change from 2011/2012 to 2012/2013

School	2011/2012 School Year			2012/2013 School Year			% Change		
	Total (%)	Females (%)	Males (%)	Total (%)	Females (%)	Males (%)	Total	Females	Males
School 6	70/164 (42.6)	33/98 (33.6)	37/66 (56.1)	72/145 (49.6)	26/81 (32.1)	46/64 (71.8)	+7.0	-1.5	+15.7
School 7	30/43 (69.8)	11/24 (45.8)	19/19 (100.0)	22/44 (50.0)	8/18 (44.4)	14/26 (53.8)	-19.8	-1.4	-46.2
School 8	96/199 (48.2)	35/94 (37.2)	61/105 (58.1)	145/231 (62.8)	42/109 (38.5)	103/122 (84.4)	+14.6	+1.3	+21.6
School 9	167/331 (50.4)	63/163 (38.6)	104/168 (61.9)	181/314 (57.6)	63/132 (47.7)	118/182 (64.8)	+8.4	+9.1	+2.9
School 10	102/219 (46.6)	39/107 (36.5)	63/112 (56.3)	137/263 (52.1)	40/130 (30.8)	97/133 (72.9)	+26.3	-5.7	+16.6
Total (%)	465/956 (48.6)	181/486 (37.2)	284/470 (60.4)	557/997 (55.9)	179/470 (38.1)	378/527 (71.7)	+7.3	+0.9	+11.3

Note. This table represents the whole student population at each school; even students who did not volunteer to participate in the study

HPSS Participants Enrolled in Grade 11 Elective Physical Education in 2012/2013 in Intervention Schools

	Enrolment in 2012/2013 School Year		
	Total n (%)	Females n (%)	Males n (%)
School 1	20/31 (64.5)	8/12 (66.7)	12/19 (63.2)
School 2	43/96 (44.7)	20/47 (42.5)	23/49 (46.9)
School 3	30/51 (58.8)	20/34 (58.8)	10/17 (58.8)
School 4	6/24 (25.0)	6/22 (27.3)	0/2 (0.0)
School 5	14/21 (66.7)	5/11 (45.5)	9/10 (90.0)
Total	113/223 (50.6)	59/126 (46.8)	54/97 (55.7)

Note. This table represents participants who consented for the study at baseline.

HPSS Participants Enrolled in Grade 11 Elective Physical Education in 2012/2013 in Usual Practice Schools

School	Enrolment in 2012/2013 School Year		
	Total n (%)	Females n (%)	Males n (%)
School 6	21/42 (50.0)	6/22 (27.3)	15/20 (75.0%)
School 7	7/15 (46.7)	3/7 (42.8%)	4/8 (50%)
School 8	10/39 (26.6)	3/20 (15.0)	7/19 (36.8)
School 9	26/56 (46.4)	5/21 (23.8)	21/35 (60.0)
School 10	36/57 (63.2)	11/26 (42.3)	25/31 (80.1)
Total	100/209 (47.8)	28/96 (29.2)	72/113 (63.7)

Note. This table represents participants who consented for the study at baseline