

Reading Into Physical Activity: Exploring Relationships Between Health Literacy and Physical  
Activity In The Community

Study 1: Health Literacy, Physical Activity & The Theory of Planned Behaviour  
Study 2: Creating an Active Community Using Collaborative Action Research Methods

By

Kai H. Bellows Riecken  
BA, University of Victoria, 2004

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

DOCTOR OF PHILOSOPHY

School of Exercise Science, Physical and Health Education

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## **Supervisory Committee**

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## Abstract

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The focus of this research relates to physical activity (PA) among populations at risk for inactivity. Two studies were completed. Study 1 was an exploratory study examining the relationship between health literacy (HL) and PA as they relate to the Theory of Planned Behaviour (TPB) constructs. Study 2 was an action research-based project in partnership with the staff and students of an alternative school.

In Study 1 participants (N=65) completed measurements including the REALM to assess HL, and accelerometers to establish PA levels. The results of this study showed that even after controlling for covariates HL and PA are significantly linked ( $r = 0.37, p < 0.01$ ), however, the TPB constructs were not found to mediate this relationship. However, Perceived Behavioural Control ( $r = 0.29, p < 0.05$ ) and Intention to Exercise ( $r = 0.29, p < 0.05$ ) were significantly linked to HL. Of particular interest, Difficulty Reading was cited as a significant barrier to PA for those with lower levels of HL ( $r = 0.37, p < 0.01$ ). Finally, HL was found to be a significant moderator of the Education-PA relationship.

Study 2 contained two components. First, focus groups with community partner organization (CPO) members to establish issues of relevance to them related to PA, to gather suggestions for incorporating PA into CPO programs, to gain an understanding of the barriers experienced by the community members, and to receive input regarding their current feelings and knowledge surrounding PA. Second, a process evaluation was conducted with administration to gauge how the CPO had progressed over the first academic year, using the TRACE process evaluation tool.

The findings from the focus groups were organized by socio ecological level into PA facilitators and inhibitors, and were used to plan a new PA program for the school year. A repeated measures survey and process evaluation tool were used to assess these program objectives for the initial year. Perceived HL scores increased from baseline ( $M = 20.71, SD = 4.29$ ) to follow-up ( $M = 22.58, SD = 5.15$ );  $t(-2.44), p < 0.05$ , as did perceived understanding of the importance of PA from September ( $M = 4.46, SD = 1.60$ ) to June ( $M = 5.54, SD = 1.67$ );

$t(-3.06)$ ,  $p < 0.01$ . There was an increase in total minutes of MVPA among students as well, although this trend merely approached significance, from September ( $M = 526.60$ ,  $SD = 557.63$ ) to June ( $M=817.0$ ,  $SD = 674.69$ ),  $t(-1.97)$ ,  $p = 0.06$ . The evaluation tool revealed that the community was “Half Way There”, and identified areas where improvements could be made.

These findings are relevant to creating equitable and comprehensive promotion and education of physical activity in the future and to understanding the mechanisms involved in PA disparities. These findings also support the need for health promoters and researchers to work with communities known to be at risk for low HL, and using action research methods to create locally relevant program development and research.

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## Dedication

To Theo who kept me sane and grounded throughout this process; and who surely felt with me every bump, every glory, every tear, and every accomplishment I did. School may have taught me about research and academia; you have taught me about the optimism and joy of life.

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## CHAPTER 1. INTRODUCTION

This dissertation explores concepts of physical activity (PA), health literacy (HL), and action research as important facets of health promotion and healthy populations. Two studies were conducted to gain an in depth understanding of these health concepts and methods. First, a quantitative study was explored examined potential relationships between HL and PA in young adults. Second, a mixed methods, action research based study working with a community at risk for low HL to develop a PA program was completed. A high level overview of key concepts will first be introduced here in Chapter One to provide a basic foundation of information before moving on to the detailed information provided in Chapter Two.

The benefits of regular physical activity (PA) are well documented. Incorporating daily PA into one's life reduces chances of disease and early mortality and can be beneficial to other components of physical (Warburton, Charlesworth, Ivey, Nettlefold, & Bredin, 2011) and psychological wellbeing (Public Health Agency of Canada, 2003). However, approximately 85% of Canadians are not active enough to experience health benefits (Colley, et al., 2010), based on the Canadian national recommendation of 150 minutes of moderate-vigorous activity per week. Factors such as age, gender, and socio-economic status have been associated with influencing PA levels and should be considered in the health promotion realm (CFLRI, 2004).

Due to these known benefits, a great number of health promotion resources and research are related to increasing involvement and knowledge of the benefits of engaging in PA. In Canada a national physical activity guide outlines the importance of PA as well as tools and tips for incorporating PA into one's daily life (Health Canada, 2011). Although 54% of Canadian adults are aware that PA guidelines of some sort exist, only 37% of Canadians know of the Canada Physical Activity Guide (CPAG) (CFLRI, 2004). Those individuals who are aware of

the PA guidelines are more likely to have high incomes and higher levels of education than those who are not aware that guidelines exist. Similarly, the 41% of Canadians who report having received or having access to PA guidelines and information tend to have higher incomes and educations. Interestingly, women are more likely than men to have heard of PA guidelines, but are less likely to be active. Finally, even when people are aware of PA guidelines, such awareness does not translate into them being significantly more active. These data from the Canadian Fitness and Lifestyle Research Institute (2004) highlight the disparity in PA levels and a disconnect between health promotion materials and their effectiveness within the greater community. Steps to make PA health promotion more effective and equitable, and to address this disconnect between PA promotion and PA behaviour, are required in order to follow our current understanding of what health promotion entails.

Consider that the Ottawa Charter (WHO, 1986) states that:

Health promotion is the process of enabling people to increase control over and to improve their health...Health is therefore seen as a resource for everyday life...Health promotion action aims at reducing differences in current health status and ensuring equal opportunities and resources to enable all people to achieve their fullest health potential (WHO, 1986, p. 1).

In relation to the Ottawa Charter and health promotion, Saan and Wise (2011) state that “people cannot achieve their fullest health potential unless they are able to take control of those things which determine their health...this includes a secure foundation in a supportive environment, access to information, life skills and opportunities for making healthy choices” (p. 189). If health promotion is indeed about helping people make healthy choices, can we consider our current PA

health promotion effective at advocating and enabling when only some of the population seems to be accessing, understanding, or translating this messaging into practice?

If health promotion is indeed about enabling and empowering individuals and populations to take a proactive role in their own health, then the parallels to health literacy (HL) are clear. Health literacy has been defined in various ways. The U.S. Institute of Medicine and Healthy People 2010 defines HL as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Institute of Medicine, 2004, p. 4). The Canadian Council on Learning (CCL) (2008) states that HL reflects the skills that enable one’s access, understanding, communication and use of information for health (2008). Canadians Rootman and Gordon-El-Bihbety (2008) define HL as “the ability to access, understand, evaluate and communicate information in a way to promote, maintain and improve health in a variety of settings across the life-course” (p.11). These conceptualizations of HL address the central concepts of one’s ability not only to and comprehend health information, but to integrate and utilize this information in a meaningful way. These are skills needed in the processing of information and the formation of attitudes about health behaviour, which many people lack. Critical HL is related to empowerment of individuals and communities, and the development of their capacities to deal with health related scenarios in daily life (Nutbeam, 2008). This is crucial to ensure that health is about capabilities rather than compliance (Kickbusch, 2001).

Clearly there is overlap between these concepts of health promotion and HL, given the focus of each on empowerment and enabling personal control over health choices. However, more than half of Canadian adults do not have the necessary skills to properly manage health-related issues, which is of concern given that individuals with low levels of HL are 2.5 times

more likely to report poor or fair health than their high HL counterparts (CCL, 2007). Only 46% of Canadian adults and 36% of American adults possess a HL level of 3-5 (functionally adequate) on a scale of 1-5. The greatest proportion of adults fall into level 2, that, is only possessing skills to deal with simple material and uncomplicated tasks, while levels 3 and above are considered adequate levels for functioning in daily situations (CCL, 2008). Approximately 35% of Canadian adults and 38.6% of American adults have only a marginal level of HL, and while they are able to manage clear and simple tasks, but may struggle with more complex information (CCL, 2007a; 2007b). At greatest risk of low HL skills are seniors; the HL decline begins in early adulthood and continues to fall into old age. Other groups at risk for lower levels of HL include immigrants and the unemployed (CCL, 2007), those with lower income levels (CCL, 2008; Wolf et al., 2007), those with less education (TenHave et al., 1997; Wolf et al., 2007), and people with limited community connections (CCL, 2008).

Further exacerbating the HL issue is the readability of health material accessible to the public. Research has shown that much of the health promotion and health education material disseminated to the public is produced at too high a reading level to be accessible for many people. Health promotion material is often produced at or above a 9<sup>th</sup> grade reading level (Dollahite, Thompson, & McNew, 1996; Greenfield et al., 2005; Jackson et al., 1991; Neuhauser, Rothschild, & Rodriguez, 2007), despite the fact that a majority of Canadian adults possess a level 2, or 8<sup>th</sup> grade, level of HL (CCL, 2007b). A recent study revealed that most PA material in Canada is produced at a 10<sup>th</sup> grade reading level (Vallance, Taylor, & Lavalley, 2008), despite the low levels of HL reported in the general population.

These statistics help to frame “health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century” (Nutbeam,

2000, p.1). The relationship between health literacy (HL) and physical activity (PA) has potential to shed light on PA disparities and to work with specific populations to improve their understanding of and involvement in PA. One might consider the issues surrounding HL and PA to be related, not just because they are identified as public health concerns, but also because there are several HL perspectives that conceptually link HL to PA.

Rootman and Ronson (2005), for example, depict HL as falling under the umbrella of ‘general literacy’ and describe how HL and general literacy affect one’s overall health. In this framework culture and education are important determinants of literacy as well as potential avenues for action. Aging, income, personal capacity, gender, and childhood development are also considered determinants. Their model posits that literacy has both direct and indirect impacts on health outcomes. Direct influences include medication use/compliance and safety behaviours. Indirect effects include stress, work environment, income, use of services, and lifestyle factors (including PA).

Similarly, Nutbeam (2000) proposes that health promotion action creates an intermediate set of health promotion outcomes, including HL, which in turn affects modifiable determinants of health. These intermediate health outcomes, including PA, over time determine broader health and social outcomes such as morbidity, disability, and quality of life. This model is congruent with the assumption that information access and processing precedes behaviour (see Appendix A for a modified version of this conceptual map). Furthermore, this conceptual map connects many components relevant to PA research and promotion, yet, research to date has not thoroughly explored all of the components, particularly those related to HL lifestyle. Healthy living may be considered to be making positive choices to enhance personal wellness through

good nutrition, being regularly active, not smoking, and avoiding other negative health behaviours (Health Canada, 2011).

Population health issues such as these are complex. Thus, selecting research methods that will be the most effective at providing an understanding of this relatively unexplored relationship, HL and PA, while also being cognizant of community needs, issues of empowerment and application, needs to be addressed carefully. Baum states that “[p]ublic health has, then, both to *describe* and to *understand* communities. The analysis...calls for the application of both qualitative and quantitative techniques” (2006, p.15). Thus, this research extends beyond traditional, quantitative designs, to using action research and mixed methods designs may be beneficial and will be discussed in the chapters that follow.

Action research frameworks have a natural fit with mixed methods as illustrated by Green and Kreuter (1991; 2005) and allow for thorough exploration and explanation of population health queries such as: how does understanding and access to health information relate to PA? And, how can we work with community members in at risk groups to improve PA levels?

There are several health theories and models that could be helpful in addressing these queries and in explaining why some individuals are active and others are not. Social ecological models tend to look at broad social and environmental contexts as well as individual factors in relation to PA (Sallis, Cervero, Ascher, Kraft, & Kerr, 2006; Sallis & Owen, 1997; Wharf Higgins, Rickert, & Naylor, 2006) which suggests the need for a holistic understanding of this health behaviour. A framework that provides a good foundation for organizing and understanding individual health behaviours within ecological context is the PRECEDE-PROCEED Model (Green & Kreuter, 1991; 2005). This model allows examination of health

issues in terms of individuals, communities, policies and evaluation and provides a foundation for action research in order for change to be community driven. Given that this model allows research to draw on information such as surveys, interviews, and behavioural theories to examine relationships between variables at the individual level, but also demands community member involvement and voice at various stages, makes it a logical fit when using mixed methods. Thus, the present study utilized mixed methods, organized within the PRECEDE-PROCEED Model, to explore concepts of HL and PA at multiple levels from the individual to the greater community (See Appendix C). This framework allows a researcher to draw on a variety of methods and sub-theories in a very pragmatic fashion, allowing for examination of health topics using the intricacies of individual behavioural theories within broad action based research.

For example, early phases of the PRECEDE-PROCEED Model calls for understanding of epidemiological, demographic, and behavioural factors (such as attitudes and values). In order to understand PA at the individual or behavioural level social cognitive theories such as the Transtheoretical Model (Marshall & Biddle, 2001; Prochaska & Marcus, 1994; Spencer et al., 2006), Social Cognitive Theory (Bandura, 1986; Keller et al., 1999), and the Protection Motivation Theory (Milne, Sheeran, & Orbell, 2000; Rogers, 1975) can be drawn on to provide insight regarding predisposing, reinforcing and enabling factors. Another theory that is commonly used to explain behaviour is the Theory of Planned Behaviour (TPB) (Ajzen, 1991). The TPB has been widely used in PA research (Hagger, Chatisarantis, & Biddle, 2002; Symons-Downs, & Hausenblas, 2005) and may be helpful in explaining how HL and PA relate. This theory states that behaviour is determined by one's intention to engage in, and perceived behavioural control over, the given behaviour. In turn, intention is affected by one's attitudes, subjective norm, and control. See Appendix B.

Studies have confirmed that attitudes and perceived behavioural control (PBC), key constructs in the TPB, are central to understanding and predicting peoples' behaviours (Ajzen, 1991; Petty et al., 1997; Rhodes, Blanchard, & Matheson, 2005); perhaps they are also linked to HL.

Thus, the first phase of this project explored the HL-PA relationship, using the TPB. Quantitative data obtained in this first phase provided insight into the magnitude and type of relationship that exists between HL, PA and behavioural constructs at the individual level using quantitative data. However, as mentioned earlier, health needs to be considered in a broader social and environmental context. Although further understanding of the mechanisms behind personal health behaviours is very important for theory development and health education implementation, context cannot be ignored. Nutbeam (2000) discusses the relevance of understanding HL at both an individual behavioural level, as well as at a social and environmental level, so too do these levels need to be considered in PA research (Sallis et al., 2006). One might consider who which demographic groups need to be the focus of this research and within what context.

A noticeable deflection point in activity levels and obesity rates among young adults approximately aged 18-35 (Association for Canadian Studies, 2005; Nielsen et al., 2006), as well as the beginnings of a decline in HL (CCL, 2007). In addition to particular age groups being at risk for inactivity, there are several other socio-demographic factors that also appear to be associated with increased risk of inactivity and poor health status such as gender, ethnicity, income, and education. A similar trend is seen with HL, that is lower levels of income and education are associated with inadequate levels of functional HL. As noted earlier, this situation

is exacerbated by health resources that are too complicated for the majority of the general population.

Health Promotion, Health Protection, and Disease Prevention are all identified as key areas in HL research (CCL, 2007b) and all relate to lifestyle behaviours. Yet little research about HL in conjunction with PA has been conducted, and lacks voice from community members via qualitative research. Thus, additional research involving qualitative and action research methods within communities at risk for low levels of HL may be effective at addressing PA while providing opportunities for community engagement and addressing the various socio-ecological levels.

#### Statement of the Problem

Physical inactivity and low HL are national public health concerns, yet their relationship to each other is not well understood. Experts and theorists in each field identify possible links between the two topics but there is limited empirical research investigating this relationship. A great deal of HL research has been clinical and medically oriented (Rootman & Ronson, 2005), yet many of the frameworks for understanding HL include a ‘lifestyle’ component which is where physical activity resides (Nutbeam, 2000; Rootman & Ronson, 2005).

Healthy living and healthy lifestyles generally involve making positive choices that enhance personal health and wellbeing (Health Canada, 2008). Healthy living encompasses a variety of behaviours including PA. For conditions such as diabetes, cancer, CVD, and depression, research indicates that lower levels of HL are associated with poorer health and disease management (Institute of Medicine, 2002; CCL, 2008; Berkman et al., 2011). In addition, HL has been significantly linked to one’s overall perceived health independently of demographic factors (von Wagner, Knight, Steptoe, & Wardle, 2007). Health status also appears

to have a near linear relationship to health literacy level (CCL, 2007b, p. 22). Together these findings suggest that understanding the relationship between healthy living and HL is of import. Indeed, prominent HL scholars have recently called for the measurement of HL in relation to a variety of health outcomes (Paasche-Orlow & Wolf, 2010); PA is one such area.

However, HL research to date has generally focused on clinical health outcomes and settings, (Berkman et al., 2011). The vast majority of research examining healthy lifestyles and health literacy has focused on nutrition (Ammerman et al., 1992; Bell, Patel, & Malasanos, 2006; Donovan, 2005; Gonzales, Dearden, & Jimenez, 1999; Hartman et al. 1994 & 1997; Howard-Pitney et al., 1997; Kim et al., 2004; Kolasa et al., 2001; Levy et al., 2000; Macario et al., 1998; Nimmon, 2007; Rudd, Betts, & Dirkx, 1993; Struempfer & Marshall, 1999; TenHave et al., 1997; von Wagner et al., 2007; Yajima et al., 2001). Cross-sectional studies have shown a trend for lower HL and limited knowledge of nutritional information to be linked with poor nutritional outcomes such as malnourishment (Gonzales et al., 1999), increased dietary fat intake (Levy et al., 2000), and less heart healthy eating (TenHave et al., 1997). Von Wagner and colleagues (2007) found that higher HL was significantly associated with eating five servings of fruit and vegetables per day among adults. Research has also shown relationships between participants' understanding of food labels and food intake, indicating that HL may affect understanding and application of nutritional information related to dietary fats (Levy et al., 2000).

Although the nutritional studies revealed similar trends not all associations were found to be significant. Further, there is evidence of the opposite relationship: Kim et al.'s (2004) longitudinal study found that HL was not associated with self care, in that diabetes patients with limited HL adhered more to nutritional recommendations than those with adequate levels of HL (Kim et al., 2004). The authors speculate that "This may be

related to baseline diabetes education status, as more patients in the limited literacy group had previously received diabetes education. Reinforcement of previously taught behaviours may have led to greater improvement in the limited literacy group” (p. 2981).

Development of HL sensitive nutritional interventions was common, though measurement of intervention impact and HL as a variable was often not included. These interventions involved a variety of program components such as training volunteer community members to consult with and educate others in the community (Kolasa et al., 2001); outlining interactive web-based tools that allow teachers to facilitate healthy eating, HL, and weight control concepts with students in an electronic manner (Donovan, 2005); and distributing easily readable food newsletters and recipes via a food stamp system to target those living with low-income and limited HL (Struempfer & Marshall, 1999). Hands-on examples and take-home packages can effectively change overall eating patterns (Hartman et al., 1997) and literacy sensitive classes were also an effective intervention to increase nutrition knowledge, as well as attitudes and efficacy towards healthy eating (Howard-Pitney et al., 1997). Web-based interventions (Bell, Patel, & Malasanos, 2006) and physician facilitated information distribution of literacy sensitive diet information (Ammerman et al., 1992) were also shown to be effective intervention methods to improve diet practices and attitudes surrounding healthy eating.

Interventions that were described and statistically evaluated were found to be effective and showed statistically significant group differences. These studies did not directly measure HL, although one assessed general literacy (Howard-Pitney et al., 1997), however, all interventions were developed to address issues of low health literacy in nutritional contexts. These interventions were generally developed in collaboration with low-literacy populations or practitioners concerned with HL issues, or tested on populations identified previously to have

limited literacy skills, further supporting the notion that action research is beneficial. Focus groups (Macario et al., 1998; Hartman et al., 1994; Rudd, Betts, & Dirks, 1993) and photonovels (Nimmon, 2007; Macario et al., 1998) were used to draw on the voices of the community to inform research and intervention development.

In addition to highlighting intervention components and effectiveness, as well as general findings linking HL to a lifestyle behaviour, the nutritional literature highlights which populations have been included. Demographic groups have been diverse and have included adults (Von Wagner et al., 2007), students (Kolasa, 2001; Donovan, 2005), low income families (Struempfer & Marshall, 1999), and clinical populations (Ammerman et al., 1992; Kim et al., 2004).

Though this research focuses on nutrition rather than PA, it provides insight and support for the argument that HL is an important factor in healthy living. The research also helps summarize what intervention methods have been successful in regard to healthy living and HL, noting that community member involvement, cultural and literacy sensitivity, addressing attitude and efficacy, providing information through a variety of sources, and working with a population at risk for poor HL may be effective places to begin. As informative as the nutritional literature can be, this does not fill the void for research about HL and other health behaviours; there has been limited research regarding HL and PA.

Based on the literature to date we can conclude that HL and PA are both issues known to be related to population health, yet how they relate to each other is not well understood. Research is still lacking a younger and non-clinical populations, use of standardized PA measurement, and a behavioural or contextual theory to guide research and to delve deeper into the constructs effecting the HL- PA relationship. Finally, only limited participatory research

methods have been utilized within this specific subject domain. Using a framework, such as the PRECEDE-PROCEED Model to provide direction, seems warranted and would address issues of equity, empowerment, and community involvement discussed in the introduction.

Based on these gaps in the current literature the first study conducted for this dissertation examined connections between HL and PA at the individual level to better understand this relationship. Second, using the PRECEDE-PROCEED Model as a guide, a collaborative research project with a community partner organization (CPO) was done to address PA within a community at risk for low levels of HL.

The dissertation is organized as follows: the remainder of Chapter One outlines research purpose, operational definitions, research questions, and hypotheses. Chapter Two includes an overview of the literature related to these research questions and relevant to 1) HL and PA at the individual level based on the TPB, and 2) action research in relation to HL and PA; as well as the research questions, hypotheses and assumptions related to these items. Chapter Three details the methods for 1) the quantitative, exploratory study examining HL, PA and the TPB constructs, and 2) the focus groups and process evaluation from the action research component. Chapter Four presents the results of 1) HL and PA at the individual level using the TPB, and 2) action research collaboration with a community. The dissertation concludes in Chapter Five with an analytical discussion of the research findings, recommendations for future research, and implications for practice.

#### Purposes of Study 1

1. To examine the relationship of HL (independent variable), PA (dependent variable), and the TPB constructs (potential mediating variable); more specifically to examine

whether HL is an antecedent to PA behaviour mediated by the TPB constructs. See Appendix B.

2. To examine the HL-PA relationship among young adults, as an understudied population in this field, using standardized measures of HL and objective measures of PA.
3. To explore the magnitude and direction of the relationship between HL and PA literacy when socio-economic and demographic variables are considered.
4. To make personal connections with a community group concerned about low health literacy and PA in order to establish relationships for Study 2.

#### Research Questions Study 1

The following research questions were addressed in study 1:

1. Is HL predictive of PA knowledge and involvement?
2. Do the components of the TPB mediate the relationship between HL and PA?
3. To what extent are HL scores related to PA levels, as measured by the REALM survey and ActiGraph accelerometer, respectively?

#### Hypotheses Study 1

1. Participants in lower HL levels will have less knowledge of PA.
2. The relationship between health literacy and PA will be mediated by the TPB constructs, particularly attitude and PBC.
3. Participants with lower levels of HL will be less active.

#### Assumptions Study 1

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

2. The REALM is predictive of HL.
3. The accelerometer instructions will be followed and the accelerometer worn correctly.

#### Limitations Study 1

1. This study used a cross-sectional design which precludes establishing a cause and effect relationship between the variables.
2. The REALM assesses only one's ability to read health terms, thus additional questions will be posed to examine other components (such as ability to utilize and understand information). However, no standardized tool currently exists so these questions were developed based on existing literature and with the help of a supervisory committee member. The REALM was the standardized HL instrument used and the additional physical activity appraisal questions were not standardized.
3. The researcher read the questions aloud to participants as well as provided a written copy that had been tested for readability by myself using the SMOG Index (MacLaughlin, 1969), however, there was the potential that low HL persons might still have had difficulty answering questions. Due to researcher presence some may have responded in a socially desirable way.
4. Data were not analyzed to compare results between genders. This may be of potential interest for future research given that women are more likely to have higher HL scores and men to be more active.
5. Accelerometers are known to have several limitations including: underestimation of activity in some people who engage in non-ambulatory motions; the device is not sensitive to load bearing activity (such as weight lifting); the device requires calibration for accuracy of measurement; the assumption is made that participants wear the accelerometer as

instructed; in instances where a participant slept in the device and provided no logged information a subjective decision is made about when the day ‘ended’; and the device may act as a motivator to be active in the initial day, particularly in children.

#### Delimitations Study 1

1. The sample included only adults between the ages of 18-35 years of age.
2. The sample was limited to residents of Greater Victoria and Duncan, BC.
3. Given the nature of the questionnaire, the sample was restricted to those who speak English fluently.

#### Operational Definitions Study 1

1. **Health Literacy:** the ability to access, understand, and use health information (CCL, 2007).  
Health literacy is measured here based on the categories of the REALM instrument and the scores on additional questions developed as an appraisal of HL as it relates to knowledge, access, and utilization of PA material. These two survey instruments will be discussed in greater detail in the methods section.
2. **Physical Activity:** exercise behaviours of low, moderate, and vigorous intensity completed in bouts of 10 minutes or greater accumulated daily as indicated by accelerometer output. Those considered to be physically active are those who completed 150 minutes of moderate to vigorous physical activity (MVPA) per week as specified under the Center for Disease Control and Health Canada Guidelines. Those who completed 150 minutes of MVPA were considered to be active, those who did not were considered to be inactive.

## Purpose Study 2

The community partner organization (CPO) members and context are discussed at length in the methods section. According to action research principles that identification of key problems and research direction should be generated by community members (Israel et al., 1998; Creswell, 2008). The following paragraphs reflect information shared by my contact in the community group to provide direction to this project.

The issue identified at the time of Study 2 commencement was a PA regulation mandated by the Ministry of Education that stipulated that all students must complete 150 minutes of PA per week (2009, see Appendix, F). However, the CPO serves a population of adult/alternative learners in a unique learning environment where there is little understanding of PA/health at the centre, and limited resources to implement any PA program changes. The intention of the project was to engage all students in a daily physical activity (DPA) program to try to meet the new Ministry of Education guidelines. At the time of the study, drug use and smoking and a general disinterest and lack of involvement in health and PA at school among students were noted as concern by the CPO administrator. The CPO administration wanted to increase involvement of students in PA, as well as awareness of and support for PA among teachers. The CPO administration acknowledged that the input of students and teachers was critical to creating a solid and successful new PA program. Based on this statement of intent, the goals of this collaborative research endeavor were:

1. To speak directly with community members at the alternative education centre to better understand their perspectives of access to and barriers inhibiting PA in order to address these in the new program.

2. To give members of this community an opportunity, via focus groups, to provide input into the development of a PA program.
3. To work with the community to establish a direction and resources for their new PA program based on the focus group findings and using the PRECEDE-PROCEED Model as a guiding framework.
4. To conduct a process evaluation to gauge progress over the first year by administering a baseline and follow-up questionnaire, and a community specific process evaluation tool.

#### Research Questions Study 2

1. How can the CPO become an active community? Specifically,
  - a. how can the new PA guidelines and programs be implemented to best suit the needs of the CPO community members?
  - b. what barriers to PA do CPO students and staff experience (individual, social, and community wide)?
2. What was the implementation experience during the initial year, including identifying strengths and areas to improve in future program planning?
3. Does the new program influence PA and TPB scores among students?
4. What are students' levels of access, knowledge, and understanding of PA, as measured by the International Physical Activity Questionnaire (IPAQ) and likert scale questions related to the TPB and HL, at the beginning and end of the first academic year?

## Hypotheses Study 2

1. Qualitative-Focus Group: no a priori propositions assumed given the exploratory nature of the research questions.
2. Process Evaluation: No statistical hypothesis has been generated as the purpose of the process evaluation is to monitor and reflect on progress of and adherence to a program's plan, rather than hypothesize an outcome based on data. However, we did anticipate an output of effort by the staff and administrator in terms of planning and programming initial steps for daily physical activity within the school based on focus group feedback.
3. Although the purpose of this study was not to accept or reject a hypothesis, it was anticipated that the IPAQ scores of CPO members will improve from Time 1 to Time 2 and that the TPB constructs, as related to PA, will improve from T1 to T2.
4. Similar to number three above, it was anticipated that CPO members will report higher levels on HL constructs (such as access, understanding, and evaluation) related to PA from Time 1 to Time 2.

## CHAPTER 2. LITERATURE REVIEW

The purpose of this chapter is to provide a current and comprehensive account of relevant research that has been conducted in relation to HL and PA. Literature up to and including the year 2011 has been considered in this review and comprises of pertinent studies and concepts of PA as it relates to HL and action research. In the initial section of this chapter, 2.1, the research related to relationships between HL and PA, as well as potential links of these two health variables within the constructs of the TPB, will be discussed. The latter section, 2.2, will build on these concepts with the addition of a review of the literature regarding PA as it has been examined using action research and how the concepts of PA and action research are relevant to the HL field.

### 2.1 Study 1 Literature Review *Health Literacy and Health*

According to the Canadian Council on Learning (CCL, 2007b) HL is a public health concern. Health literacy varies in the population; factors including ethnicity (Chaundry et al., 2011; Olives, Patel, Patel, Hottinger, & Miner, 2010; Wolf et al., 2007), increasing age, non-English speaking, unemployed (Olives et al., 2010; Wolf et al., 2007), low education, and low income (CCL, 2008; Downey & Zun, 2008; Wolf et al., 2007) are all associated with marginal or inadequate levels of HL. The CCL further states that there are four general areas of HL that have been investigated in the HL realm: literacy demands within the health care system, relationships between literacy and health outcomes, improving HL through systemic change or skill development, and communication skills between patients and providers. Of these four areas, the second item has received the most attention.

Literacy been found to be associated with cardiovascular disease (Gupta et al., 2005), medication use (Osborn et al.2007; Williams, Parker, Baker, Parikh, Pitkin, Coates, & Nurss, 1995), mental health outcomes, global health status, mortality (Berkman et al., 2011), breastfeeding (Kaufman, Skipper, Small, Ferry, & McGrew, 2001), diabetes, hypertension, therapy adherence, asthma, contraception, disease management, arthritis, immunization, and preventative care (CCL, 2008; Institute of Medicine, 2004). A recent systematic review of HL and health outcomes supports these findings through an analysis of ninety-six HL related studies (Berkman et al., 2011).

Other peer reviewed publications add that HL is critical in understanding health inequities and justice in health systems given that limited HL is related to poor health knowledge, chronic illness, use of health services, and overall mortality (Volandes et al., 2007); and note that the death rate of those with low literacy was twice that of those with adequate HL skills (Sudore et al., 2006). Health literacy is also associated with increased health care costs and risk of hospitalization (Baker et al., 1998, Baker, Gazmararian, & Williams, 2002), which may help to explain why a majority of the research has focused on clinical behaviours and populations. However, lifestyle behaviour should be considered a central issue in HL research based on one of the key findings of the Institute of Medicine's document *Health Literacy: A Prescription to End Confusion* which states that, "Adults with limited health literacy, as measured by reading and numeracy skills, have less knowledge of disease management and of health promoting behaviors, report poorer health status, and are less likely to use preventive services" (2002, p. 83).

Despite this acknowledgement, there is a relative paucity of research examining HL as it relates to lifestyle behaviour, in particular PA. Further, because healthy lifestyle information

tends to be heavily reliant on print media and jargon, and requires high levels of literacy to interpret (Dollahite, Thompson, & McNew, 1996; Neuhauser, Rothschild & Rodriguez, 2007), it merits consideration by HL researchers.

As discussed in the introduction, HL theorists explain HL as part of a complex pathway between health promotion efforts and health outcomes. Nutbeam (2000) identifies HL as an intermediate outcome of education, social mobilization, and advocacy, which in turn affects intermediate health outcomes (healthy lifestyle, health services, and environments), which then lead to broader health outcomes such as quality of life, disease, and mortality rates. In this model HL progresses from a functional level, where one possesses sufficient reading and writing skills to use select health material; to an interactive level, where HL involves more advanced skills and cognition in order to communicate with and be involved in the health world; and finally a level called critical health literacy, which combines advanced cognitive and social skills allowing an individual to analyze and use health information and services.

Nutbeam (2008) also suggests that HL can be considered a risk factor or an asset to health outcomes. As a risk factor HL influences health via access to health care, interaction with health systems, and self-care capability. As an asset to health, HL is viewed as an enabling factor needed to maintain control over one's health and foster empowerment, and exists as an outcome of knowledge, skills, and social advocacy.

Rootman and Ronson (2005) identify a similar pathway between social action and education, health literacy, and health outcomes; proposing that HL indirectly and directly impacts one's health capacities and behaviours. Both models identify HL as an antecedent to healthy lifestyle choices, and Nutbeam (2000) specifically identifies PA as an intermediate health outcome of HL. However, as aforementioned, the vast majority of research relating HL to

healthy lifestyles has focused on nutrition, as discussed in detail in the introduction (Ammerman et al., 1992; Bell, Patel, & Malasanos, 2006; Donovan, 2005; Gonzales, Dearden, & Jimenez, 1999; Hartman et al. 1994 & 1997; Howard-Pitney et al., 1997; Kim et al., 2004; Kolasa et al., 2001; Levy et al., 2000; Macario et al., 1998; Nimmon, 2007; Rudd, Betts, & Dirkx, 1993; Struempfer & Marshall, 1999; TenHave et al., 1997; von Wagner et al., 2007; Yajima et al., 2001). Although this is important in terms of establishing links between HL and lifestyle, such as highlighting key issues such as readability, tailoring, and capacity building; physical activity still must be considered as a component of healthy living within in the HL discourse given its known effects on health outcomes.

#### *Physical Activity Behaviour*

Physical activity is an important factor in reducing risk of mortality, chronic disease, (Warburton, Charlesworth, Ivey, Nettlefold, & Bredin, 2011) and is related to improved psychological wellbeing (Public Health Agency of Canada, 2003) in terms of decreasing depression (O'Neal, Dunn, & Martinsen, 2000), anxiety (O'Connor, Raglin, & Martinsen, 2000), as well as improving body image (Hausenblas & Fallon, 2006), self-esteem (Fox, 2000), sleep (Youngstedt, 2005) and quality of life (Wedel-Vos, Schuit, Tighuis, & Kromhout, 2004). However, 85% of Canadians are not active enough to experience these health benefits (CMHS, 2010), based on the recommendation of 150 minutes of moderate-vigorous activity per week. Age, gender, and socio-economic status have been shown to influence PA levels (CFLRI, 2004). In sum, understanding PA is important in relation to public health.

Physical activity is understood by some to be a lifestyle behaviour under individual control, and this school of thought argues that PA can be examined and interpreted based on the

constructs of behavioural models such as motivation, intention, threat, self-efficacy, and attitude (Biddle & Nigg, 2000). Other researchers in the PA domain believe that behavioural theories lack in consensus and in scope (Noar & Zimmerman, 2004). They contend that PA is a facet of personal wellness that is affected by the social and environmental context in which it exists (Sallis et al., 2006; Reger-Nash et al., 2011). However, if we focus for a moment on the individual, one behavioural theory which guides our understanding of PA behaviour at the individual level is the Theory of Planned Behaviour (TPB). The TPB (Ajzen, 1991) posits that behaviour is founded on three types of beliefs: behavioural beliefs (those about likely outcomes), normative beliefs (those about the normative expectations of others), and control beliefs (those beliefs associated with factors that facilitate or impede a behaviour). These beliefs produce attitudes, subjective norms (SN), and perceived behavioural control (PBC) respectively. These three constructs predict one's intentions to engage in a given behaviour, which in turn affects behaviour itself. Although intention is the most proximal antecedent to the behaviour, PBC is also directly linked to behaviour because limits to personal control over engaging in a specific behaviour may directly impact the outcome regardless of intention.

Meta-analyses show TPB overall to be a good predictor of PA (Hagger et al., 2002; Symons-Downs & Hausenblas, 2005), for example intention and PBC can explain 21% of variance in physical activity behaviour (Symons-Downs & Hausenblas, 2005). The TPB has been used in research to explain enjoyment, barriers (Riecken, Rhodes, & Mark, in press), adherence, and interventions (Rhodes, Warburton, & Bredin, 2009), eliciting exercise beliefs (Downs & Hausenblas, 2005; French et al., 2005; Hagger, 2002; Sutton et al., 2003), and motivations for PA involvement (Bellows-Riecken, Rhodes, & Hoffert, 2008). At the core of this theory are the intention-behaviour and attitude-intention relationships, with correlations ( $r$ )

of 0.51 and 0.56 respectively (Hagger et al., 2002). The TPB has been used successfully across a wide range of populations to shed light on PA behaviour (Hagger et al., 2002; Symons-Downs & Hausenblas, 2005). For example, the TPB has recently been used to test the efficacy of game bikes (stationary exercise bikes that are used in place of a video-game console controller) for increasing affective attitude (Rhodes, Warburton, & Bredin, 2009), and to elicit beliefs pertaining to PA involvement via open ended questions (Bellows-Riecken, Mark, & Rhodes, in press).

Many of the above studies use young adults, such as university students, as participants although the model has been tested for use and applied across ages, and research has tended to be quantitative in nature. The TPB is often used to inform researchers about specific constructs related to PA or to elucidate more detail about a PA relationship, and to test PA interventions. For example, Rhodes et al. (2009) examined the use of video game bikes versus standard stationary bikes as a way to enhance PA attitudes, intentions, and adherence among young adult males. The authors concluded that increased adherence in the experimental (video game bike condition) was likely due to enhanced affective attitude, or enjoyment, related to game bike use. In addition, the TPB has been used as a heuristic tool to tease apart details of the determinants of PA, such as the key social cognitive beliefs about leisure time PA among elderly and disease populations (Lee et al., 2006). Although research using the TPB is diverse, one gap in the research is in understanding and explaining what variables precede, or determine, beliefs.

The TPB has been chosen to explore PA at the individual level, and used in my research, because of the potential links with aspects HL. Although no articles could be found that used the TPB to better understand the HL- PA relationship, the above research highlights the potential use of the TPB in studying this relationship, given that it is an established model in PA research and

serves as a useful framework to augment and extend existing research efforts. Furthermore, HL relates to the TPB in two possible ways. The first relationship between HL and PA behaviour under the TPB is via attitude formation. Attitudes are important in predicting PA behaviour and intention, and attitudes have been identified as a component of health literacy (Nutbeam, 2000; Appendix A). Yet attitudes are affected by information processing. In turn, information processing is dependent on ability to access, evaluate, and integrate information; and HL encompasses skills related to accessing, understanding and utilizing information related to a specific health topic (much as self-efficacy is topic specific). Second, HL may affect perceived behavioural control (PBC). Perceived behavioural control is an important TPB construct in predicting behaviour and relates to issues of self-efficacy and controllability in relation to ability to engage in a specific behaviour. Health literacy may be an avenue to empower people, as well as to increase their capacity to access, evaluate, and use health material thus increasing their perceived control over the behaviour (Ajzen, 2002; see Appendix B).

“Attitudes are commonly viewed as summary evaluations of objects (e.g., oneself, other people, issues, etc.) along dimensions from positive to negative” (Petty et. al., 1997, p. 611). Attitudes are pieces of information integrated into a single representation of our values and beliefs ascribed to something. Attitudes can be implicit (e.g., attitudes which are created and integrated unintentionally) or explicit (e.g., conscious formation of attitudes), but are generally a product of information processing (Betsch et al., 2006). Information is obtained through active evaluation of, or passive exposure to, an issue or thing. This information, and the feelings associated with it, are then entered into memory, and finally integrated with other information and evaluated to form a summative attitude (Betsch et. al., 2006; Petty et. al., 1997). This process assumes high levels of cognition and the ability to process relevant information. In other

words, social cognitive models, and more specifically constructs such as attitude, assume that a base-level of cognitive processing is present. This may indicate that additional constructs precede attitude and are not included in current behavioural models.

Information processing can be a conscious and deliberate act to reach a specific outcome or can be spontaneous in nature without a specific end goal. Either way information processing involves “several stages of judgment-relevant activity: comprehension, retrieval, inference and response generation” (Wyer, 2006, p. 185). Knowledge and the ability to make inferences about validity of the information and evaluation of information are central mechanisms in information processing: “[h]aving this information base may provide both motivation and ability to defend one’s view” (Petty et al., 1997, p. 618). Thus, possessing both the information and the ability to critically analyze information is an antecedent to forming attitudes, which in turn are critical in influencing behaviour. This presents a potential issue for behavioural research and a possible explanation for the disparity seen in health behaviours such as PA.

For example, attitudes have been shown to be the key predictor of PA intentions (Symons Downs & Hausenblas, 2005), particularly affective attitudes. Explaining this relationship and PA behaviour using a social cognitive theory, such as the TPB, assumes that a base level of information processing was achieved prior to the formation of the attitudes. The TPB has shown differences in PA across the major constructs in relation to demographic and socio-economic factors (Symons Downs & Hausenblas, 2005), yet the mechanism behind these differences is not well understood. One explanation for these gaps rests in the assumption of a base level of information processing and acquisition. At the heart of information processing is one’s ability to access, understand and critically utilize information; in other words being health literate. Thus, further exploration of the relationship between PA, HL and the TPB is warranted as this has not

been examined in the literature to date. It is of import at this juncture to note that theorists in the HL domain consider much of what is being considered here in relation to the TBP to exist at the individual level. This individual, or micro-level, is comprised of knowledge, skills, beliefs, values and personal experience, and is only one part of a social-ecological explanation of how HL manifests itself (Wharf Higgins, Begoray, & MacDonald, 2009). Much like the social-ecological explanation of HL, Nutbeam (2000, 2008) has contended that HL is not merely a reflection of the individual, but a matter of social and environmental factors as well. In his framework HL and PA are presented as health outcomes enveloped by social, cultural, and political factors such as education, healthcare provision, healthy environments, and social mobilization (See Appendix A). Health literacy seems to have evolved from what was primarily a medical based approach at its inception, focused risk factors and on intervening at the individual level, to an ecosystem based concept revolving around the emancipation of ‘patients’ in the health domain and the creation of supportive environments and health practitioners (de Leeuw, 2012). In its most recent wave of development HL encompasses advocacy and community empowerment to address “the skills, capacities and knowledge required to access, understand and interact with social and political determinants of health and their social discourse” (de Leeuw, 2012, p. 2). Thus, while it is important to understand how HL and PA relate, and to acknowledge the potential explanatory power of a behavioural theory in shedding light on these health variables, one must be aware of the complexity of this relationship and interpret results with caution given that HL frameworks suggest HL exists only in part at the individual level. Johnson et al. (2011), as well as Berkman et al. (2012) suggest that use of theory and study of mediating variables would help advance the health literacy domain. Perhaps

examining the research that has evaluated HL and PA together will further illuminate the discussion.

Only eight studies related to PA could be found (Chang, 2011; Bell, Patel, & Malasanos, 2006; Kim et al., 2004; TenHave et al., 1997; von Wagner et al., 2007; Williams et al., 1998; Wolf, Gazmararian, & Baker, 2007; Yajima et al., 2001). Of these eight studies four have focused on clinical populations and disease prevention, such as diabetes, cardiovascular disease, and hypertensive populations (Bell, Patel, & Malasanos, 2006; Kim et al., 2004; TenHave et al., 1997; Williams et al., 1998). Six of the studies were cross-sectional (Chang, 2011; Kim et al., 2004; TenHave et al., 1997; von Wagner et al., 2007; Williams et al., 1998; Wolf, Gazmararian, & Baker, 2007), all used quantitative methods and none described a theoretical framework to design or explain the research findings. Participant numbers for those studies presenting statistical data ranged in size ( $N = 92$  to  $N = 2923$ ), and included both men and women. Five studies were conducted in the United States, one in the Britain, and two in Asia. Five studies utilized a non-standardized PA measure (Chang, 2011; TenHave et al., 1997; von Wagner et al., 2007; Wolf, Gazmararian, & Baker, 2007; Yajima et al., 2001), one used a subscale to assess PA level (Kim et al., 2004), and two did not measure PA level in any form (Bell et al., 2006; Williams et al., 1998). All PA measures were self-report, and did not include a specific measures of all intensity, duration, and frequency to interpret whether participants met recommended activity levels. To measure HL, the Test of Functional Health Literacy in Adults (TOFHLA) was used in five studies (Chang, 2011; Kim et al., 2004; von Wagner et al., 2007; Williams et al., 1998; Wolf, Gazmararian, & Baker, 2007), a non-standardized test was used in one (TenHave et al., 1997), and no measure of HL in two of the studies (Bell et al., 2006; Yajima et al., 2001). Further description of these studies appears below.

Comparing some of the findings of the existing research in this area the information has been disparate. For example, individuals with inadequate levels of HL were found to be more sedentary (Kim et al., 2004; Wolf, Gazmararian, & Baker, 2007) and less likely to know the benefits of PA (Williams et al., 1998). Still other research found no significant relationship between these two variables (von Wagner et al., 2007), or that it was dependent on the type of PA participants reportedly engaged in (TenHave et al., 1997).

The HL-PA studies to date have largely focused on clinical populations, such as diabetic or hypertensive patients, and the HL-PA connection was usually positioned as part of a larger disease management program. Similarly, research has generally focused on older adults. The general population has essentially been excluded from the HL- PA research to date. For example, a recent study (Wolf, Gazmararian, & Baker, 2007), focused on Medicare enrollees over the age of 65 years, the vast majority of whom were Caucasian and had an education of at least grade 12. Similarly, Williams et al. (1998), who examined HL scores and PA knowledge in relation to disease management, studied a clinical population of hypertensive and diabetic patients, who although diverse in ethnicity and education, were an average age of 64 years. Other studies followed a similar trend and included CVD risk prevention program (TenHave et al., 1997). Von Wagner and colleagues (2007) did conduct a population wide study inclusive of younger, non-clinical groups (Mean age of 48 years), however, the PA measure was not standardized, rather they sought to assess whether any exercise had been engaged in over the previous week through self-report.

Research to date has been characterized by both a lack of standardized PA and objective PA (such as an accelerometer or pedometer) instruments. Physical activity was usually assessed with more general questions, such as amount of time engaged in light/inactive behaviour

(TenHave et al., 1997), or whether an individual engaged in a bout of PA over the previous week (Yajima et al., 2001). In contrast, health literacy is typically measured as a distinct variable, by using standardized tools. A common instrument to measure HL was the Test of Functional Health Literacy in Adults (Kim et al., 2004; von Wagner et al., 2007; Williams et al., 1998; Wolf, Gazmararian, & Baker, 2007).

Beyond the methods, the studies reveal interesting results as well. Longitudinal research of a clinical population showed that diabetes patients with adequate HL were more likely to adhere to PA regimes than those with lower levels of HL (Kim et al., 2004). This study tracked an educational program regarding diabetes management, which included a three hour class for participants, however the details of the class and the specific PA measurement tools used were not provided.

In terms of interventions, those sensitive to HL have been successful at improving PA involvement (Bell, Patel, & Malasanos, 2006; Yajima et al., 2001). One intervention used a web based tutorial package, providing a variety of interactive units at both fourth and tenth grade reading levels, to educate patients and nurses about diabetes prevention and management; this intervention was significantly linked to improvements in PA. The second intervention (Yajima et al., 2001) showed promising results for a community based intervention conducted in Tokyo, Japan using volunteer community leaders to promote healthy living. These community leaders, generally women, were educated about healthy living components such as PA in relation to community and family contexts. The women were then expected to disseminate this knowledge within their own communities by leading local seminars. While this study was not community driven at its inception, it demonstrated the importance of community involvement at the

implementation level and building knowledge and skills among community leaders, and was found to be successful across the municipalities that were involved.

It should be noted that there has been a heavy reliance on cross-sectional and quantitative measurement in these studies, and unlike the nutritional literature, there has been a dearth of research using qualitative or action based research methods, which could offer valuable insights in the HL- PA context. Participatory research methods have been applied in health promotion discussions, for example with lone mothers in relation to cardiovascular disease (Young & Wharf Higgins, 2010), allowing for dialogue between and involvement of researchers and lone mothers to better understand poverty, social context and heart health issues with this constituency. Using a mixed-methods design, the researchers engaged the lone mothers in an iterative research process, informing the selection of quantitative variables to be analyzed, the qualitative issues to be explored, and in the analysis and dissemination phases of the study.

Other participatory methods have successfully involved community members from marginalized and stigmatized social groups as research assistants for health research, allowing for discussion between sex trade workers and staff about information related to their occupation (Benoit, Jansson, Millar, & Phillips, 2005). Research with a community partner organization, structured around outreach and education for sex trade workers, provided the platform to involve marginalized members of society in the research process. Not only was the original partnership intended to provide opportunity to the community partner organization to better understand how to work with and serve the sex trade workers, but also hired and trained members of this community as research staff. The authors further includes the voices of these community members by interviewing the interviewers about their experience as action researchers. Although the type and level of community involvement differs by project, the accepted premise

is that “participatory research opens a space for inquiry that is inclusive, educational, and/or political to inform social change” (Young & Wharf Higgins, 2010, p. 347). Action research methods are a valuable tool when working with marginalized or hard to reach populations, despite inherent methodological challenges, and have been effective with groups vulnerable to other health issues.

To summarize the literature review, there is evidence of links between information processing and social cognitive theories and constructs, in particular attitudes. Attitudes are a major construct of the TPB and well established as a predictor of PA. Health literacy may influence information processing of health material as it is indicative of skills related to accessing, understanding and evaluating health information; HL is also linked to PA. However, research has not tested whether the TPB mediates this relationship, indicating that HL is in fact an antecedent to attitudes and thus intentions and behaviours. Research has also not used objective PA measures to test the HL-PA relationship, and has relied too heavily on elderly and clinical populations. The current study will attend to some of these limitations to try to better understand PA behaviour as it relates to HL.

In addition, there has been little research conducted with young adults even with rising concerns over obesity and plummeting levels of PA in early adulthood. Indeed, there is a noticeable decline in these health variables during early adulthood (Association of Canadian Studies, 2005; Baranowski et al., 1997; Caspersen, Pereira, & Curran, 2000; Caspersen et al., 2000; Leslie, Fotheringham, Owen, & Bauman, 2001; Leslie et al., 1999; Nielsen et al., 2006), concurrent with a peak and then decline in HL (CCL, 2007b; Jackson, Winkleby, Flora, & Fortmann, 1991; Ratzan & Parker, 2006), and a misperception by young adults that they lead healthy lifestyles, when in fact most engage in unhealthy practices that increase their risks of

developing stroke and other chronic diseases later in life (American Heart Association, 2011). The decline in PA may be a reflection of the many changes that can happen during this transitional stage in life such as entering the workforce, marriage, university, moving away from home (Bell & Lee, 2006), and becoming a parent (Bellows-Riecken & Rhodes, 2007). Physical activity levels do not rebound over time, but rather continue to decline after this initial deflection point into older adulthood. Similarly, HL is known to decrease with age, showing a gradual decline after age sixteen (CCL, 2007b). It appears early adulthood may be an important deflection point for health behaviour, and many of the people in this age range are associated with venues appropriate for health promotion such as schools, hospitals, universities etc. and a greater understanding of their ability to access, understand and utilize health material as it affects PA would be helpful in the health promotion realm. Finally, use of a theoretical framework or frameworks to provide a conceptual structure and platform for research collaborations are needed.

In critiquing the current HL- PA research we can establish a direction for future studies. Although there seems to be a relationship between HL and PA the results must be interpreted with caution because many of the studies have focused on physical activity/inactivity as part of a disease state in a clinical population, such as patients with diabetes or CVD, and in older adults. Similarly, there has been a heavy reliance on self-report PA measures which is of particular concern when literacy is a potential issue. Of the studies that related HL and PA, none utilized an objective form of PA measurement, such as an accelerometer. Considering the findings as a whole provides compelling evidence to support the concept that HL and PA are related and merits further research. Thus, future research should consider: standardized measurement of PA, specifically objective measures to avoid issues of readability; measurement in non-clinical

populations and settings to glean information about the general population; use of a theoretical framework; and qualitative or action research methods.

The following sections outline a research program that encompassed concepts of HL and PA guided by well founded theoretical frameworks. The Theory of Planned Behaviour (TPB) was used to shed light on how HL and PA relate to each other at the individual level. In order to address PA within a community of individuals at risk for lower levels of HL and PA, the PRECEDE-PROCEED Model (Green & Kreuter, 1991; 2005) provided structure by which to organize phases of my research at both micro and macro social ecological levels. This model will be discussed in greater detail in the literature review, however, a schematic of how health literacy, physical activity and the various components of this research fit together can be seen in Appendix C.

## 2.2 Study 2 Literature Review

Engaging in PA is an important component of a healthy lifestyle. Healthy living and healthy lifestyles are generally defined by making positive choices that enhance health and wellbeing (Health Canada, 2008). Influencing on healthy living and health behaviours, including PA, is often attempted via health promotion. As discussed earlier, HL is an important consideration in health promotion, but it is only one aspect of the greater issue of empowerment and community involvement in health. Similarly, there is evidence that PA involvement and promotion should extend beyond individual level theories to address broader socio-economic and environmental issues, such as income, social connections, and built environment. Thus, while the exploratory, correlational research conducted in Study 1 has utility, there are other avenues of

research that may benefit health promotion in an applied manner, and there has been a call for both basic and applied research in this domain (Johnson et al., 2011)

Consider the parallels between the Ottawa Charter's widely accepted definition of health promotion (see above), which is founded on the notions of advocating, enabling, and mediating (Saan & Wise, 2011; WHO, 1986), and definitions of participatory action research. Participatory action research (PAR) is a systematic form of inquiry, involving collaboration with those affected by the issue studied, for purposes of education and action to create change (Green et al., 1994; George, Daniel, & Green, 2007). Reason and Bradbury (2001) argue that not only is the primary purpose of PAR "to produce practical knowledge that is useful to people in the everyday conduct of their lives" (p. 2), but that the philosophical underpinnings of action research dictate that this form of research be practical and community driven at some level to create change. The idea that 'good research' is grounded in the perspectives and needs of those affected, that knowledge is shared, and that experts exist outside of the walls of academia in the community is key to change. Based on these definitions some may argue that a participatory program of research is the most ethical and thorough paradigm to utilize in health research given that it demands community member involvement and empowerment in order to be considered rigorous.

Although action research shares many similarities with traditional forms of research, it is distinct in several ways, most notably its purpose of collaboratively taking a form of action for social change. Participatory action research differs from traditional research methods and paradigms on several other levels (Kelly, 2005; Small, 1996). The epistemology and ontology of the two research genres differ in that traditional research assumes a positivist approach, with a single objectively measured reality, whereas "community based research draws upon

constructivist and critical theoretical perspectives that address some of the criticisms of positivist science” (Israel et al., 1998, p. 176). Rather than researchers examining subjects and discovering knowledge, research and knowledge are co-created in a locally relevant manner with each partner bringing a piece of expertise to the relationship to share, and each benefitting from the investigation or project. “It is for people themselves, in their own right, to enter into agreements with each other to discover and create knowledge, and this is the only principle on which research and inquiry has the right to exist” (Reason & Bradbury, 2001, p. 10), thus it is about collaboration but also about consciousness raising, education, and sharing of power.

Creswell (2008) discusses two forms of action research- *practical and participatory*. Practical action research involves team based inquiry to unpack and reflect on the personal practice or experience of a community member in order to improve their situation or behaviour. Participatory action research, based on Creswell’s definition, is to improve and empower a community, organization, individual, or social unit through collaboration, shared vision, and democratic aims towards positive change. Given the issues related to inactivity, HL, and the inequitable nature of health promotion material, action research, particularly participatory action research (PAR) may be an important and effective method for addressing health behaviours across communities and increasing healthy living among at risk groups. Because the very nature of PAR demands community member involvement, collaboration, capacity building, reciprocation, and local relevance, the power of knowledge creation, measurement and sharing is no longer held solely by an academic researcher, but is shared by partners working towards change.

Green et al. (1994) identified five principles that must be implemented in PAR health research: 1) high levels of community participation in all phases of research, 2) identification of

the issue/question addressed in the research is made by the community, 3) the purpose of the research focuses on co-learning and action within the community, 4) methods are flexible and appropriate, 5) the end product is beneficial to the community. These principles are echoed throughout the PAR literature and have been expanded on by other researchers (Frisby, Crawford, & Dorer, 1997; George, Daniel, & Green, 2007).

Now consider the definition of health literacy again, “the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life-course” (Rootman & Gordon-El-Bibherty, 2008, p.11). To increase personal capacity, control and ability in relation to health is the key goal, an almost mirrored definition to health promotion and PAR. These three concepts have a natural fit together in the world of health research, and in fact Saan and Wise state that as a form of enabling “[h]ealth education has begun to reshape its goals to those of health literacy – offering a more nuanced approach to building and strengthening the competencies needed by all people and communities to achieve and maintain good health (2011, p. 192). Recall that Nutbeam (2008) discusses ways of looking at HL in today’s world, as a risk factor or as an asset to health. As an asset HL can be viewed as something to build on, and as a means to enable people, and as a tool to support empowerment over decision-making in the health realm.

Based on similar principles and consistent findings in health research regarding the inequity of health status faced by marginalized and low income populations, Whitehead and Dahlgren (1991) discuss starting points for taking action, initiating change, and creating opportunities for empowerment in health related contexts. They suggest four possible approaches for action research. First, to select a particular health problem that shows disparity and addresses the determinants of this specific health issue. Second, to select a health damaging

factor related to a condition in which people live or work that limits their health potential. This approach focuses on the effects of a specific context on health outcomes. Third, research could begin by asking how health hazards, health status, and health related services are distributed across a population in order to identify populations most at risks and opportunities to close gaps in health status. Finally, action can be taken through the examination of policy differences across regions or countries to establish how the greater socio-political context may affect health.

In relation to HL and PA, the first approach may be the most suitable at this time given that this is a new area of research. Both HL and PA show great disparity by income and education and both have determinants that can be explored with community members as potential avenues for action and change. Alternatively, we know that those with lower levels of HL are at greater risk of being inactive and may experience unique barriers to healthy living (Wolf, Gazmararian, & Baker, 2007), thus a potential area for collaboration and ability development might be to work with a community known to have lower levels of HL in order to address PA.

[T]he decisions on priorities and strategies for social change affecting the complicated lifestyle issues can best be made collectively as close as possible to the homes and workplaces of those affected. This principle assures that programs are relevant and appropriate to the people affected, and it offers greater opportunity for the people to be involved in the planning process (Green & Kreuter, 1991, p. 5).

Examining PA within an action research framework affords the opportunity not only to be inclusive of the community, to form partnerships, and to engage in locally relevant research but provides a means for citizen empowerment within the community. In relation to HL and PA

this concept furthers the argument for use of action research methods to address multifaceted health issues such as PA. Health literacy and PA capabilities could be said to be the result of individual, environmental, social, and political factors and contexts, thus requiring multilevel and locally relevant solutions to create change. This is in line with much of the research that has used social ecological frameworks to examine PA (Sallis et al., 2006; Reger-Nash et al., 2011) and HL (Wharf Higgins et al., 2009) separately.

Two studies surfaced in relation to HL and action research. First, Nimmon and colleagues (2007) worked with a group of women who spoke English as a second language to create photonovels about their health and eating habits as a form of health and nutritional education, as well as to understand the lived perspectives of these women to help inform future health education among English as a second language communities. Similarly, Stewart et al. (2008) used an audio-visual approach to providing voice to community members about their health. This study outlined an endeavor with First Nations youth to create videos about their perspectives on holistic health as it exists in their culture. These videos were intended to increase their HL through personal thoughts discourse about their health; and then using these videos to facilitate strategies to improve health among aboriginal youth and to build leadership skills within their community. These studies showed the import of providing opportunity for voice among the community members, as well as addressing local context/culture in HL discussions.

Action research is often applied in relation to PA in a variety of ways. Collaboration with community partners to conduct research identified as relevant by the community has been utilized to create physical activity interventions (Daniel et al., 1999; Goldfinger et al., 2008; Reger-Nash et al., 2006), understand barriers experienced by community members to living an

active lifestyle (Kelly et al., 2007), understand poverty and PA (Frisby & Millar, 2002), in a disease prevention context (Young & Wharf Higgins, 2010) and promote PA and sport in communities (Vail, 2007). Given the nature of action research being reflective of the community with which it occurs, it is difficult to provide a single synopsis for the methods of findings of the PA action research completed to date, however, much can be learned from what has been accomplished to date in order to proceed with current collaborations.

### *Action Research and Physical Activity*

Action research in the PA domain has been used with several communities, or target populations, for a variety of reasons. Women and girls (Berger & Peerson, 2009; Okley et al., 2011; Parra-Medina & Messias; Wharf Higgins & Reed, 2001; Young & Wharf Higgins, 2010), First Nations bands (Daniel et al., 1999; MacAuley et al., 1997; Perry & Hoffman, 2010), children/youth (Bryant, et al., 2010), schools (Enright & O'Sullivan, 2010; Khunti et al., 2007; Okley et al., 2011), service providers, workers (Farag et al., 2010), older adults, local churches (Wilcox et al., 2010), and low income groups (Frisby, Crawford, & Dorer, 1997; Frisby & Millan, 2002) have all been part of PA action research in some form. Physical activity was often embedded as a cofactor related to a broader health concern such as obesity (Neira & de Onis, 2006; Paradis et al, 2005; Perry & Hoffman, 2010), diabetes (Daniel et al., 1999; Bradley & Puaone, 2007; Armstrong, 2000; MacAulay et al., 1997), hypertension (Bradley & Puone, 2007), and cardiovascular health (Kim et al., 2004; Pazoki, Nabipour, Seyednezami & Imami, 2007; Kalra et al., 2004; Young & Wharf Higgins, 2010).

The studies conducted to date varied in their methods as well as in the degree to which they were action oriented and/or participatory in nature. Studies ranged from those engaged in more traditional research based in a community setting (for example Vail, 2007; Granner et al.,

2010), to those that were inclusive of community members at all phases of research and very concerned about change within the community. In some cases community members were involved in the formative process, contributing ideas for program planning and intervention development via focus groups and interviews. Community members provided insight here regarding barriers, needs, and preferences. Schools were also given information and resources from academic and government partners to implement their own programs; to ensure relevance to each unique student body ( Okley et al., 2011). In other cases, key community members were trained about healthy living concepts, provided with a small budget, and then asked to share the knowledge as they saw appropriate within their own locale (Yajima et al., 2001). Other studies take the intervention one step further in terms of community member involvement and empowerment by engaging youth in the design, implementation, and evaluation of physical education programs in which they partake. Here the students were also involved in focus groups to discuss PA, but were then involved in the reflective process of theming and revisiting the transcribed data. During the six week planning period these students kept task books to document thoughts and ideas regarding PA planning, as well as took photos related to PA and relevant to them, all of which was used for discussion among group members. These sessions culminated in students coming up with a list of activities they wanted to try and how to go about doing so. Students then engaged in ten weeks of sessions based on the information they had generated; each student was given a responsibility in the planning and execution of these sessions. Finally, the students reflected on the curriculum and made suggestions for changes and areas they could control/negotiate, such as music selection (Enright & O’Sullivan, 2010).

In terms of methods, surveys were a common tools for gathering data either as the primary purpose of a cross sectional study (Groft et al., 2005) or as baseline and for follow up

measurements in conjunction with an intervention (e.g., Armstrong, 2000; Dugdill et al., 2005). Other quantitative methods used included anthropomorphic measurements (Bradley & Puoane, 2005; Farag et al., 2010), site assessments and observation (Bradley & Puoane, 2005; Frisby & Millar, 2002), as well as body mass index calculation, fitness testing, and body composition (Macaulay et al., 1997). Specific PA measurements included 7-Day PA recall (e.g., Macaulay et al., 1997), Four By One Day Recall Physical Activity Questionnaire (Khunti et al., 2007a), pedometers (Pazoki et al., 2007), and accelerometers (Okley et al., 2011; Wilcox et al., 2010). Concept mapping was used in a single study (Kelly, Baker, Brownson, & Schootman, 2007) to identify, rank, and quantitatively analyze challenges community members face in being physically active. Similarly, geographical mapping of the community's physical environment, by community member's, indicating positive or negative influences on PA and health has also been used (Bradley & Puonane, 2007).

Qualitative methods were also effectively employed in the PA PAR research. Interviews in person (Dugdill et al., 2005) and over the phone (Mjelde-Mossey, 2005; Wilcox et al., 2007) were often used to gain insight from community members regarding PA or related health behaviours or disease states. Written open-ended questions (Kim et al., 2004) and photovoice were also used (Enright & O'Sullivan, 2010). However, use of focus groups was the most widely used qualitative technique and was applied to inform survey development (e.g., Sloane et al., 2006; Berger & Peerson, 2009) or to obtain information from community members and partners about needs, barriers, and ideas in order to guide intervention development (e.g., Burroughs et al., 2006; Goldfinger et al., 2008; Enright & O'Sullivan, 2010). Many of the studies employed mixed methods, using a combination of the qualitative and quantitative methods

discussed above to best understand PA within the community (e.g., Davey et al., 2011; Okley et al., 2011; Perry & Hoffman, 2010).

Although the use of standard qualitative and quantitative methods were common, several studies applied unique methods during the PAR process that are of particular interest. A number of studies contained a component in the procedure to teach community members skills related to PA or to PAR research. For example, instructing community health workers on proper measurement of anthropometrics, allowing them to identify and document these health factors in their own community and to develop a locally relevant intervention (Bradley & Puoane, 2007); other community members were educated about PA and other CVD risk factors, and equipped them with materials and demonstration options to use in facilitating their own community health education workshops (Goldfinger et al., 2008; Frisby & Millar, 2002; Kim et al., 2004). Similarly, staff within schools were trained to conduct fitness tests and collect PA data among their students (DiNapoli & Lewis, 2008).

As diverse as the communities and methods used in the PA action research reviewed, so too were the theoretical frameworks. Social marketing was one framework that was utilized in the literature reviewed (Burroughs et al., 2006; Skinner et al., 2006). The PRECEDE-PROCEED Model and Social Learning Theory (Macaulay et al., 1997), as well as the Theory of Planned Behaviour (Reger-Nash et al., 2006) were also used. Perhaps most common was the use of an ecological model (Armstrong, 2000; Davey et al., 2011; Parra-Medina & Messias, 2011; Reger-Nash et al., 2006). Other studies developed their own models based on input from the literature and the community (Vail et al., 2007; Horowitz et al., 2008). Though often not outlined in detail or related to a specific tool, process evaluations were used in some instances as a gauge of how a community had progressed towards a goal in terms of a program change or to

provide a form of cyclic feedback about intervention development (Davey et al., 2011; Okley et al., 2011; Reger-Nash et al., 2006). Process evaluations were inclusive of tracking the number of initiatives, participants, or settings involved (Armstrong, 2000; Vail et al., 2007), marketing and reach within a community to certain demographics (Peck et al., 2008; Daniel et al., 1999), environmental or program audits (Sloane et al., 2006; Macaulay et al., 1997), general tracking of dose of PA programs within a community and project development phases (Reger-Nash et al., 2006; Bradley & Puoane, 2007).

In some cases results from the action research projects had not yet been identified, however, among those studies that did discuss results there are a few findings which provide direction for my own research. In particular, studies that were focused on program development, intervention, or informing policy change tended to report PA barriers among community members and PA levels and involvement.

First, PA barriers tended to be discussed and themed across community focus groups and interviews, and worded uniquely in terms of member quotes and anecdotes to bear local relevance. Common barriers included: lack of time, limited money or resources, lack knowledge or expertise, absence of role models, poor social support, fatigue, low motivation, environmental constraints, and life obligations (e.g., Berger & Peerson, 2009; Okley et al., 2011; Parra-Medina & Messias, 2011; Perry & Hoffman, 2010). Identifying barriers to PA participation helped to empower community members and facilitated a better understanding of what was required in the context of community programs to make PA more accessible and feasible for people (Frisby, et al., 1997; Frisby & Millar, 2002; Groft et al., 2005; Kalra et al., 2004; Kelly et al., 2007; Khunti et al., 2007; Reger-Nash et al., 2000; Skinner et al., 2006). In some cases results about barriers also included discussions regarding suggestions, recommendations, or facilitating factors that

could be considered in program development such as: continual opportunity for member input, providing information and education, increasing accessibility to PA options, creating social opportunities for PA, making ‘fun’ a central goal, and allowing for trial periods of a variety of activities (e.g., Bryant et al., 2010; Davey et al., 2011; Okley et al., 2011).

Second, reporting PA levels or community involvement in PA was common, and was sometimes in conjunction with testing an intervention’s impact. Several studies indicated a significant increase in PA following an intervention/PAR program (Daniel et al., 1999; Khunti et al., 2007a; Kim et al., 2004; Pazoki et al., 2007). Not all PAR projects showed significant changes, two PA interventions within the community were not found to produce significant increases in PA levels (Goldfinger et al., 2008; Wilcox et al., 2007). Findings beyond PA levels indicate that PAR endeavours are relevant and effective in other ways. One study found a significant increase in fitness scores following a school-based intervention (Paradis et al., 2005), while another identified that improved self-perception and integrating PA into school culture were important factors (Okley et al., 2011). Other research showed marked increases in PA knowledge and significant decreases in sedentary behaviour among community members (Goldfinger et al., 2008). The research also showed that recreation significantly impacted scores of self-worth, friendship, behavioural conduct, and physical appearance, and helped to reach goals to create supportive environments and increase health enhancing opportunities (Wharf Higgins & Reed, 2001). Thus, while action research partnerships and interventions may not yield immediate changes in PA levels, other benefits are seen among the community members.

To highlight in depth how PA action research has unfolded successfully in different settings, I turn to two exemplary studies. First, Wharf Higgins and Reed (2001) engaged in a participatory action research project with adolescent females in a recreation setting, to explore

health goals and build social capital. This project encouraged collaboration between researchers, recreation providers, and girls in low income neighborhoods in an effort to increase girls-only recreation opportunities for young women aged 9-11 and 12-14 and understand how these experience may enhance their social capital (involvement and trust in community). Once a week sessions were offered, free of charge, for girls to participate in their choice of physical activities, learn how to make healthy snacks, establish friendships, fundraise for their own recreational pursuits, and engage in volunteer activities. Through mixed methods, including health surveys, journaling, observation, focus groups, and key informant interviews a picture of PA, recreation and health was developed and outings planned with the girls involved. Over the year the girls identified that new and supportive relationships had been developed, skills and capabilities related to PA had been honed, and their voices had been heard. Impressively, for this age range, the young women remained in the program for the entire school year. Despite the short-lived grant funding, the recreation centre committed to continuing the program in subsequent years from its own budget.

In a second action research study that was conducted within the context of a school, we can also see the success and impact PAR research can have on PA. Okley and colleagues (2011) also worked with girls to improve access and understanding of PA program development for them. This study was community (school) driven, where each school independently created a program with the help of a “critical friend” who provided aid and expertise. This critical friend was an expert staff member provided by the program planners. Although the programs were each unique, the goal was the same - to prevent a decline in girls’ involvement in PA. Each school formed an action team, developed a plan, identified barriers, and reflected on the program as it unfolded. To do this schools worked with the girls and expert liaisons conducting focus

groups, quantitative measurement of PA access, enjoyment, efficacy, support, school environment, and self-perception, as well as a final process evaluation. Although PA levels, measured using accelerometers, did not significantly improve, physical self-perceptions did. Furthermore, focus groups helped identify key barriers such as resources, staff knowledge, boy domination of physical education, and lack of skills/confidence to consider for future changes to the program and to school culture.

Both of these exemplary studies used a reflective format for planning, involving various stages of community connection, information gathering, implementation, and program evaluation.

As mentioned earlier in the literature review one theoretical framework suggested for action research in the PA domain, to allow for this reflection, but also to provide structure and guidance through stages of measurement and planning, is the PRECEDE-PROCEED Model (Green & Kreuter, 2005) which has been applied in the PA domain (Daniel et al., 1999; Reger-Nash et al., 2011) (See Appendix C). This model reflects many of the individual and contextual factors discussed thus far. For example, at the individual level it takes into account predisposing factors, which are an important piece of the puzzle to understand before program development and allows for the inclusion of behavioural theories and epidemiological data. This model then takes into account social, political and environmental contexts, which relate to the capabilities approach. It provides opportunities to illustrate levels of involvement by partners or areas for intervention within a community in relation to a specific behaviour. From a researcher stance, it provides a framework to guide methods, for example instrument selection or interview question design. This model also incorporates stages that demand community input and local relevancy. In sum it allows for the flexibility required in a PAR project where multiple parties are involved

in reaching a common goal using mixed methods. It attends to both scientific needs as well as community input at various levels. As mentioned above this model works naturally with a social ecological framework. A social-ecological approach to understanding PA (Economos & Irish-Hauser; 2007; Sallis et al., 2006) is an effective way of addressing both individual and contextual factors and is commonly used in PA action research as summarized in the literature presented earlier. Sallis et al. (2006) describe in detail how an ecological approach can be applied to PA, outlining how factors such as one's biological, psychological, and demographic variables effect PA just as perceived environment, information environment, social environment, natural environment, as well as the political environment do. The ecological approach to explaining health issues has also been used to better understand HL among high school students in a health education classroom (Wharf Higgins et al., 2009), where HL is understood to be a reflection of micro context, such as knowledge, attitudes, values, and internal influences; meso context, comprising of school, family, and social factors; and the macro context, which consists of societal and community factors such as culture and health policies. In short, this model posits that health and health behaviours exist in relation to intrapersonal, interpersonal, community, and socio-political factors.

The PRECEDE-PROCEED Model can best be described as an ecological model given that it considers these intrapersonal, interpersonal, community and environmental factors thus making it conducive to a research paradigm that necessitates inclusion of contextual factors and social development. The PRECEDE-PROCEED Model also includes phases and detail that provide the opportunity for the research to look at issues such as partnership, advocacy, and process evaluation. When appropriate to the research topic, these phases allow for inclusion of other topics such as empowerment and capacity building, as well as more traditional social

cognitive, epidemiological, and socio-demographic measures. Finally, this model is cyclic in nature providing opportunity for reflection, reevaluation, and changes to methods over time, which is important in a potentially long-term action research project. Thus, it is robust for use in collaboration given the challenges of power sharing and scheduling identified by other researchers (Benoit et al., 2005).

In sum, although it can be difficult to identify gaps and limitations in action research projects, in that each one has a unique goal, set of partners, and methods, a review of the literature does highlight potential target communities and established methods that may be of use. The literature does seem to indicate that schools may be an effective community organization with which to work and that action research is an appropriate paradigm for addressing PA among marginalized populations. However, there has yet to be an action research project that examines PA within a community of adult and alternative learners. In addition, mixed methods, direct input from community members, a discussion of PA barriers and facilitators prior to any program planning, and a process evaluation are commonly used in this field. Finally, use of a framework or theory such as the social-ecological model or PRECEDE-PROCEED Model may help to provide structure to the collection and interpretation of data.

Knowing that action research is commonly and effectively used, and taking the current findings into consideration a logical next step is to consider theoretical frameworks with which to approach and organize a PA action research endeavor.

## CHAPTER 3. METHODS

This chapter discusses the mixed methods used in this research; the exploratory, quantitative Study 1 (section 3.1 below), as well as the action research conducted with a community organization in Study 2 (section 3.2).

As discussed in the introduction health research needs “both to *describe* and to *understand* communities. The analysis...calls for the application of both qualitative and quantitative techniques” (Baum, 2006, p.15). Further, research that seeks to explain a health issue may also need to understand the needs of a specific population in order to be effective, thus a mixed methods design may be the best approach. A mixed methods design is “a procedure for collecting, analyzing, and “mixing” both qualitative and quantitative research and methods in a single study to understand a research problem” (Creswell, 2008, p. 552).

Mixed methods in research can be an effective and pragmatic approach to complex health issues. Creswell (2008) identifies four types of mixed methods designs, each ascribing a different purpose and priority to the qualitative and quantitative methods used. The Explanatory Design describes the methods of my study. In this mixed methods design data are collected and analyzed sequentially. Quantitative data are first collected to understand the general relationship, and in some cases are given more weight, followed by qualitative research to allow for community input, involvement and/or description. In my research data were collected sequentially and both quantitative and qualitative are of equal import; quantitative data were used to shed light on a relatively unexplored relationship (HL and PA) to better understand how they are related. Qualitative methods were used to work with a community, known to be at risk for low HL levels, to create a physical activity program based on their input. The organization of

these data and how and why they were integrated as part of the research process is outlined in relation to the PRECEDE-PROCEED Model (Appendix C).

However, mixed methods is not without its critics. While some might celebrate the opportunity to use diverse forms of data to explain a phenomenon, there is a concern held by others that by using both quantitative and qualitative approaches one is compromising the research by not adhering to a particular paradigm; that is to say that positivist and constructivist research perspectives are too different at the core to be used in conjunction (Denzin, 2010). The latter school of thought would argue that one's epistemology, ontology, and axiology define how knowledge is constructed, measured, and validated, and thus determines what type of questions we seek to answer and how we do so. Mixed methods design straddles these world views of knowledge and reality to address research from multiple angles, arguably to create a more comprehensive explanation (Bergman, 2011; Denzin, 2010). So, is it true that randomized controlled trials, science based research, and quantitative methods cannot inform qualitative discourse and practice based evidence, and vice versa to generate knowledge? One response is, "there are no ironclad criteria regulating the production of knowledge or the validation of inquiry findings" (Denzin, 2010, p. 424), that research approach is dependent on purpose.

To better understand how mixed methods was viewed in this study, I turn to Jennifer Greene (2012) who debunks the notion that one must be positivist or constructivist and believes that multiple paradigms can be accepted and explored. In this sense mixed, or multiple, methods do not blend or destroy data, but provides comprehensive support of research findings by addressing both the causes and contexts, variables and processes, general and particular related to a given topic; all very important considerations when looking at complex health issues. Again, if one's rationale, purpose, and methodological steps are clearly outlined and adhered to, mixed

methods can be an effective way to explore complicated, multifaceted issues in depth (Cresswell, 2008; Greene, 2012).

Mixed methods not only lend themselves well to researching health issues; this approach is also very conducive to action research, which often utilizes both qualitative and quantitative data within a community based collaboration. The following sections outline the methods, both qualitative and quantitative, that were used to inform the PA domain about links to HL, and to work with a community on an action research collaboration.

### 3.1 Study 1 Methods

#### *Design*

This quantitative study followed a cross-sectional design to investigate the interaction between the TPB, PA, and HL in this emerging area of research. Because of the cross sectional design, attrition was not a concern. This study also provided the opportunity to meet and interact with communities and individuals experiencing varying levels of HL.

#### *Procedure*

All research phases were conducted within Greater Victoria (as well as data collection in Duncan). To enhance the sample representativeness and socio-economic diversity, recruitment occurred across all districts in Greater Victoria and in Duncan, BC. Community centres, literacy advocacy groups, and adult learning centres were contacted by telephone and in writing (Appendix H) requesting their involvement in recruiting participants. Face-to-face recruitment was also conducted by me at these locations upon securing permission from the facilities' administration. I received approval from two adult and alternative learning centres, one in Victoria and one in Duncan, to recruit participants at their sites. Both of these locations allowed

for private stations for interested students and staff to complete measures on site. In addition, posters containing plain language messages, that is with minimal text and jargon, and contact information were posted in community locations such as coffee shops, grocery stores, post-secondary institutions and such. Additional posters were distributed to locations where people in the target age range are often employed (e.g., food and beverage businesses, retail outlets) to be posted in staff rooms. An advertisement was also posted under 'community events' on [UsedVictoria.com](http://UsedVictoria.com), a local website that is free for all users and allows residents to search for activities and merchandise. The letters and posters contained basic information regarding the purpose of the study, participant eligibility, and contact information. Finally, snowball sampling was used (Heckatorn, 1997). This type of recruitment asked participants to tell others they know about the study, and thereby to potentially reach community members who had not otherwise seen recruitment materials. Due to limited funding, incentives were not provided for aiding in the snowball recruitment. Most participants (27) were recruited via the two aforementioned learning centres and by word of mouth from previous participants (16). A total of nine participants responded to posters, five from a recruitment session at Camosun, and eight as pilot participants. No respondents came forward after seeing a poster at their workplace.

Measures were completed in person on a one-one basis to ensure understanding of the questions, to provide privacy for participants, and for opportunity to ask questions as needed. A \$10 honorarium was given as thanks for the participant's time when the questionnaire was completed. Each participant was met either at a community location (such as a community centre), their home, or a research office on the university campus. Each participant was given two copies of the informed consent, one to sign and one to keep. The consent form was read aloud to the participant to ensure that reading level was not a barrier to understanding the

document. Participants were then provided an opportunity to ask questions about the study prior to completion of the questionnaire. Participants were informed that if they should require assistance or clarification about the survey as we proceeded, that assistance could be provided.

The first measure to be completed was the Rapid Estimate of Adult Literacy in Medicine (REALM). Next, to maintain consistency, the basic survey questions were read aloud to all participants regardless of score on the REALM. Participants were provided with their own copy of the survey on which to privately indicate their responses. One participant requested assistance in completing the survey as he/she was unsure of how to complete the Likert Scale formatted questions. Following completion of the survey each participant was instructed on how to wear the accelerometer and the purpose of doing so. An accelerometer was loaned to each participant to take home and wear for the week with verbal and written instructions to begin wearing the device the following morning and removing it only when going to sleep or into water (e.g., to bathe, swim etc.). Simple activity logs were provided for participants to document activity involvement and non-wear times. After seven days the accelerometer was retrieved from the participant; pre-paid return envelopes were provided for those who resided in Duncan. Participants who were interested in their own accelerometer output (which appears in a graph format showing number of motion counts and over each day by time of day, as well as cut-lines indicating how intense the activity was) were provided with this information along with a plain-language letter explaining what the graph meant and how to interpret the information.

Ethical approval was obtained from the University of Victoria Human Research Ethics Board. As per ethical guidelines to maintain privacy and confidentiality the questionnaires were kept in a locked cabinet at the University of Victoria, and were distinguished only by identification numbers.

### *Participants*

Participants were delimited to young adults ranging in age from 18-35 years, who resided in Greater Victoria or Duncan, BC. The delimitation to Victoria and Duncan was set for pragmatic reasons. For example, the use of accelerometers and oral questionnaire instruction required face to face contact. The geographical area was inclusive of Duncan to provide greater variation in socioeconomic status and literacy levels, given the relatively high average education, age and income levels in Victoria compared to elsewhere in Canada. Based on Canadian census data, the median income per person is \$28,541, \$23,082 and \$25,615 for Victoria, Duncan and Canada respectively. Education is also higher in Victoria than in Duncan or nationally. Population rates for those who have not completed high school in Victoria, Duncan and across Canada are 15.4%, 25.5% and 20.2%; for those who have graduated from high school, rates are 27.9%, 28.2% and 26.3%; and for those who have completed some level of postsecondary the rates are at 56.7%, 46.4% and 53.4% (Statistics Canada, 2006). A strong effort to include people from a of range socio-economic and demographic backgrounds was made during recruitment.

### *Instrumentation*

#### *Socio-demographic questions.*

A set of basic questions pertaining to demographic information and socio-economic status was used. Variables included: age, gender, income, education level, parent status, and employment status. In addition, height and weight were asked in order to calculate BMI should this variable be of interest in future analysis. Self-report data was obtained for these body measurements for practical purposes related to data collection at public locations (such as a school).

*Rapid estimate of adult literacy in medicine (REALM).*

This brief measure takes less than five minutes per person to administer and has been established in the literature to be a reliable and valid method of assessing health literacy in an adult population (Murphy et al., 1993). Participants read a list of health related words that increase with difficulty as they progress. Each word that is pronounced correctly receives a point, all incorrect pronunciations receive zero. The REALM scores can be categorized by grade equivalency, Level 1 (0-18 points,  $\leq$  grade 3, ), Level 2 (19-44 points, grade 4-6), Level 3 (45-60 points, grade 7-8), Level 4 ( $>60$  points,  $\geq$  grade 9). Level 4 is said to be a functional level of HL, those with scores in lower levels may need health materials to be adapted. These categories provide an estimate of a person's relative health literacy. The REALM tool does not assess comprehension or evaluation of health-related words. Each participant's score was converted to the corresponding level for analysis.

*Physical activity knowledge and awareness (PAKA).*

Given that this was an exploratory study and no tool currently exists to test PA literacy or PA knowledge, a questionnaire was developed based on instruments used in the literature appraising other healthy lifestyle behaviours such as nutrition. Several studies examining health literacy have incorporated a knowledge component to supplement data (Arnold et al., 2001; Howard Pitney et al., 1997), and were used to guide the development of this questionnaire as well. The tool was comprised of three parts. Part I asked eight questions related to access and basic understanding of physical activity as a health behaviour: for example, *Where do you find out about physical activity information?* AND *List as many benefits of regular physical activity*

*as you can think of.* Part II posed four questions specifically related to one's ability to utilize information about physical activity. The participants were provided a copy of the Canada Physical Activity Guide and asked to find and interpret basic information in this guide. Similar to other health literacy tools such as the Newest Vital Sign (Weiss et al., 2005) this component required participants to use prose, mathematical and analytical skills to answer the questions correctly, for example, *I need to do \_\_\_\_\_ 10 minutes sessions of vigorous activity per day to benefit my health AND If you usually go jogging for 30 minutes per day but your doctor has advised you to do something less strenuous how many minutes of stretching would you need to do to make up for the jogging?* Part III further probed at understanding of common words in PA material. A total of six words that appear in both the Canada Physical Activity Guide as well as the REALM were tested for understanding (Stress, Obesity, Diabetes, Osteoporosis, Depression and Cancer). A copy of this questionnaire and the scoring can be found in Appendix E.

Scores on the PAKA significantly correlated with REALM score (0.59,  $p < 0.01$ ) and Level (0.67,  $p < 0.01$ ) indicating validity as a HL measurement tool. Cronbach's Alpha was used to test reliability ( $\alpha = 0.66$ ).

#### *Theory of planned behaviour (TPB).*

A series of 7-point Likert scale questions based on the TPB (Ajzen, n.d.; Rhodes et al., 2005) were utilized to assess PA intentions, attitudes, PBC, Subjective Norms and related beliefs. As aforementioned the TPB is a social cognition model that has been used extensively to explain physical activity behaviour. The TPB has been validated for use in the PA domain and has shown excellent predictive validity and internal consistency in adult populations (Hagger et al., 2002; Rhodes, Blanchard, & Matheson, 2006).

*Accelerometers.*

Physical activity was measured objectively for seven days using the GT1M Activity Monitor, ActiGraph. The ActiGraph is designed to ascertain normal human movement without impeding activity and has been shown to provide valid and reliable estimates of physical activity (Janz, 1994). The activity monitor is attached to an elastic belt and worn at the waist above the hip for seven consecutive days, only taken off while sleeping, bathing, swimming or engaging in other water sports. Participants were also given a daily log / diary to document when the accelerometer was removed. The ActiGraph measured acceleration and activity counts, by tracking duration, frequency and intensity of PA. Each participant was given verbal instructions as to how to wear the accelerometer, its purpose, and use of the log. Participants were also provided with written instructions and a photograph of how to correctly wear the accelerometer.

*Analysis.*

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Data were entered into SPSS by question or accelerometer output variable for each participant. For variables, such as those from the TPB, that are comprised of combined responses from a series of questions related to a specific construct, the mean of scores was taken and used in analysis. For example, Affective Attitude is measured based on 3 questions related to pleasure, enjoyment, and fun of PA. Each of these questions has a response ranging from 1-7; an aggregate was formed by dividing the sum by 3. Questionnaire data were entered by a research assistant who was hired using funds from my Sarah Spencer Grant, following which I randomly checked 10% of the files (7 participants) to check for proper entry, as well as scanning descriptive and frequency statistics for accurate ranges of variables. Accelerometer data were downloaded and

analyzed using the necessary ActiGraph and Kinesoft Software to convert the raw data to the specific variables of total minutes of PA bouts and total minutes of Moderate-Vigorous PA (MVPA). It is recommended that an individual engage in a minimum of 150 minutes of MVPA per week (CDC, 2011; Health Canada, 2008; Kho et al., 2011). Thus, participants were assessed on whether or not they met these minimum requirements. The raw data from the accelerometers appears in Excel format and consists of motion counts for each minute of each 24 hour day for 7 days. A process of data reduction was done to remove sleep time (as indicated by the time the accelerometer is put on and taken off each day), and to model missing times (Esliger, Copeland, Barnes, & Tremblay, 2005; Ward, Evenson, Vaughn, Rodgers, & Troiano, 2005).

A post hoc power analysis revealed a power of 0.70 for correlational data (Faul et al., 2009), based on a medium effect size ( $r$ ) and an alpha of 0.05. For the regression analysis, a power of 0.98 was calculated post-hoc based on a medium effect size ( $f^2$ ) and an alpha of 0.05. The following statistical analyses were used for the research questions posed:

- 1) A linear regression was used to assess whether HL (REALM) was predictive of PA knowledge (PAKA).
- 2) Pearson's correlations ( $r$ ) were used to assess whether a relationship existed between PA level and HL and their constructs.
- 3) A series of linear regressions were used to test if the TPB mediated the relationship between HL and PA. Based on the methods outlined by Baron and Kenny (1986), a regression analysis was performed between the Independent Variable (IV) and mediator, the IV and Dependent Variable (DV), and the IV/mediator and DV. Several conditions must hold true in order to assume a mediating effect. First, the IV must be shown to effect both the mediating variable and the DV. Second, the mediating variable must have

an effect on the DV when the IV is present. If an effect is found in each of these relationships, mediation is then indicated if the coefficient for the IV is smaller in the third regression than the second. For those tests for mediation that met all of the conditions, Sobel's test was used to establish significance of the mediating effect. Only two relationships met all the conditions, thus these two equations were followed by Sobel's test for indirect effect to calculate the magnitude and significance of the mediator effect (Baron & Kenny, 1986). Sobel's test was not conducted for those equations that violated one or more of the conditions established by Baron and Kenny (1986).

In the current study the IV was HL, mediator was a TPB construct, and the DV was PA. This series of regressions to test for mediation was completed with each of the major constructs of the TPB as a mediating variable.

### 3.2 Study 2 Methods

#### *Theoretical Framework*

The PRECEDE-PROCEED Model was used in my study to guide the research design at various phases. The application of the nine cyclic stages of this model as applied to Study 2 can be seen in Appendix C. This model allowed for me to build on the findings of Study 1 in the early phases of 'Precede'; to work with a community organization; to formulate the research design; and to guide the thought process through this complex project. The Eight Steps for conducting action research outlined by Creswell (2008) were also taken into consideration during planning and evaluation. The steps include: determine if action research is the best design to use, identify a problem to study, locate resources to help address the problem, identify information you will need, implement data collection, analyze data, develop a plan for action,

implement the plan and reflect. Although these steps are not specifically identified throughout this paper each was considered in the development and execution of the project.

In Study 1 of the research I examined the link between HL and PA among young adults aged 18-35, and these findings were used as background information (predisposing factors examined in the social, epidemiological, and behavioural assessments of the PRECEDE-PROCEED Model) in the latter components of the research program when working with alternative education providers and learners to create and track a PA program. Study 1 also provided an avenue to connect with community groups with lower levels of HL, thus creating an opportunity to engage in action research. This combined with new Ministry of Education Daily Physical Activity guidelines opened a discussion with administrators about partnering for an action research project.

The adult/alternative learners may be a unique population in terms of health behaviour and HL given that many have lower levels of education, lower levels of income, and are a hard to reach population in terms of recruitment. They risk becoming invisible within efforts directed among the general population; a not uncommon issue when conducting research with relatively marginalized groups (Heckatorn, 1997). Yet, they may be reachable through job training programs, literacy advocacy services, and alternative education centres, hence the hopes to connect with these community groups during Study 1. Making connections with this community and the staff who work with them was an effective way to determine what issues this population was experiencing in terms of PA involvement, understanding, and barriers. An action research approach created an opportunity between myself, as a researcher, and the service providers regarding PA levels within this community. This approach allowed for us to examine questions relevant to the community; to create sustainable partnerships between the alternative education

community and local health/recreation services; and to provide an opportunity for the learners to voice their concerns about their access to PA resources, thus targeting, rather than measuring, a potentially low HL population. Although HL was a component of interest and a mechanism by which our discussions began, the primary interests of this community related to PA, the connection to HL were the community members themselves. Research shows that lower HL is associated with lower levels of income, education and employment (CCL, 2008), all factors present in this student body of adult and alternative learners. In addition, having identified this community as having lower levels of HL via communication with administrators and through Study 1, attending to community needs based on input from my community contact, providing a voice for their opinions about PA, and developing relevant PA program ideas were paramount to measuring each individual's HL level. Thus, the link to HL lies in the community itself, rather than the tools used in this collaboration.

### *Community Partnership*

The community involved in this project was an adult and alternative education facility that is part of the Sooke School District (62), but provides services to people throughout Greater Victoria and Sooke, BC, Canada. There are two primary locations. The first location provides distance education, job training certification, and alternative programs for students completing lower grade level BC curricula. The second location provides First Nations education programs as well as high school equivalency classes for other students needing an alternative schedule or learning environment. Students at the CPO range in age from 15 onward and consist of diverse social and ethnic backgrounds. Although the specifics of the student demographic information could not be shared by administration with an outside party, my community contact spoke to the diversity as well as to the struggles with literacy faced by many of the students. There are

approximately 700 students and 30 staff in the CPO, however, only an estimated 100 students are full time and onsite. Other students are fast tracking specific courses for upgrading or completing adult continuing education courses such as book keeping or basic computer application classes. Thus, the 100 students who are considered to be under the umbrella of public high school curricula are the focus of the CPO in this project.

Contact with the administrators of this centre was made in March, 2008 during recruitment efforts for Study 1. This centre was contacted as a potential location to meet and recruit adults with lower literacy levels. During this process I met an administrator who was very interested in health and PA issues as they pertained the CPO staff and students. Several weeks later the administrator contacted me to come to the centre for a meeting during which she discussed new provincial guidelines from the Ministry of Education that stipulated that all schools providing any form of K-12 education must follow new PA guidelines (See Appendix F). Students in the CPO community were required to do 150 minutes of PA per week, something never before expected of them, at a facility with no gym, no field, limited equipment, and only two teachers familiar with physical education. During the discussion the idea surfaced to register the CPO as an Active Community through the provincial government's ActNow program (discussed in more detail below), as well as for us to collaborate over the initial year of implementing these new PA requirements to generate ideas for a PA system that was amiable to both staff and students. The fact that my community contact identified this issue and initiated the thought process needs to be highlighted as this is an important component of the tenets of action research, that the issue or research topic be identified and initiated by a community member (Creswell, 2008; Green & Kreuter, 2005; George, Daniel, & Green, 2007; Israel et al., 1998; Reason & Bradbury, 2001). From a research perspective, this was a great opportunity to

work *with* a community of adult and alternative learners, a population who in previous research have been shown not only to be at risk of lower levels of HL, but also to have contributed to their own health interventions (Murphy et al. 1996). Before conceptualizing a specific research plan we discussed the following:

*My role as a researcher.*

In action research it is recommended that roles be clearly defined for partners (Israel et al., 1998; Stoecker, 2003). In early meetings with the CPO administrators it was decided that my role in this collaboration would be to spearhead the research, to gather information using relevant research methods to inform community PA program development, and to help create partnerships in the PA community. Stoecker (2003) identifies several roles that academics might take in a collaborative project such as this; I took on the role of a consultant in this particular project. In this role “the community commissions the research, and the academic carries it out while being held accountable to the community...To ask already overburdened community members to do the research when they could be doing other more important things contradicts the social change goal of [PAR]” (p 844). Given the cramped schedules of administrators and staff, my contribution was the time and knowledge devoted to the research component. Although my partner contact was concerned about empowerment of students and developing their capabilities and involvement in health and PA, she had limited time and resources to put towards this endeavor. Similarly, there was concern about how open and honest staff and students would be in contributing their voice to program development if asked directly by an administrator, thus I also acted as a neutral figure in this regard.

Focus groups were chosen as an initial step to gain the perspective of the staff and students on issues surrounding PA, their thoughts on the new guidelines and how PA and education fit

together, and ideas to incorporate into the first year of the new program. This allowed for staff and students to provide feedback to administration in a non-biased and confidential form and to have a voice in the planning process. As requested by my community contact I also conducted baseline and follow-up measures among a small group of CPO members to analyze the PA levels, attitudes and feedback of the CPO members over the first year. A process evaluation was also conducted in June, 2009 to reflect on what was accomplished, this was completed with the community contact. Other involvement in the project on my behalf included helping write grant applications for community funding.

*The Community Partner Organization's contact role.*

The contact at the CPO helped to develop the research questions and methods (outlined in detail in later sections). Information from focus groups and surveys were then shared with the contact. Together with staff, students council and other administration, the contact planned and executed the implementation of the initial program components. The program itself, budgeting, course alterations, and broad discussions of long term program development were completed solely by the community contact and community members. Given their knowledge of the CPO community context and resources, as well as the requirements and restrictions imposed on them by the provincial government it was most appropriate for them to do this on their own and further adheres to the PAR guidelines (George, Daniel, & Green, 2007).

To nurture sustainability (Green et al.,1994; George, Daniel & Green, 2007; Israel et al., 1998; Reason & Bradbury 2001), one of the goals was to create networks within the community that could provide assistance or aid in some form over the long term for the CPO's PA program. One of these contacts was the head administrator for the local municipal recreation centre. This

partner also provided input for questions for the focus group and survey to inform better provision of recreation services to the CPO members.

Some argue that to be truly action research the CPO must be involved in every phase, while others consider the purpose of the research, rather than the roles of each player, to be indicative of the ‘action’ (Reason & Bradbury, 2001). “The problem, however, is not with the approaches but with a conception that [PAR] is a research project. It is not. It is a community organizing and/or development project of which the research is only one piece” (Stoecker, 1999, p 845). As such, in this study, roles were identified and the continuum of PAR guidelines were attended to (George, Daniel, & Green, 2007), but ultimately roles were based on personal skills, time, and the common goal of creating a healthier and more active CPO on their terms. It was research with the purpose of daily physical activity (DPA) program development.

*First steps identified.*

Together with the community contact several initial steps were outlined to commence the project: to hear directly from community members (staff and students) as to what the issues were that needed to be considered during the implementation of this new program, to register the CPO as an Active Community to generate ideas and connections, to apply for two grants to subsidize the limited resources available for daily physical activity (DPA), and to contact potential partners in the community. In terms of research, three main goals were identified by the community contact: to speak with teachers and students using qualitative methods, to develop a survey to generate a baseline and follow-up of PA rates and associated PA concepts among community members, and to conduct a process evaluation to track the program development over the first year. Each of these steps was completed and will be discussed in later sections.

As mentioned above, the CPO was required to implement a program and resources for students to complete 150 minutes of physical activity per week. Following our ‘first steps’ the CPO administration and staff have set up several partnerships to help with this transition. The centre was registered as an Active Community through the provincial ActNow platform, managed through the BC Recreation and Parks Association’s in 2008. This step was taken as a way to connect the CPO with a variety of resources and people to create an avenue for skill and network development to advance the CPO’s PA involvement and knowledge. ‘Active Communities’ ([www.activecommunities.bc.ca](http://www.activecommunities.bc.ca)), modeled after the Healthy Communities movement where constituents and stakeholders define how to best create healthful and physically active opportunities for their own contexts, was designed to facilitate PA program development and promotion within communities. Registration was free to communities and provided information, grants, planning assistance, online measurement tools, branding concepts, and workshops. The program encouraged partnerships within and across communities to create physical activity networks. This initial step created a certain level of commitment from the administration and staff to making PA changes in the community. Further, because Active Communities called for programs to be community specific and locally flavoured, the movement addressed the PAR tenets of sustainability, empowerment, and local relevance (Creswell, 2008; Israel et al., 1997).

In addition, contact was made with the local municipal recreation centre which was also registered as an Active Community. This partnership continues to develop but at the time of this study included access to recreation facilities for CPO classes, education sessions on nutrition and PA skills and information, and sharing of information about community member needs. The recreation administrator also proposed having ‘guest instructors’ come to the CPO venues to

teach a variety of fitness classes for a nominal fee rather than transporting entire classes from school to a recreation centre, thus saving time and money. This partnership was established as a way to create a meaningful and long term connection between the CPO (a school) and the recreation centre in a mutually beneficial way; the school had access to much needed facilities and knowledgeable staff while the recreation centre was reaching identified target populations of youth and low income adults.

The final collaboration for commencing this project was between myself and the CPO. We partnered to develop research strategies to guide program development and to track the program over its first year of implementation. Academic involvement in and support of community initiatives is seen as a valuable way to share knowledge and create meaningful change when done with respect and clear purpose (Stoecker, 1999; Benoit et al., 2005).

The CPO community contact identified several methods and questions. Although the purpose was to create a program, before proceeding to this stage, it was fundamental to get the very people who make up the CPO community involved, particularly since they are the ones affected by the program. It was time to talk with the staff and students, to hear their ideas and use their concepts and concerns as the foundation for program development. Before describing methods used to engage with these research participants, below I offer my reflections on my stance as a researcher in this part of the study.

### *Researcher Stance*

Those well versed in qualitative (Mason, 2002; Patton, 2002) and action research methods (Frisby & Millan, 2002; Reason & Bradbury, 2001) discuss the importance of 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. While efforts were made throughout this research to follow established research protocols and guidelines for qualitative and action research methods, the subjective nature of my involvement must still be noted. Patton (2001) provides several questions to pose to oneself as a researcher during this reflexive process in order to depict one's perspective in terms of background, epistemology, and demographics.

I am a Canadian born woman, residing on Vancouver Island. My family and spouse have been supportive both financially and emotionally of my education, recreation, and personal life choices, for which I am extremely grateful. As a new mother, I am familiar with many of the challenges and joys experienced by many women my age. Like my fellow participants I am what would be considered an younger adult, being between the ages of 18-35; however, I have had the great privilege to have attended university at both the undergraduate and graduate level. My postsecondary education has focused on psychology during my undergraduate years, and healthy living and wellness in my latter years as a graduate student. Work and volunteer experiences in academia and with community organizations further cultivated my interest in health equity, health education, and health promotion in the physical activity domain. All these factors combined with a personal love of sport and exercise ultimately led to this thesis. My life circumstance and social situation have allowed me these opportunities, thus, while I find the notion of better understanding how to eliminate health inequities it has always been clear that understanding and action would come from collaboration. Similarly, the positivist stance that reality exists to be measured and that there is a clear and deductible answer to queries strikes me as a limited way to view the world. We live in a social world where reality, knowledge, inequity and change is constructed by people and systems every day, thus the lens through which I tend to

view the world is more constructive in nature. Having said that, I do see the utility in numbers, and have been trained and mentored to appreciate both qualitative and quantitative methods and perspectives. In short, I am a pragmatist, each problem, person, and community is different, as such so should each solution. To revisit Stoecker (1999, p. 845) “Doing research is not, in itself a goal. Research is only a method to achieve broader goals.”

### *Participants*

#### *Focus groups.*

Five focus groups were conducted, including a total of twenty-seven people (staff and students from the CPO) who volunteered to contribute their ideas. Two of these focus groups were with teachers (one at each location), and three of them were with students (also represented from both locations). Each person participated in only one focus group session. The number of people in each group was based on several factors. First, Patton’s (2002) recommendation to limit participation to a maximum of 10 people per group. Second, to represent both CPO locations by having focus groups scheduled at each locale. Third, as recommended by teachers and administrators, to separate students by gender at one of the locations to create a safe and accepting speaking environment for the female students who volunteered. Finally, to ensure credibility of data through multiple sources of voices (teachers and students) and spaces (location one and location two).

### *Procedure*

#### *Focus Groups.*

Knowledge exchange is key in PAR and in establishing external validity (Reason & Bradbury, 2001; Young & Wharf Higgins, 2010); each partner contributes and shares his/her

expertise. The experts about the community's needs are the community members themselves (Reason & Bradbury, 2001; Stoecker, 1999), so the first phase of the research involved gaining insight from the staff and students before proceeding with program development (Green & Kreuter, 2005). Focus groups were selected rather than individual interviews to help stimulate idea generation and discussion in a comfortable environment, and to accommodate the time sensitivity of students and staff. These are common benefits of focus groups (Patton, 2002). Also, "focus groups mitigate the control the researcher has during the data gathering process by decreasing the power of the researcher over research participants. The collective nature of the group interview empowers the participants and validates their voices and experiences" (Madriz, 2000, p. 838). All staff and students were invited to participate in the focus groups. My community contact acted as a gatekeeper to the community, providing ways for me to contact students and staff during recruitment (Creswell, 2008; Patton, 2002). Teachers were emailed an invitation and were sent a hardcopy notice as well inviting them to participate in the discussions. To invite students to participate, announcements were made in each class by teachers that focus groups were being held with students for this study. Pamphlets with a simple description of the purpose, the incentives, and my contact information were also given to students via the teachers. Individuals who were interested in volunteering were asked to contact me directly via email or phone or merely to show up on the specified day of the focus group. The invitation was again extended to any students/staff who were present at the centre immediately prior to the focus group commencing.

The focus groups were held at the two CPO locations during school hours for students and after work hours for staff in order to be as accessible as possible. Refreshments were provided at each focus group. Student focus group attendees received a \$20 honorarium and

teachers received a Starbucks gift card as thanks for taking the time to contribute to this process. Administration asked that teachers receive a “gift” rather than payment so as not to imply that this was required, paid work.

To provide as much privacy as possible, gain comprehensive member feedback and avoid power-over scenarios between administration and students/staff, the administration, including my immediate community contact, were not privy to the identities of the staff or students who agreed to participate. Names were removed during the transcription process prior to this information being shared with partners to maintain participant confidentiality.

At the onset of each focus group the consent forms were read aloud and focus group members were given an opportunity to ask questions about the process. A list of guidelines for focus group etiquette was outlined to insure respect of all individuals involved and ideas presented, and was followed by a series of open ended discussion questions. The specific etiquette guidelines given and questions posed can be seen as part of the moderator’s guide (Appendix G).

As suggested in the action research and qualitative literature, research should be reflective, cyclic, and sustained (Green & Kreuter, 2005; Israel et al., 1998, Patton, 2002), thus these focus groups were the initial phase to begin planning the PA program and better understanding the student and staff perspective. The schedule of focus groups alternated student-staff-student-staff-student so that ideas from each could be presented to subsequent groups for feedback and to stimulate discussion and idea generation. Such a schedule is also suggested as a way to establish credibility of qualitative data through triangulation between groups (Patton, 2002). In addition to focus group questions, the student focus groups included an activity to help them summarize their ideas in a visual format and highlight key issues. This

activity is one suggested by Colucci (2007) as a method to increase involvement and understanding during focus groups. The activity also served as a form of member-checking (Patton, 2002) to ensure the accuracy of data given that follow up contact with students was difficult based on logistics and privacy concerns in terms of sharing contact information. Based on the content of the preceding focus group discussions, the students were asked to generate a list of the barriers to PA that they experienced, and a list of the top activities they would like to see in the new PA program. These were written on a poster and hung on the wall. Each student was then given a package of coloured stickers. Each colour was associated with a ranking (i.e., red indicated the top priority, blue indicated the second priority etc.). During a break from discussions each student, on his/her own, placed stickers ranking the list in order of importance to them personally. We then discussed which barriers and program ideas surfaced as most important (e.g. which ones had the most red stickers, or no stickers at all). This activity was not conducted with teachers due to time constraints, rather an email was sent to focus group teachers after an initial round of coding had been completed to ensure accuracy of initial themes (Patton, 2002).

Focus groups were audio-recorded and a fellow graduate student served as a note taker to provide written back up and an audit trail of proceedings. The audio files were then downloaded and transcribed by a research assistant at the university and uploaded to NVivo 2.0, a qualitative software program, for analysis. A summary of the notes and the rankings from the posters, as well as a list of barriers and ideas (based on initial coding) was given to my community contact immediately following the focus groups. A full report of the focus group analysis, as well as copies of the transcribed focus groups, was given to the community contact when this process

was complete. Based on the initial focus group findings administration and PA staff discussed next steps in their planning process.

The focus groups were funded through the Sarah Spencer Grant, a graduate student operational grant. However, based on the focus group findings we applied for two additional grants for use in program development. Both grants were received and will be discussed in the process evaluation. The spending of these funds and PA budget was based on focus group findings as well.

#### *Process Evaluation.*

After careful discussion with the CPO contact it was decided that two additional forms of data collection would be beneficial to the community in terms of feedback and reflection during the program development. Following the focus groups, a baseline and follow-up survey was conducted at the beginning and end of the school year to assess student activity and attitudes, sense of control, and knowledge regarding PA. Finally, a process evaluation of the initial year was completed to provide further feedback to administration about the program objectives and planning.

A repeated measures design was used for the survey to track changes and processes during the first year of the CPO PA program from Time 1 (September) to Time 2 (June). Those CPO members who completed the questionnaire in September were asked to complete the follow-up in June. Although the purpose of the survey was for feedback and population description for use in program planning, rather than for testing an intervention.

The survey distribution involved two methods. First, teachers were contacted by the CPO gatekeeper requesting 20 minutes of class time in the first and last month of classes (September and June). Teachers who agreed to do this during class time contacted me to

schedule an appropriate time for survey completion. During the time in class with me, the survey was outlined for the students, the consent form read aloud, and the opportunity for questions given. Student participation was voluntary, and this was stated to them. Each student was assigned an ID number which was kept confidential and was used to track them from Time 1 (September) to Time 2 (June). Names did not appear on surveys. Because literacy is an issue for many of these students the survey was read aloud to each group and each student answered privately on their survey. All students were given a copy of the survey and asked to return it so that no student felt singled out for completing or not completing the survey. Those who did not complete the survey were asked to work quietly at their desks during the 20 minutes. Students were provided with my email and phone number in the event that additional time and assistance working through the questions was needed; no students contacted me. In cases where students were absent on the day of survey completion, copies of the surveys were left with teachers for students to complete if they elected to do so. Any surveys completed by absentee students were placed in a sealed envelope and picked up by me from the teacher.

The second option for completing the surveys, designed primarily for distance education students and those in classes where teachers opted not to have me in, was an online version of the survey. The survey in its entirety was available on Survey Monkey. Survey Monkey is a secure online system where surveys can be created, posted, and answered electronically. All teachers were given the hyperlink for the survey, to be passed on to students. In the consent form, which was the first page of the online survey, my contact information was available for questions or additional assistance. Upon clicking 'submit' the completed survey was automatically sent to a password protected account where it was viewed and printed by me. This is a less desirable option than face-to-face, however, it provides more flexibility for distance

education students and is inclusive of students who have teachers not willing to use class time for the survey. However, the electronic option demanded students access and complete the survey on their own time and required use of a computer.

Students who completed and returned the survey were entered in a draw for an iPod (one draw at baseline, one at follow-up). Staff were also invited to complete the surveys as they are part of the CPO community and their attitudes, knowledge, and involvement in PA was also of interest. The purpose of the survey was to inform the CPO administration and staff, provide feedback opportunities for students, and to provide insight for some components of a process evaluation.

In addition to the follow-up survey in June 2009, upon completion of the school year, a formal process evaluation was conducted. This step is recommended as a phase of the PRECEDE-PROCEED Model (Green & Kreuter, 2005), as process evaluation is an important component of program implementation which addresses the monitoring of program utilization and organization (Rossi, Lipsey, & Freeman, 2003). The purpose of the process evaluation in this project was to provide direction and reflection for the CPO, as well as an opportunity to pass on knowledge and practice in the use of a process evaluation tool and the Active Community website, to aid the CPO in their future PA endeavors. Process evaluation does not examine how effective a program was at changing a behaviour, but rather how the program was implemented and whether it was done so as originally designed. Process evaluation also provides the opportunity for reflection on the partnership and program, which is the final step recommended by Creswell (2008). The process evaluation included a discussion with the CPO administration to review the components of the program that were implemented during the year. As aforementioned, the CPO was registered as an Active Community through the BC Parks and

Recreation Association to provide training and networking at a broader community and policy level, and Active Communities asked registered communities to complete a process evaluation as part of their membership to the program. A free, user-friendly process evaluation tool was provided through Active Communities, thus this tool was used for the process evaluation.

### *Data Collection*

#### *Focus Groups.*

The purpose of the focus groups was to provide an opportunity for staff and students to voice their interests and concerns in a safe environment, and to provide information to aid planning.

Based on the questions and needs of the community as identified by my community contact and colleagues a series of open-ended questions were developed to pose to teachers and students. A moderator's guide was developed to facilitate the focus groups (Bopp et al., 2004). Questions were based on the components of the frameworks used throughout this dissertation; a social-ecological model and the Theory of Planned Behaviour. The questions were posed to determine individual, social, and broader structural/environmental issues related to PA in the lives of CPO students and staff such as understanding of PA benefits and guidelines, barriers, preferred activities, concepts of the current state of PA within the CPO, and how PA and education relate. The questions were intended to gain a rich thick description of a variety of key issues related to PA involvement and program planning, each question had several probes for teachers and students to ensure a high level of description (see Appendix G). Teachers and students were asked similar questions, although teachers' questions were related more to the administration and planning of the new program, as well as their perspectives on the value of PA. Students'

questions were framed more towards discovering their interest in participating in the new program and understanding their current experiences with and perceptions of PA. The focus groups addressed the issue of inclusion and empowerment of community members given that their uncensored opinions and beliefs directly contributed to program development within their school.

#### *Process Evaluation.*

The survey conducted at the beginning and end of the school year (September and June respectively) was used to assess such items as the activity levels of CPO members, their attitudes, values, control beliefs, and intentions regarding PA. The survey also posed questions of interest to community partners that relate to accessibility of PA resources, facility use, and demographics. Finally, a series of questions pertaining to the components of health literacy were asked. Because no HL tools currently exist to examine access, understanding, knowledge, and use of PA resources, a series of brief questions inquiring about these components was posed in Likert Scale format. Due to time restrictions it was not possible to meet in person to conduct standardized HL questionnaires thus these self-report questions added in lieu of traditional HL measurements as an exploratory marker of the major components of HL. Sections of the questionnaire were tested for readability using the SMOG Index. The survey can be seen in Appendix J.

#### *International physical activity questionnaire (IPAQ).*

This is a standardized instrument that assesses physical activity level during work, leisure, and transportation. This tool has been found to be reliable and valid for measuring physical activity (Craig et al, 2003). The short form of the IPAQ was selected for time reasons. This self-report tool consists of seven questions regarding moderate and vigorous activity, walking, and

sedentary time. The format was kept in its original form, however, the language and examples were adjusted for the CPO community to attend to various reading and HL levels. For example, ‘vigorous’ was defined.

*Theory of planned behaviour (TPB).*

As mentioned in the previous methods section this cognitive theory is commonly used to evaluate PA behaviour (Hagger et al., 2002). Survey questionnaires similar to those discussed for study one were used here. All domains of the TPB were represented including intention, attitudes (instrumental and affective), perceived behavioural control (PBC), and subjective norms. These constructs, particularly affective attitude and intentions, are linked to PA behaviours and PBC helped to gain insight into control beliefs among the community members thus touching on issues of efficacy and power over this behaviour. Questions pertaining to some Health Literacy components were included in this section in the same Likert Scale format and included access, understanding, and utilization of PA information.

*Demographics.*

Income, gender, education, employment status, age, as well as current CPO program enrollment status were included in this section.

*Facilities.*

Questions requested and designed by the community partners (e.g. CPO administration, local municipal recreation partners etc.) were also included to establish access to and use of facilities.

For the broader process evaluation the Active Communities process evaluation tool TRACE, which is available online to registered Active Communities was used. This tool asks communities to identify: Who was reached by the program? How many people used program

components? Which sites (or in the CPOs case teachers) adopted the program? How effective are partnerships? How was the program promoted? The TRACE tool is based on the well established RE-AIM Framework (Glasgow, Vogt, & Boles, 1999). This framework can be used in program development, process evaluation and dissemination to illustrate Reach, Efficacy, Adoption, Implementation, and Maintenance of a program or partnership.

We completed the process evaluation using TRACE at the end of the academic year (June, 2009) to establish where the program stood, what was done well, and what needed follow up. Because this community is relatively small, and is a school rather than a municipality, some of the TRACE questions were not relevant. This tool allowed the CPO contact to answer 'not applicable' to such questions. Although I was present for TRACE completion, my role was to explain the purpose of each set of questions, sub-tools, and tool output, and the CPO administrator decided which questions, tools, and sections were relevant to the CPO and answered accordingly.

For the purposes of personal reflection and discussion in the final phases of this project, notes regarding each meeting with CPO were taken, and all email communications saved as a form of audit trail of interaction during the process to help provide insight and organization during analysis and manuscript writing.

### *Analysis*

#### *Focus Groups*

Analysis of the focus groups was completed following the methods outlined by Patton (2002) and Morse (1994), who suggest that project purpose guide analysis. Because these data were being used as an applied qualitative component by the CPO, findings needed to be relevant to the community for program planning rather than laden with theory and jargon, thus analysis of

the focus groups reflects this intention. The audience included the administration, staff, and partners working to develop and sustain a PA program for the CPO students. The purpose of the focus groups was to gain greater insight from teachers and students about the barriers, current knowledge, and attitudes towards PA, as well as the feasibility of the new program and ideas for program implementation.

Focus groups were transcribed verbatim and imported into NVivo 2.0 for content analysis based on the methods suggested by Patton (2002) who suggests several options for organizing and reporting qualitative data. The general methods used in grounded theory content analysis were chosen because they fit the purpose of this research given that grounded theory “aims to generate explanatory propositions that correspond to real world phenomena” (Patton, 2002, p. 489) and involves “classifying and coding qualitative data to produce a framework for organizing and describing what has been collected during fieldwork” (p. 464). Based on this approach to data analysis basic steps involved micro-analysis, open coding, axial coding and note taking in order to conceptually organize qualitative data into discrete categories. However, given that this study was not conducted for theory generation or modification, but rather for practical use of interviewee input in a community program, the final phase related to theory development was not included.

Micro-analysis involved a line-by-line reading of the transcriptions to identify potential categories. This was then followed with open-coding to identify re-occurring concepts and dimensions that formed general categories in the data, creating “free codes” in NVivo. This initial categorizing of data allowed me to define and compare codes that emerged from the focus groups based on commonalities in basic properties. This initial phase of *Comprehending* is key

in uncovering central and peripheral concepts in the data and identifying patterns (Morse, 1994) and lays a foundation on which to proceed with category development.

The second phase of analysis involved identifying major themes and comparing them with each other to ensure convergence within each theme and divergence between them. This meant analyzing the data in a more systematic fashion based on the initial categories. The categories were collapsed and redefined to outline themes by merging ideas and experiences to create a composite pattern. Morse (1994) calls this *Synthesizing* where meaningful pieces of text, related by content, are identified and organized as discrete units.

In the final interpretive phases of analysis *Theorizing and Recontextualizing* (Morse, 1994) themes were reflected upon, as they applied to the CPO context and the major theoretical constructs of the TPB and Social-Ecological Model. “Theory gives qualitative data structure. Theory gives qualitative findings meaning. Without theory, qualitative results would be disconnected from the greater body of knowledge” (Morse, 1994, p. 32).

To help distinguish between categories and themes I turn to more recent guidance by Morse (2008). A category may be considered “a collection of similar data sorted into the same place, and this arrangement enables the researchers to identify and describe the characteristics of the category” (Morse, 2008, p. 727). Theming asks “What is this about?” (p. 727), and requires thinking interpretively about the surfacing patterns. Although themes may be conceptually connected, each theme will be discrete, that is internally homogeneous and externally heterogeneous, themes with overlap in content were collapsed and divergent themes separated. This method is also supported by Creswell (2008, p. 251). This process was organized by converting free codes into a tree-structure of major and minor nodes in NVivo 2.0.

To establish substantive significance (Patton, 2002, p. 467) the findings were compared to other PA literature specifically related to the theories used to guide the focus groups and were provided to the CPO via my community contact for feedback requiring the extent that the findings of the focus groups were useful. To validate the data Patton (2002) suggests several methods of establishing the credibility or validity of qualitative data including comparing perspectives of people from different points of view and data sources called triangulation (Patton, 2002), or crystallization (Denzin, 2010), and member checking. In this study two points of view were expressed, that of the students and that of the teachers, as well as perspectives from both the CPO locations. In addition, multiple data sources were considered in this process including focus groups, the sticker-ranking activity, and research assistant notes. Focus group themes were member checked using the sticker ranking activity with students and an email to teachers. Finally, a peer review of the themes was conducted by allowing a faculty member at the university to examine the themes and supporting quotes to establish accuracy and heterogeneity of themes.

### *Process Evaluation*

Despite the purpose of analysis being related to community use and reflection, rather than statistical significance or theory building, analysis is still a key step in action research just as it is in other paradigms (Creswell, 2008). The pre- and post-surveys were analyzed using SPSS 17.0 to answer research questions 3 and 4. A dependent samples t-test was used to assess differences in PA, TPB components, and HL constructs from Time 1 to Time 2.

Analysis of the TRACE process evaluation was reflective and applied to sustaining and improving the PA program at CPO. The TRACE tool automatically analyses responses and scores a community based on the RE-AIM categories, producing what they call a  $W^4H^2$  Score,

which refers to who, when, where, and how you were reaching community members, as well as what was implemented as part of the plan/program, and how will it be sustained in the community. The community ratings throughout the tool, based on partnership, marketing, program components, participant feedback etc., are combined to automatically scores for five subcomponents. Each score is associated with a certain level of progress on that category ranging from “Still Finding Your Way” to “Well On Your Way”, as well as a total process evaluation score. The tool also allows qualitative comments to be typed and saved in relation to each question, and provides a summary form at the end of the survey if comments were entered.

This automatic analysis allows communities to reflect on the program and its various components, as well as to understand which areas need more development and which were successful. The tool and the results can be accessed an unlimited number of times to help keep the community on track, aid with future planning, and maintain a lasting connection with BCRPA database. Each time the tool is used and saved it is archived and password protected so CPO can return to the surveys in future months and academic years if needed. Although this evaluation uses a different form of analysis than traditional qualitative and quantitative studies, this process evaluation phase is identified as an important component of action research in the latter phases of the PRECEDE-PROCEED Model, and is relevant to the reflection suggested by Creswell (2008) in Step 8 of an action research plan. Furthermore, the analysis is simple and easily accessible to the community thereby creating a resource that can be used by the CPO as their PA program evolves, thus addressing issues of community empowerment via sustainability, knowledge sharing, and skill building (Green et al.,1994; George, Daniel & Green, 2007; Israel et al., 1998; Reason & Bradbury 2001). This analysis and the process evaluation data evolves

with the community as the program grows and the CPO administrators reflect in order to provide a cycle of feedback and change.

## CHAPTER 4. RESULTS

The following chapter includes the results from each of the two studies. Subsection 4.1 outlines the results of Study 1, the exploratory, quantitative research examining the relationship between HL and PA. This is followed by subsection 4.2, which summarizes the results of the focus groups and process evaluation conducted with the CPO in the action research component of my dissertation.

### 4.1 Study 1 Results

#### *Participant Characteristics*

A total of 71 people completed the measures, however, 6 had to be excluded (N = 65) for the following reasons: 4 participants had insufficient accelerometer wear-time (less than 4 days), 1 person stated that the data were not a valid picture of a regular week due to an unrelated back injury that occurred, and 1 participant had abnormally high accelerometer output, completed no log and could not be reached to confirm details regarding wear time. Across the participant sample (N = 65) the mean age was 23 years. The mean income of participants was \$25,274 per year. The highest level of education completed by participants in this study was: Professional/Graduate Degree (3.1%), College/University Degree (23.1%), Vocation/Some College (21.5%), High School Diploma (18.5%). A total of 33.8% of participants had not completed high school. The mean REALM score was 60, a level associated with grade nine ability or higher; thirty-four participants scored 60 or higher (level 4, associated with high school or higher), thirty scored between 45-60 (level three, associated with a seventh to eighth grade level), and one person scored less than 45 (level 2, associated with elementary levels) . A

summary of participant characteristics can be seen in Table 1. In addition, based on recruitment information, of the 65 individuals who completed the measures, 24 were attending an adult or alternative education facility. Twenty-one of the 24 were assessed at a REALM level of three or lower and 12 were not meeting the recommended amount of PA. Across the whole sample 68% of those with REALM level 3 or lower and 66% of those considered inactive were attending an alternative/adult learning centre.

### *Health Literacy and Physical Activity*

REALM level was found to be a significant predictor of PA ( $B = 0.38$ ,  $t = 3.84$ ,  $p < 0.001$ ,  $R^2 = 0.19$ ), explaining 19.2% of PA variance. Participants' REALM levels were also a significant predictor of several major TPB constructs: Attitude ( $B = 0.50$ ,  $t = 2.73$ ,  $p < 0.01$ ,  $R^2 = 0.11$ ), PBC ( $B = 0.45$ ,  $t = 2.07$ ,  $p < 0.05$ ,  $R^2 = 0.06$ ), and Motivation ( $B = 0.84$ ,  $t = 2.76$ ,  $p < 0.01$ ,  $R^2 = 0.11$ ). The mean activity level, in terms of minutes of MVPA per week, was fairly high ( $M = 340$ ) as was REALM score ( $M = 60$ ). However, if we look at the frequencies of each of these there are several interesting findings. Of the 46 participants who were considered to be active, 32 were also high HL (69%). Conversely of the 19 participants who were not considered active, 16 had low HL (84%).

Testing for a mediating effect of the TPB constructs on the HL - PA relationship revealed a mediating trend (that is, the coefficient was smaller for the IV when a mediator was present than when IV alone predicted DV). However, after performing Sobel's Test it was not found to be significant. Based on the study's hypotheses and correlation tables, the mediating effect was tested for on Attitude, Perceived Behavioural Control (PBC), and Subjective Norm (SN), Affective Attitude, and Reading Control Belief, and Jargon Control Belief. Although there was a

trend for mediation, the lack of significance does not support the hypothesis that the TPB mediates the HL-PA relationship.

To better understand the HL-PA relationship, correlations between REALM scores and PAKA scores were also examined. Bivariate correlations ( $r$ ) between key variables can be seen in Table 2 below. First, HL was significantly correlated with PA, both when looking at REALM level ( $r = 0.44, p < 0.01$ ) and PAKA scores ( $r = 0.25, p < 0.05$ ), thus supporting the hypothesis that participants with lower HL scores would be less active. Several other interesting correlations emerged when constructs were teased apart which provide insights into the HL-PA relationship. Health literacy was significantly correlated with all of the TPB constructs related to PA behaviour except for Intention and SN, see Table 2. Of particular interest was the relationship between HL and Affective Attitude ( $r = 0.28, p < 0.05$ ), Instrumental Attitude ( $r = 0.29, p < 0.05$ ), PBC ( $r = 0.25, p < 0.05$ ), and Control Beliefs ( $r = 0.30, p < 0.05$ ). A novel finding was the relationship between HL and some of the specific control beliefs to exercise, 'Jargon or Difficult Instructions Related to Exercise' ( $r = 0.29, p < 0.05$ ), and 'Difficulty Reading as A Barrier to Exercise' ( $r = 0.39, p < 0.01$ ), indicating that these are significant PA barriers for people with low HL compared to those with higher levels of HL. Also of interest was the fact that the TPB constructs were not significantly correlated with exercise behaviour in this population despite the fact that HL was correlated with both the TPB constructs and PA.

However, when socio-economic factors were controlled for, such as age, income, education, marital status, employment status, gender and ethnicity, the magnitude of many of the relationships changed (See Table 3). After controlling for these covariates, a significant correlation still emerged for HL and PA ( $r = 0.37, p < 0.01$ ), however, others such as motivation and attitude were no longer correlated. Other correlations remained significant but changed in

magnitude (effect size). In addition, Intention became a significant correlate ( $r = 0.29$ ,  $p < 0.05$ ) to HL after controlling for socio economic variables.

To further probe this relationship, education was isolated as a covariate. When education alone was added as a control to partial correlations between HL and PA variables, similar change in magnitude and significance in the correlations was seen indicating that education is perhaps a major covariate.

Keeping in mind that a variable acts as a mediator based on “the extent that it accounts for the relationship between the predictor and the criterion” (Baron & Kenny, 1986, p. 1176), and given the findings that the TPB does not significantly mediate the HL-PA relationship, and education in particular seemed to affect HL and PA correlations, a series of regressions were completed to establish an interaction between education and these two variables. A second round of mediation analysis revealed that HL was a significant mediator between Education Level and PA ( $B = 0.022$ ,  $t = 4.53$ ,  $p < 0.001$ ,  $R^2 = 0.17$ ). This is of interest because it tells us that HL and Education are discrete constructs in relation to PA, and that HL helps to explain how or why education affects one’s PA level. The finding that HL mediates the Education-PA relationship may indicate that although overall education is relevant as a social determinant of this health behaviour, there are specific skills and knowledge associated with HL that are unique in preparing or enabling people to maintain an active lifestyle.

Although the PAKA evaluated knowledge as well as more applied aspects of HL, such as utilizing and accessing health information, it had a smaller correlation with PA than the REALM ( $r = 0.25$ ,  $p < 0.05$ ) and became insignificant when controlling for the socio-economic variables. Perhaps this indicates education level is particularly important in relation to some of the components of HL; this is supported by the national data published by the Canadian Fitness and

Lifestyle Research Institute (2003, 2010) which found education to be a key variable in awareness of and access to PA information. However, further research using standardized tools that measure HL more in depth and/or standardized tools more specific to physical activity is warranted to further elucidate this relationship.

The final goal of this study was to examine if general HL (measured by the standardized REALM) was predictive of PA knowledge and literacy (PAKA score). Results from linear regression show that HL is predictive of PA knowledge and literacy ( $B = 7.89$ ,  $t = 7.10$ ,  $p < 0.001$ ,  $R^2 = 0.45$ ), indicating that general HL explains 45% of variance in PA specific knowledge and literacy. This further supports the notion that HL affects a multitude of other health outcomes but that there may be more forms of literacy that are very content-specific, such as those related to distinct lifestyle behaviours. To fully understand this phenomenon, additional standardized measurement tools related to a broader spectrum of health behaviours are needed.

In sum, HL and PA were found to be significantly correlated with each other. The TPB was not found to mediate the HL-PA relationship, as hypothesized. However, HL was found to significantly mediate the relationship between Education and PA. Although the major constructs of the TPB were not found to be related to PA behaviour, several PA beliefs within this model were found to be correlated with HL. Of particular interest was the significant correlation between HL and PBC, as well as HL and PA barriers related to reading ability. These findings help illuminate issues surrounding PA disparities and inequities, create avenues for future research and health promotion planning, and provide a platform for discussion of HL within the PA domain.

Table 1  
*Participant characteristics (N = 65)*

Surveyed Characteristics	
Mean age, years (SD)	22.8 (4.38)
Mean Annual Income (SD)	25 274.42 (21893.47)
Mean BMI (SD)	24.0 (3.37)
Mean MVPA (SD)	340.3 (246.17)
Mean PAKA Score (SD)	21.9 (6.2)
Mean REALM Score (SD)	60.3 (4.04)
Female (%)	43.1
Race/ethnicity (%)	
Caucasian	86.2
Asian	1.5
First Nations	1.5
Other	10.8
Highest level of Education (%)	
< High school	33.8
High school diploma	18.5
Vocational school or some college	21.5
College/University Completed	23.1
Professional or Graduate Degree	3.1
Employment Status (%)	
Unemployed	13.8
Homemaker	0.0
Retired	0.0
Part time employment	23.1
Full time employment	36.9
Student	26.2
Parent Status (%)	
Parent	4.6
Non parent	67.7
Pregnant	1.5
No answer	26.2
Marital Status (%)	
Married/Common law	21.5
Divorced	1.5
Single	73.8
Other	3.1

Table 2  
*Correlations (r) of Key Variables*

	13	12	11	10	9	8	7	6	5	4	3	2	1
1. REALM Level	0.29*	0.39**	0.28*	0.13	0.33**	0.29*	0.28*	0.33**	0.25*	0.11	0.44**	0.67**	1.0
2. PAKA	0.04	0.17	0.03	0.14	0.30*	0.16	0.34**	0.33**	0.23	0.14	0.25*	1.0	
3. PA (150 Mins)	0.22	-0.06	0.15	0.15	0.21	-0.01	0.17	0.14	0.11	0.18	1.0		
4. Intention	-0.10	0.25*	0.13	0.33**	0.32*	0.31*	0.27*	0.32**	0.29*	1.0			
5. PBC	0.15	0.28*	0.19	0.32**	0.39**	0.31*	0.43*	0.45**	1.0				
6. Attitude	0.11	0.32*	0.35**	0.64**	0.74**	0.69**	0.95**	1.0					
7. Affective Attitude	0.07	0.22	0.31*	0.58**	0.71**	0.42**	1.0						
8. Instrumental Attitude	0.14	0.42**	0.30*	0.50**	0.50**	1.0							
9. Motivation	0.08	0.30*	0.43**	0.57**	1.0								
10. Behavioural Beliefs	0.13	0.52**	0.35**	1.0									
11. Control Beliefs	0.69**	0.52**	1.0										
12. Difficulty Reading	0.54*	1.0											
13. Jargon	1.0												

\*p < 0.05, \*\* p < 0.01

Table 3  
*Partial Correlations (r) for Key Variables*

	13	12	11	10	9	8	7	6	5	4	3	2	1
1. REALM Level	0.13	0.37**	0.17	0.15	0.22	0.25	0.11	0.18	0.29*	0.29*	0.37**	0.55**	1.0
2. PAKA	-0.10	0.19	0.36	0.24	0.30*	0.66	0.30*	0.27	0.33*	0.28*	0.07	1.0	
3. PA (150 Mins)	0.16	-0.05	0.1	0.15	0.15	-0.07	0.05	0.02	0.16	0.26	1.0		
4. Intention	-0.10	0.23	0.16	0.37**	0.45*	0.32*	0.36**	0.41**	0.32	1.0			
5. PBC	0.12	0.27	0.19	0.35*	0.45**	0.32*	0.42**	0.46**	1.0				
6. Attitude	0.17	0.33*	0.49**	0.69**	0.69**	0.64**	0.94**	1.0					
7. Affective Attitude	0.10	0.21	0.45**	0.61**	0.68**	0.33*	1.0						
8. Instrumental Attitude	0.22	0.32*	0.34*	0.50**	0.38**	1.0							
9. Motivation	0.06	0.29*	0.46**	0.54**	1.0								
10. Behavioural Beliefs	0.14	0.22	0.40**	1.0									
11. Control Beliefs	0.62**	0.44	1.0										
12. Difficulty Reading	0.49*	1.0											
13. Jargon	1.0												

Controlled for age, income, education, marital status, employment status, gender and ethnicity

\*p < 0.05, \*\* p < 0.01

Table 4  
*Tests for mediation*

Variables	B	SE	Sobel's Statistic
HL x Attitude	0.500	0.183	-
HL x PA	0.378	0.098	-
HL x Attitude x PA	0.378	0.104	-
HL x Motivation	0.848	0.307	-
HL x PA	0.378	0.098	-
HL x Motivation x PA	0.357	0.104	-
HL x PBC	0.450	0.217	-
HL x PA	0.378	0.098	-
HL x PBC x PA	0.380	0.103	-
HL x SN	0.101	0.193	-
HL x PA	0.378	0.098	-
HL x SN x PA	0.384	0.098	-
HL x Intention	0.349	0.396	-
HL x PA	0.378	0.098	-
HL x Intention x PA	0.367	0.098	-
HL x Affective Attitude	0.678	0.296	-
HL x PA	0.378	0.098	-
HL x Affective x PA	0.365	0.103	-
HL x Instrumental Attitude	0.323	0.132	-
HL x PA	0.378	0.098	-
HL x Instrumental x PA	0.410	0.102	-
HL x Difficulty Reading	1.130	0.334	-
HL x PA	0.378	0.098	-
HL x Difficulty Reading x PA	0.463	0.103	-0.746
HL x Jargon	0.639	0.268	-
HL x PA	0.378	0.098	-
HL x Jargon x PA	0.352	0.103	-
Education x HL	0.243	0.044	-
Education x PA	0.106	0.044	-
Education x HL x PA	0.022	0.051	2.567*

*Sobel's test only conducted on those that met mediation criteria, see analysis section*

*\*Sobel's z statistic,  $p < 0.05$*

### *Summary*

This study has identified some interesting discussion points in relation to HL and PA, but has largely focused on intrapersonal factors, or those at a micro-level. To heed the advice of established academics in the HL and PA domains, future research must look beyond the individual in order to be comprehensive and meaningful. In fact, there is general consensus that “we need to transcend treating health literacy as an individual issue” (Lee, Arozullah, & Young, 2004, p. 1317). Increasingly, evidence shows that addressing social determinants of health is needed to reduce health disparities and a possible mechanism for doing so is to empower people via teaching critical health literacy (Mogford, Gould, & Devoght, 2010). Thus, if addressing issues of personal control, access, and ability along with educational factors as potential avenues for improving PA, a logical starting point for change and empowerment is collaboration within a school where students are at risk for low HL and inactivity. Furthermore, many of the people who scored lower levels of HL were members of adult/alternative learning organizations indicating that working with members of an alternative/adult learning centre may be a good opportunity to meet and reach low HL and inactive people. Although the education system is just one of many potential points of contact, targeting the education system as a means to improve health literacy and health is a current recommendation in the literature (Paasche-Orlow & Wolf, 2010). Working with students and teachers in such a community to identify barriers, voice concerns, create partnerships with broader community organizations, and to develop a program from the bottom up may be effective and will take into account the interpersonal and community factors. This notion of inter-sectoral collaboration and participatory research is supported in the latest guidelines (CCDPC & PHAC, 2011) as a priority and has been identified as an effective

approach to HL interventions (King, 2007). It is this direction to which Study 2 now turns its attention.

## 4.2 Study 2 Results

### *Focus Groups*

The focus group results revealed several interesting themes related to the various levels of the social ecological model. Participants were asked a variety of questions based on knowledge, interest, values, barriers, access, and programs related to PA at the CPO and in their personal lives, responses were organized as such by social ecological level, and as a series of themes related to factors that either inhibited or facilitated PA within the CPO.

Before delving into the specific results, this is an apt time to revisit the social ecological model (SEM), as this is the framework that advanced the analytical process from open categories to a thematic and theory based structure. This model posits that health behaviours and outcomes, such as HL and PA, are multidimensional in nature and span factors at the individual, environmental, and socio-political levels. This model is often conceptualized as a series of concentric circles with the individual at the core.

At the centre is the intrapersonal or micro-level, (Sallis et al., 2006; Wharf Higgins, Begoray, & MacDonald, 2009) in this case the factors related directly to the students. The interpersonal or meso-levels represent the immediate context in which the individual exists, which can include factors such as the perceived or built environments, as well as school, family and peer influences. In this case teachers and the community emerged as key inter-personal factors. Finally, the outermost ring encompasses broader socio-political factors that envelope and impact the students, teachers, and CPO community. A depiction of this model, as it emerged from the focus groups, can be seen in Figures 1 and 2. It should be noted that the concentric

rings have been blurred, using dotted lines, to indicate the complex nature of these factors and their progressive and interrelated nature. Similarly, themes have been listed in ascending order from intrapersonal/micro, to interpersonal/meso, to broader socio-political/macro. The inhibitors and facilitators will be discussed below based on these levels and points of interest, and a summary table of the results is provided to highlight the major themes and provide supporting quotes and descriptive information to further illustrate the emergent themes (See Table 5). The results are largely presented in the form of quotes from community members, as they eloquently depict exactly what the issues and solutions are in their own words. Parallels to the literature will be drawn in the discussion section in order to maintain simplicity in presenting the complex layers of this study and give due credence to the CPO members' voices.

#### *Micro-Level PA Inhibitors*

Three primary themes emerged that captured barriers or challenges to engaging in physical activity at the personal level. These ranged from personal beliefs and attitudes to issues relating to personal accessibility.

##### *Theme 1. It's just not me.*

Participants in both schools, while in different programs, provided a clear voice about what made PA difficult in their lives and at school. At the core of these individual level themes was the issue that *It's Just Not Me*, illustrated by 35 comments from teachers and students. This theme was comprised of two sub themes: 'Efficacy and Esteem' and 'Student Diversity' that combined to create a sense for students that PA was not compatible with their life. Students and teachers had distinct concerns about student ability, self-confidence, and personal diversity hampering PA involvement. Inhibitors ranging from variety or lack of PA skills, and poor self

efficacy in relation to PA in general, to embarrassment about involvement in PA, were hampering involvement and comfort in PAs.

Certain people in gym class they stop trying because they know they can't even keep up and they're not willing to push past that point. [Teacher 1]

Like if people laugh, going to the gym and you feel embarrassed about like, oh I'll be working out beside someone who is really toned out and it is hard if you are like overweight or something. [Student 1]

In addition, student variability in skill, confidence, and desire to be involved creates a complicated scenario where PA needs to be customized. For example, some students enjoy competition and feel comfortable while others avoid PA because a competitive tone feels exclusionary for those less skilled or self assured. When asked about competition students all chimed in talking over one another:

[Student 1] "NO!"

[Student 3] "NO!"

[Student 2] "I think it depends..."

[Student 1] "I hate competition."

[Student 2] "...I love competition!"

[And later, in a shy voice], [Student 4] "no, not so competitive."

Teachers support the notion that self-confidence and skill are of issue, but like the students, also highlight diversity as a concern for PA involvement. How, as activity developers, do teachers provide an inclusive lesson plan for PA with such diversity?

...you know you're basically teaching to the exception...it'd be tough to do that kinda activity because then once again you have to segregate the school, who's taken PE, and you guys don't do anything while the other, the rest of the population does this sorta physical activity, and then what do you do? You just gonna leave these kids in the classroom? You can't do that because they need to be supervised. [Teacher 3]

I don't think everyone's going to fit the same shoe. [Teacher 2]

You're unique! [Teacher 5]

*Theme 2. I am not convinced.*

Moving beyond one's sense of personal identity and perceived short comings, another inhibitor emerged at the student level that was considered more overt by teachers and a central issue to successful PA program implementation. Can students be convinced to participate in PA when it has not been required in the past, and when they are attending an alternative school on a voluntary basis? Three subthemes here include: 'Alternative Options and Obligations', 'Only Do PA Because I Have To', and most prominently 'Lack of Student Buy-In'. The overall concept is students are opting not to participate. For some students it is due to obligations that consume their time and energy, "I don't have time. I have work and school" [Student 5]. But '*Alternative Options and Obligations*' often were unhealthy choices made in lieu of PA such as drugs and alcohol for leisure, screen time, and motorized transport.

One student stated, “yeah, I can see drugs being a problem too because you get really, really drugged up on, on everything and you don’t really feel like being active, just sit around and do nothing” [Student 6]. Another concurred that free time is better used, “maybe they are doing something else with their time like watching TV” [Student 7]. Regardless of the reason, PA was not a priority outside school.

This lack of motivation to be involved in PA is further exemplified by responses indicating that involvement in PA occurs only because it is obligatory, and they will participate “because we have to” [Student 8]. A teacher echoed this notion of choice versus obligation in this statement, “they know that physical activity is good for them but probably think it’s more of a choice rather than an obligation to do at school” [Teacher 3].

Overarching both of these, and assuming 54 of the 84 quotes in the “I am Not Convinced Theme” is the notion of lack of student buy-in. Teachers expressed concerns about motivating or convincing students to opt in to PA despite lack of student desire to do so, or competing with activities which trump PA involvement in students’ lives.

They are here by choice, yeah by choice... it’s hard to get them to study for a provincial exam, so how are we supposed to tack on that you have to run for half an hour a day, you have to do this for half an hour a day, so I think it’s gonna be a tough sell... you know, the buy in for the students will be the big barrier. [Teacher 4]

I can certainly see the benefits of doing it all and I think it’d be great it’s just whether or not we can get, you know, it’s just kinda, almost like changing the

culture a bit, and saying this is something we're gonna be doing, and having to get people to buy into it. [Teacher 3]

“So how are we supposed to get the kids to do it?” [Teacher 3]; a sentiment echoed by students commenting on their peers’ ambivalence: “because they have to do something that involves moving. And they have to actually do something and since half the student population smokes chronic and they’re all lazy and don’t want to do anything” [Student 9]. Another student succinctly states, “It’s not so much participation, it’s more interest right?” [Student 6] All these quotes indicate that student interest and motivation is an issue, but perhaps it is not just about student buy-in and personal drive to engage in PA, there are higher level barriers at work.

*Theme 3. It is not accessible to me.*

The final theme falling into the micro level, or student related PA inhibitors, is related to students’ abilities to individually access PA opportunities. Comments about access reflected that PA programs and options were not immediately available or obvious choices for students, but were also limited due to lack of finances and resources needed for PA involvement. Thus, the 55 comments in this theme are subcategorized into ‘Limited Money and Resources’ and ‘Limited Personal Access to PA Opportunities’.

Although accessibility is often thought of as a structural barrier, it has been included here as the final micro level theme, which segues into meso/interpersonal level barriers, because the comments specifically address individuals’ incomes and access to programs. Perhaps this is best represented by the words of students and teachers in the community. These student quotes indicate that cost is an issue to students:

I think, like cost, is a lot. Like you have to have a lot of resources to do recreation, like to go play tennis or go swimming or go to the gym, but all that costs like four or five bucks. Some people doing that like three times a week, it adds up. That is like \$15, or like \$60 a month and like sometimes it is just not affordable for people. [Student 1]

And in keeping with other personal level barriers, several students commented on cost in relation to choice, “well they just go, you know, like I mean you think about it, you just go, “hmm, five bucks you can go here or five bucks you can go and do other stuff” you know what I mean?” [Student 10]. Yet others commented on cost in relation to alternative options or obligations: “you have to think of people’s list of priorities though, like, they’re probably more worried about like their entertainment budget, and they’re uh food and rent, and car payments and stuff like that, right? I think paying to go to the gym is low on people’s priorities” [Student 6].

Teachers were aware of the issue of cost creating an obstacle for students’ involvement in PA. One teacher stated, “we always have like, you know, a lot of students are below the poverty line, you know parents won’t be able to do it either so there’s gonna be stuff like nutrition, and a big one will be um health issues, and basically clothing, you know...” [Teacher 3].

In addition to not having disposable income available for recreational activities, comments about lack of appropriate clothing, footwear, and personal equipment were also cited by teachers and students. “You know we’re assuming that they’re wearing appropriate clothing to do this, yeah, and um you know, often they’re not” [Teacher 5]. Teachers acknowledged these resources as an issue both within and outside of school, while students commonly stated that if recreation or activities were subsidized they would be more likely to participate. However,

monetary and material resources were not the only hurdle to accessibility. Pushing on to the meso-level were comments related to lack of personal use due to lack of immediate access.

But uh, I know, if something's there you're more inclined to use it, if it is not there, then you know, you don't think about it... if you don't have accessibility you're not, I think you're less inclined to make the effort to, to do something right.

[Teacher 6]

...it's just having access to that and reminding you what those little activities/exercise are... [Teacher 5]

I guess it's, you know, what they have accessible to them. [Teacher 6]

And students concurred :

I think it really depends on whether you have access to things around the school, it would probably be possible. [Student 2]

[Motivation may be affected if students are] not enjoying the options that they have available, like, if they don't have a gym nearby but they do have something else that they really don't like to be doing. [Student 3]

... [or when there are] not enough options, like there is going to the gym, going for a run. It just doesn't seem like there are enough options nearby that can help you to WANT to do it. [Student 11]

There is nothing at our school and that would be one of the greatest things we could improve on. Maybe just get a few weights and like a few little things that we could have to use there and do it while we are there. [Student 1]

Perhaps students were not getting involved, faced motivational issues, and were lacking in skill and confidence because personal access to proximal PA has been limited. While accessibility is intrapersonal on some levels, it is very much tied to interpersonal and environmental context as well, hence why this theme falls on the periphery of the intrapersonal circle. One teacher acknowledged access as the complex issue it is, highlighting that motivation and knowledge needs to be cultivated by access and a positive social environment. Teachers in many cases are the interface between students and broader social contexts, and it is the teacher level inhibitors we will visit next.

Yeah, the list could go on and on and on and the sad part that I think is that they don't put themselves out there enough with physical activity to see those benefits or feel them, it's just pain and ugliness because its not frequent enough or uh there's just so much tied to it that they just don't put themselves out there unless they have extra curricular activities that they get positive reinforcement from. [Teacher 7]

### *Meso Level Inhibitors*

#### *Theme 4. Time constraints in teaching schedule.*

Time is a commonly cited barrier to PA for individuals (Symons-Downs & Hausenblas, 2005), and in particular lack of time is related to why people do not enjoy PA (Riecken, Mark, & Rhodes, in press). However, in this case teachers stated their concerns over fitting a block of

time for required daily physical activity into an already full and finite schedule. “You know basically we’re saying we’re gonna incorporate 150 minutes into a 1500 minute schedule” (Teacher 1). Students were attending this alternative school to complete academic requirements in order to progress scholastically and ultimately it is an academic institution. While the benefits of PA are widely understood, and links to academic performance and its importance in school settings are well documented (Active Healthy Kids Canada, 2009), addressing academics remains the primary mandate of educational institutions, and the balancing the curricula schedule an important task of administrators. How are all the curriculum requirements going to fit into a six hour schedule?

That’s one thing that has to be kept in line with education, physical activity like it’s all very well to add in, I appreciate the effort where it’s been added in, but at the same time nothing’s taken away either, there’s no gaps that are being allowed to fill with it, it’s simply another thing put on and it’s up to us to still satisfy the curriculum rich classes. [Teacher 1]

Students also have full schedules as acknowledged by this teacher, “It’s always time. That’s the, the problem with almost everything, is not enough time, you know, as it is they [students] have barely enough time to do their courses online let alone commit to an, uh, physical activity program” [Teacher 6]. Personally reflecting on his/her tightly packed schedule, one student remarked “it’s too much time right, it’s like not only do you want us to be active, but you gotta be active for like an hour, right? The time just seems daunting to people” [Student 10].

Is it possible to fit this extra requirement into the existing schedule without extending the school day? Or is it a matter of cutting down on the curriculum and restructuring classes as

several of the teachers mentioned; raising another concern at the teacher level: who is responsible for such a curriculum shift?

*Theme 5. Teacher overload.*

A concern cited by teachers at both locations, and only by teachers (18 comments), was that these new requirements and the inclusion of daily physical activity was going to become an additional responsibility of the teaching staff. The teachers are a hardworking group of individuals, with limited time and resources, who voiced great concern that PA will be yet another expectation of the teacher role and could cause stress and burnout due to the additional workload. How can teachers do one more thing?

Indeed, as summed up by Teacher 3, “I’m all for options, that sorta stuff, like at the end of the day um how much more can we do? Do we have to monitor what every single student is doing for those three minutes a day, that’s a big job. We don’t get lunch as it is.” Similarly this conversation between two coworkers reveals the issue of work overload:

That’s the thing though, how do we, like, what, something has to be given up, gotta give, and you know, I hear myself talking and I’m thinking like man...[Teacher 4]

...that’s another thing I have to do...[Teacher 8]

...but I never wanted to be that teacher. And trust me, I haven’t had a lunch in 6 years, I haven’t had a break in six years. [Teacher 4]

Although this was a distinct theme and real concern for teachers involved in the focus group sessions, it was a complex issue related to time and curriculum restraints, as well as support and resources available. It is important to note that teachers’ explanations of the issue tended to be embedded in longer diatribes about the complexity and convolution of the education

system, revealing that solutions will require more than individual level efforts. Despite the mosaic of issues surrounding Teacher Overload as an inhibitor of effectively incorporating PA into the CPO community, the previous teacher goes on later in the focus group to eloquently summarize Teacher Overload and the context in which it resides.

I'd like to answer that question on a broader range is that, it's come down from the ministry but there's no support provided with that, whether it's lessening the curriculum, timetable time given for it, um resources provided, training days, and TOC relief provided, there's absolutely no help, it's simply another load put on the cart, and I think that you're gonna see there's an emotional impact with that, especially in the higher curriculum and areas, and you're also going to see...you know, it's just not gonna work that well and it'll probably flop unless this is provided, you know and it's really important stuff that's happening and I'm glad it's happening, but at the same time, you can't just increase work load without assistance and expect a happier and successful outcome. Like any business model knows, that's not a smart move, and yet it's just being done. [Teacher 1]

Just as the students are enveloped by broader social and systematic circumstances, so too are the teachers. Although teacher overload may partially be due to how teachers frame the extra work; for the most part teachers commented on their willingness and even excitement about including PA but the burden of extra work was viewed as a major hurdle. If the curriculum requirements are expanding, so too does the support from the broader school community and policy levels. This brings us to other meso-level factors at work that affect PA in the CPO.

Research has shown that the meso-level encompasses teachers, but also peers, friends, family, and perceived environment (Sallis et al., 2006; Wharf Higgins, Begoray, & MacDonald, 2009).

This trend was evident among the additional inhibitor themes that emerged.

*Theme 6. This place is physically limiting.*

Just as Sallis and colleagues (2006) and Wharf Higgins and her coauthors (2009) found that built environment influenced PA and health literacy respectively, so too does it seem to limit PA among CPO members here. This school is essentially located in two office buildings, there is no gymnasium or workout room in either location, no field affiliated with the school, and no designated recreational space. Both facilities are located on busy roads, and have small parking lots set aside for cars, and are located in a suburban municipality that, while naturally beautiful, is far away from the resources of the city's core. One location does have a garden, which will be discussed in later sections, however, the opportunity for PA here cannot sustain the DPA requirement for all the CPO students. Thus, it is clear why this was a notable concern among teachers and students alike, and generated thirty four comments directly related to the facility itself as a barrier to PA at the community level. In short, this theme revealed that space constraints and the physical location of the CPO centres are not conducive to PA; this is not a typical school house by any means. This sentiment extended across the focus groups.

Yeah they'd have to have places, I was just thinking you know other schools might be...they have a gym there they have that sorta thing but we don't have access to that. [Teacher 4]

...no space, like everything will have to be in classrooms, desks and chairs will have to be moved. [Teacher 1]

The problem is, is this facility isn't really accessible to doing that. Like there's no room in this building that we'd be able to do that in, um, the parking lot would be fun, but um, too much traffic, um, and unfortunately we need all the space so it's not like we could cordon off a section. ...So, here, I you know, short of taking a section of the parking lot, which won't, wouldn't happen, you know I don't really see a space that's really close that we would have access to. I'm just trying to think, there's no little parks around either that you could just sorta walk to.

[Teacher 6]

Or even if we got like a space for equipment, there must be somewhere we can use, to put one of those bike chairs or an elliptical, or a treadmill or even just some weights and things, where we could just go in there for lunch or for, if we have a block off or something. You know? [Student 2]

In addition to the facility itself being small, the school community is viewed as limiting in that each student cohort is small as well, thus limiting options for team sports, clubs, and large events. "Like when your school, it's so small here we don't really have enough people to form groups like that" [Student 6]. Small student body was not the only barrier related to other people. Another theme at the meso level that surfaced captured social influences, and the negative social impact on CPO students.

*Theme 7. Unhealthy influences.*

Twelve comments were made about the fact that friends and family of students were not only uninterested in PA, but in many cases encouraged unhealthy behaviours instead of exercise. Although relatively small in number, these comments were distinct and vociferous among the students. Laziness, substance use, television, and disinterest in PA among social circles were cited as inhibitors of student PA involvement. At first glance this may seem to overlap the *Alternative Options and Obligations* theme cited at the intrapersonal level, for example in terms of screen time instead of PA, but the key difference here is that an influential other is seen as responsible for dissuading them from participating in PA, rather than an individually-initiated behaviour.

When I'm with my friends we normally smoke a joint and it's impossible to get those guys off the couch. Like, I always wanna get out and do something, and everyone's like, "I'm too lazy and we just smoked up" and I'm, I always get so much energy when I do it right, but they don't wanna do anything right?

[Student 6]

...people our age um tend to not wanna do that stuff, cuz when you're kids you know, that's what you always did you "Hey can I play with you?" and then you guys can all go out and play sports, or there's games and stuff but nowadays we're just like "Hey do you guys wanna go and get drunk?"

[Student 10]

Peer pressure, like going to get high and getting drunk instead of like going down to the gym. And like all this pressure from society to be, like, the cool person instead of actually doing something that will help you in the future.

[Student 1]

...they're not really engaged in what's out there they're not utilizing or becoming involved in what's available, but I mean, why would they do that unless it was family promoted? [Teacher 1]

The students and the school are situated within a culture and a context, creating an effect on the student buy-in discussed at the intrapersonal/micro level. The web of people around and within the community seemed to impact views of and involvement in PA; but further tangling the web of students, teachers, facilities, and social influences are the broader socio-political circles that envelop them.

### *Macro Level Inhibitors-Curriculum and Policy*

#### *Theme 8. How are we supposed to do this?*

A top down decision was made by the BC Ministry of Education to implement a mandatory PA requirement. The Program Guide For Daily Physical Activity from the ministry's website (BC Ministry of Education, 2008) states that students in grades ten through twelve must document and report a minimum of 150 minutes per week of physical activity at a moderate to vigorous intensity, as part of their Graduation Transitions program. Boards/Authorities are responsible for providing options

to give students a number of choices for how they will meet the daily physical activity requirements at school, at home and/or in the community (p. 4).

Although the website does provide some ideas, tools for tracking PA (such as journals), and example lesson plans, it is essentially a set of prescribed learning outcomes and achievement indicators by which the requirement can be measured. This lack of concrete and immediately tangible support concerned teachers who, while acknowledging the importance of PA in the CPO setting and the new 150 minute requirement, were unsure of how to proceed without a support to effectively implement the new mandate. A curriculum exists, more is being added, and it was unclear how to adopt and/or adapt in a resource vacuum. As one teacher candidly described,

I think you're gonna hear screams from the high school, we already are from the high school teachers, that there's, these are high curriculum areas and we hear screams if we're going to lose one day in the school year, like people freak out. Like we have provincial exams, we have, they know how many classes they have, each class is already planned, and all of a sudden they're being told "by the way..." but we're not gonna take from the curriculum you have to teach and cover, so it's just more pressure pushing, so it has to be exactly what she said, bang, easy, done, do it, incorporate it [Teacher 3].

Twenty four quotes illustrate this theme. Essentially, teachers concurred that the PA mandate was premised on good intentions, but questioned its practicality in its current incarnation, "theoretically speaking it's a wonderful idea to have '150 minutes of physical activity per week' but when you get right down to it and come into a school, it's just impossible" [Teacher 4]. Although teachers in the focus groups seemed to support the general concept of

daily physical activity, they questioned how to adequately do so without support and funding from higher levels in the form of clear expectations, teacher resources, qualified staff, and money. It was a question of feasibility based on the current top-down support provided. “I hope that if they keep to something like this that the BC Ministry of Education kind of sticks to their guns and kind of follows through, I think it’s an excellent idea without any resources” [Teacher 3].

Many of the issues discussed in the micro and meso levels were entangled in concerns about policy. For example, ministry protocol related to student inclusion and diversity became thorny when considering practical issues of tracking PA and organizing class time,

I guess the challenge is there is that, if you have half the class that does something outside of the classroom, half the class that doesn’t, what are you gonna do? Take the half the class that is not doing anything outside of the classroom and take them for a walk...and then the others...cause if you’re gonna do the 30 minutes you might as well do it with everyone...it’s gonna be just a nightmare if you get someone to sign a paper saying “Oh I jumped on the treadmill last night.” [Teacher 4]

Similarly, concern about the quick change from one set of policies to another, rather than a gradual change and culture shift over time has teachers confused about how to maintain student satisfaction and compliance:

I think one of the things you're gonna come up against to though is that for the past number of years we've told students that gym's always been an option, most of them opt out, that's why it was not compulsory anymore, so when you come to the situation like this with kids where they had the option of opting out, it's gonna be tough to get them to come, to come back in...so I think if you can get the kids coming in grade 6, 7, and 8 you know, it might be, you're gonna build a cultural, "this is what you do", you know throughout the week. [Teacher 3]

This sentiment of gradual implementation is echoed in suggestions about phasing in the length of time, "I think, another thing I would think is 150 [minutes] seems a bit grand and maybe, maybe they could have phased it in...so maybe, what, 60 minutes or something, you know, allow some transition time to get it done" [Teacher 8]. Despite the fact that the 150 minutes is a recommendation based in the scientific literature, the practical side of implementing the recommendation eluded teachers.

Communication between system levels about changes in protocol, curriculum resources, and implementation were also seen as a policy snag by teachers, and further exemplify the notion that a policy recommendation was made without the necessary consultation or foundation to move it forward. "It's crazy to think it's June 2nd and this is to start in September, and we're, and you know our first real planning meeting on it is with a university researcher (laughter). You know our principal, our vice principal hasn't sat down with us and said this is what we're doing" [Teacher 3]. But uncertainty about how to implement the ministry mandate may go beyond teachers, perhaps "the administration knows perfectly well what teachers are thinking, I'm sure

they're in the same boat thinking "Holy" how are we, you know, "how are we gonna do it." I think if you shut your eyes then it's not really there [Teacher 4].

*Theme 9. Ministry lip service to PA.*

Surrounding concerns about the practicality of implementing the daily physical activity mandate in terms of specific resources and communication needed, teachers expressed an even broader policy level inhibitor; lack of belief or trust in the longevity of the mandate itself. Thirty two comments were made about the possibility of this being lip service to physical activity and health for BC's students, rather than a real shift in value, at the ministry level. Comments ranged from simple comments about space in the curriculum and graduation requirements, to sweeping statements about lack of belief in ministry values. Teachers interpreted that, due to the lack of flexibility in the curriculum, the value attributed to academics in curriculum structure, and the transient nature of previous policies, the PA mandate very may well be a fad and that academics will ultimately trump all other components of school culture. "I think it's important enough that it should be allowed, that time, it has to be adjusted, I think we need to reevaluate our priorities, like that [PA] is just as important as math 12, you know? If not more 'cause everybody will be using this [PA as a life skill]!" [Teacher 1]. It became clear that implementing PA in schools was not easily welcomed because the structure on which daily physical activity mandate was built and the intent of policy makers themselves were questioned.

...probably teachers would be hesitant about this, is this a fad? Is this gonna go the way the [graduation] portfolio did? So, like the ministry said 'okay this is what we're gonna do' and I don't think that people, I don't think many teachers will view this daily physical activity as something that is legitimate. I think probably that this is something the

ministry came up with that's a 'great idea', and they probably all believe that it IS a good idea, but it's a lot different – some great idea in office to how we're gonna get...800 000 students doing this, transferring that over. And is there enough, is there enough between the good idea to the actual, you know, actually doing it. Is there enough there to keep it going? Funding, activities, like once again, you know, if this is gonna happen, is there support, there's all sorts of you know, various little ideas, like what you mentioned but is that enough to get 30 minutes a day of activity across the province. Or is this something they're gonna say next year in cabinet meetings, "Oh that was a great idea but we've gotta rethink this" and scrap the whole thing, which is, I would say is a flip of the coin or I would say more likely than not is what is going to happen [Teacher 3].

Not surprisingly, teachers and students recognized that creating an active community within the CPO was not as simple as telling students they need to be active. Multiple and layered factors, wedged in a system that is in constant flux, complicate and challenge policy implementation at the student, teacher, and community levels. It seemed like a daunting task to the CPO, the PA program must begin somewhere, and arguably the best place to start is by listening to the people in the community and addressing the barriers based on the comments they put forth about program facilitation. The next portion of the results will focus on themes and quotes related to program development, addressing multi-level barriers, based on the ideas of focus group participants.

### *Micro-Level Facilitators*

#### *Theme 1. Create student buy-in.*

Ultimately the daily PA mandate is about getting students active and engaged in healthy living. Thus, to some extent the program must reflect their wishes and preferences in order to maximize student enjoyment and involvement. Three subthemes converged to *Create Student Buy In*: Listen To Students, Fun Through Variety, and Create Incentives. Connecting these subthemes is the conceptual argument, and key tenet of health promotion, that adoption of a new behaviour is more successful when those it affects have input into its design. In the case of students, this means involvement in creating a fun, varied, and sometimes rewarding activity program. This theme counters the concerns stated in the inhibitor *I Am Not Convinced*.

Notably, forty comments were made regarding the need to allow for student input into activity selection. Students had widely varied tastes in what they liked to do, but were keen to propose activity ideas and shape school-based PA opportunities. Increasing student control over their health decisions may range from voicing activity preferences and choosing among options to a more direct role in program planning. Students stated that they could “have a vote or something” [Student 8]. Another suggested “... it is like there is 20 minutes of any activity we want and then 20 minutes of the next activity. And so on, or we can choose to do one for like the whole time” [Student 1]. This form of needs assessment, while foundational to health promotion planning, seemed largely absent from current practices at the CPO. In fact, one teacher admitted to being unaware of students’ PA preferences, another divulged that they failed to inquire about their preferences, and a third pointedly asked “what sort of programs are they interested in? I have students that are like from you know 15 [years] up to whatever the upper end is so, you know what sort of things are they interested in?” [Teacher 6].

In addition to seeking input into PA design, many students spoke to the fact that engaging in this manner increased their enjoyment of PA. Moreover, such student buy-in promises to

address teacher overload if students aid in planning. “At the beginning of each week you could ask the group what they want to do for PE for the day you are going to do it” [Student 9], rather than teachers making assumptions about student preferences and abilities. While some students felt a need for more understanding of the student perspective –

Sometimes you can get like, it is just hard to like, your PE teacher if they are “Do this! DO this!” and they’ll like push you over your limit. It is nothing about the actual physical aspect, I think it is more like the people who make sometimes like they shouldn’t be doing that, because we should be able to do it at our own pace [Student 1].

Other students praised teachers who did use democracy in the class, “they have this way of making us feel like we are in charge, but [the teacher] is actually still picking the activities and then we get to choose which one” [Student 2]. The focus group members chimed in with agreement, “we get options at the beginning of each day” [Student 3], “it is kind of like an A, B, C choice and then you can do one” [Student 11], “we vote” [Student 2]. Even this basic level of student involvement appeared to allow for student ownership over PA, and to increase enjoyment.

What is it that students want in their PA opportunities? The answer in part seems to be fun and varied activities, and incentives. Given the wide range in activity preferences from team sports to yoga, hiking to paintball, it was clear that providing options is needed. There was no precise answer to what specific activity students liked, rather enjoyment hinged on variety and providing class experiences that are “always changing and always fun that’s the key” [Teacher 9]. In sixty seven comments articulated during the focus groups, teachers and students described how to achieve ‘*Fun Through Variety*’. Offering a variety of novel activities may help avoid the

boredom of repetitive activities some students recalled experiencing in physical education:

“[traditional PE] it is just like the same thing over and over again, like running laps or for like two hours on the bike or whatever, it is just like the same thing. I like it when we do ten minutes of this and then twenty minutes of this, and then ten minutes of this” [Student 1]. “Like when you’re starting anything new, I think to make it fun is the first thing you do and it’s about, and that’s what I do, I know I’ve taken some students on hikes and I just make it fun” [Teacher 8]

Finally, for some students putting a personal stamp on their PA and having a range of activities to try was not enough to persuade them to be active. Although this third sub-theme was less dominant than the other two, eleven comments denoting the potential for incentives to create student buy-in could not be ignored. Teachers recognized that, for some students, their motivation relied on experiencing immediately positive outcomes from, rather than simply enjoying the act of exercise. “One of the problems I think we find, especially with the, you know, 15-19 age um is immediate gratification” [Teacher 1]. Echoing this, one student admitted “Like there is not enough incentive to go, it is like, yeah so I am going to be fit, but like, what is the immediate, like, deal” [Student 11]? Ideas for sweetening the ‘deal’ included extrinsic rewards or prizes such as receiving special course credit, food, or recreation passes.

*Theme 2. Help us learn about PA.*

Importantly, and in keeping with the definition of health literacy, enhancing students’ abilities to access, understand and use PA information emerged as an important theme. Learning about PA for students meant expanding the availability and distribution of information and their knowledge of its benefits. In effect, increasing the first three constructs of health literacy may help to alleviate the inhibitors *I Am Not Convinced* and *It Is Just Not Me*. Three subthemes helped organize the eighty-five quotes comprising this theme.

First, there was a call to educate students about PA. Eighteen comments were made in this regard. Commenting on the absence of student knowledge, teachers remarked:

...they don't really have that ability yet to think, you know to sacrifice now for long term benefits...I think education is a big one. [Teacher 1]

...[there is] not enough exposure to it, not enough education around it. [Teacher 9]

Students remembered the school nurse providing some health information, although simply handing out physical activity guides was rejected as effective and few specific suggestions were overtly made about how to introduce PA information into classrooms. However, drawing on the data revealed as the second sub-theme, the mind-body connection, may offer an avenue for integrating PA knowledge into the curriculum.

Thirty four comments surrounding the positive effect that exercise has on one's mental state were made during the focus groups, the majority of which were elicited following questions regarding the importance of physical activity and enjoyment of physical activity. The psychological benefits of PA are well documented in the literature in relation to stress, mood, energy levels, mental clarity, and academic performance (Active Healthy Kids, 2009; Public Health Agency of Canada, 2011), and were mentioned by focus group members as positive outcomes of PA. Students enjoyed the elevated mood and energy levels associated with exercise, and teachers noted the positive psychological effect exercise had on themselves as well as among students.

You can usually tell when you're not active cuz you can feel it, you can feel it in your body and your head, you just feel like, you know, really heavy, and like

drowsy and all the time right. What you notice is when you're active and you're like, energetic and you're sweating lots you notice you have more energy, you know. [Student 12]

It is like it is something you crave after a while, you NEED to do it and it is so important to, like, have. Instead of like feeling high after eating a whole bunch of candy. With the 30 minutes and some core, its really like, and then you do it and you have that natural high. [Student 1]

I think if, it's a great way to manage stress as well because kids are exposed to stress, big deal stress, and I think that's one of the benefits, especially for the, well for everyone, I think of the mental health that comes from physical activity. [Teacher 9]

Mental clarity, I would think it would give them more focus, um, if they did expend their energy. [Teacher 8]

Physical activity was viewed as effecting favourable mental outcomes, notwithstanding its often physically unpleasant demands. Students felt personal benefits, and teachers were attentive to the promise of enhanced student attention and scholastic performance. Given that both students and teachers voiced their interest and enjoyment of this component of PA, it may be a suitable gateway topic to initiate a discussion about PA.

Accessing PA information was the first subtheme in helping students learn about PA. A key component of HL is improving access to information (CCL, 2008), and teaching skills related to locating credible information sources is critical. Based on the responses to the question regarding where students, and teachers turn to retrieve PA information, there was clearly a heavy reliance on the internet. No specific sites or reputable online sources were mentioned by either group, merely references to Google, Yahoo, and the internet. There was uniform agreement among the students that the internet was a primary source of PA information when needed, however, secondary sources varied and included health care professionals, teachers, gym attendants, magazines, and friends. Statements tended to be simple, “[Get information] from the doctor or Google” [Student 7], and often contained an air of uncertainty “magazines, uhhh I don’t know, fitness flex or whatever it’s called” [Student 13]. Teachers seconded much of what students said about accessing information, “probably the internet, if they wanted to know something in particular” [Teacher 6].

But there were concerns about whether the internet was enough, and whether community members possessed an adequate level of health literacy, computer literacy, and media literacy to competently navigate and negotiate this information-dense source. “I think there’s, there’s, sort of a, an assumption that, ‘oh there’s so much on the internet, you can find stuff so easily’, well the sheer volume of information to feel your way through, especially for people, especially for myself, that don’t have a specialized knowledge, or background knowledge” [Teacher 1]. It seems that access to PA information needs to be improved. Given that teachers and students cited the internet as a preferred source both need to be educated about utilizing it effectively, if we are to create a media literate and health information savvy community. As with media

literacy curricula, students can be taught how to search efficiently, identify credible sources, and think critically about the authors of the information and the content of the information.

Students and teachers also need to learn how to diversify their information sources to alleviate the reliance on typically jargon-heavy print media and the conflicting and often questionable accuracy of information gleaned via the internet. “I mean the internet is such an amazing resource, but often it’s nice, especially with things like physical activity, um to be shown. I mean it’s difficult to read about it” [Teacher 5]. Perhaps an in depth discussion about alternate sources, introduction to recreation centre staff, and inclusion of the school nurse in the PA conversation would be appropriate places to begin the learning process. Having discussed the importance of the student level theme *Help Us Learn About PA*, it seems fitting to acknowledge that other members of the CPO also need guidance and instruction.

#### *Meso-Level Facilitators*

##### *Theme 3. Teach the teachers.*

Creating structured opportunities for teacher training, participation, and knowledge sharing regarding PA instruction was suggested as a way to provide teachers with the necessary tools and confidence to proceed comfortably and competently with PA in their classes. Increasing teacher knowledge and skills may mollify the barriers outlined in the *Teacher Overload* and *How Are We Supposed To Do This* themes, by increasing understanding of how to incorporate PA daily, how to engage students, and to effectively use the resources that are available to them as teachers.

Essentially, teachers want to be shown what to do, given options for how to proceed, and provided with the information they need to move forward with PA in their classes. In essence, increasing HL of teachers is the idea, a notion supported in the literature calling for teacher

training, and higher level education, in health related topics (Vamos, 2005; Vamos & Hayos, 2010). There are plenty of options for how teaching the teachers might take form within the existing timetable and among the current staff. For example, teachers and staff meet for regular staff meetings, Professional Development Days, and term planning sessions, which provide an occasion when teachers are present, paid, and ready to learn and discuss topics related to teaching.

What we could do is, um, even at our staff meetings discuss it on a monthly basis. Um, planning on what we're gonna do the following month as far as physical activity goes, bringing our ideas and do it as a school. [Teacher 2]

Maybe you have a group, like a Pro D day or something offered, okay, this is what it would look like, and it's how you can integrate it and then it's here, and there it is here, and here it is here...like we need something handed to us that's very easy to adjust and play with and clear, and shown. I think that's crucial, you're not gonna get teachers doing this unless they're actually in a group and shown how they can quickly incorporate this. [Teacher 1]

You know what would be amazing is to have on our school planning day, you know at the beginning of September, September 22, have someone come in for 45 minutes or an hour, show us some, give us a little tidbit, a snapshot of the research, um, and as we're doing that learn some exercises that we can do, um, you know that we can do without a whole lot of space, without any kind of uh, equipment. [Teacher 9]

[M]aybe have somebody come in like once a semester and go over everything and lay down some guide rules for like teachers and stuff and teachers could take that list and have a list of like activities and stuff that like, would be possible for people to do. [Student 6]

Teachers voiced a willingness to comply in terms of PA implementation, provided they can be shown how to do so without having to self-educate and plan alone. “I wanna be shown that. I don’t wanna to have to read it, I don’t want to want to have to um, yeah, try to figure it out. I want to be shown” [Teacher 9]. Being “shown” could be having an expert provide information, knowledge transmission from administration, knowledge sharing and idea generation among colleagues, or training a PA specialist teacher with whom other teachers consult.

*Theme 4. Take it easy on teachers.*

To further mitigate inhibitors for teachers, such as *Teacher Overload*, *Time Constraints*, and concerns about *How Are We Supposed To Do This*, making the process of PA in school as easy for teachers as possible is necessary. Fifty six comments about *Easy Implementation Ideas*, *Support Staff*, and *Incorporation of PA Into Regular Classes* were generated and converged as subthemes. Providing trained support staff, encouraging simple and effective activities, and using PA as a component of existing lesson plans were described as facilitating the integration of PA.

At the core of this theme is the subtheme, *Easy Implementation Ideas*, reflecting that activities need to be “easy, smooth, seamless, just be one less, not another thing that we have to pull

out all this equipment for, get people organized move desks” [Teacher 1], and “so it has to be exactly what she said, bang, easy, done, do it, incorporate it” [Teacher 7], “something simple and relaxing and easy, but different” [Teacher 9]. Suggestions for easy and effortless activities included ones that are innately simplistic and require little planning on the part of the teacher, such as walking or stretching. Others were related to the need for structured planning:

Yeah, I’m thinking like maybe thirty things that you could do in ten minutes, and they would have to be easy for the kids to buy in to, easy for us to go through and almost if they wanted to they could go through it independently and find something for themselves to do for five minutes, but they would have to be like low impact, uh, like really easy to do, really quick to do. [Teacher 9]

However, many of the suggestions specifically spoke to ease in relation to creating active lesson plans. Both teachers and students put forth ideas about how to incorporate PA into existing lesson plans, rather than creating new classes or redesigning course plans for academics such as English and math. In some cases this meant fitting in stretching during an informal review of class material, or summarizing a class during a group walk. A student said, “uh like go out for a walk or whatnot and talk about your class and stuff...or, maybe about what you’re learning” [Student 13]. Other suggestions were more detailed,

You can actually tie your physical activities in with the academics as opposed to if you’re doing graphs than you can actually run and do the graphs and you know, you can incorporate it, intertwine with it. So you can use it as a learning tool, which is kinaesthetic, hands on learning and you can take it back to the classroom ... [Teacher 8]

I guess ideally the hiking season would be the easiest one if you wanna incorporate it into your English class maybe you have you know, a Tuesday hike, you hike down, hopefully it's good weather, and then maybe you do some reading at the bottom there, talk about what you're gonna do and then, then you hike back. [Teacher 3]

Like in English we could go outside, like in the bush somewhere, or something. Or in art class we could go for a walk and draw something in the forest. [Student 3]

Rather than adding PA into existing curricula, participants also spoke of re-framing the PA-academic integration to account for energy expenditure embedded as part of traditional learning activities as counting towards the 150 minutes of daily PA, creating a two-for-one idea by combining PA within other classes.

You see in carpentry they'd be getting their physical activity already incorporated, hammering nails and stuff, so really when you think about it um, Wednesdays and Fridays, wouldn't their 30 minutes be taken care of already? [Teacher 4]

If they are the interested in going for swim at [the local recreation centre] or are they uh, can they work it into a trip to the library there. You know like, two for one. [Teacher 5]

I do think we have untapped um field play and kinesthetic learning, like we really haven't even gone there like there's so much we can do like even doing a little memory dance, I've done that cause it's fun to watch them do it, but little memory dances to um get a chain of knowledge locked into their brains and such. [Teacher 8]

The third recommendation to emerge from this theme to facilitate PA implementation by teachers is to have additional personnel, volunteer or paid, school district or external, to assist teachers in their planning and implementation efforts. One teacher asked, "Would we be able to hire somebody to incorporate an activity to complement what teachers will do as well, so that it's not all on just the teachers, that would be awesome, so that it just gives more insight for the staff and as well as the students" [Teacher 2]. Suggestions of who to bring in included "mobile instructors" hired for one-off fitness classes at the school, professional consultants, recreation partners, or additional physical education staff. Essentially, "support, um, for sport and resources, from the community, from the administrators and all angles of how we're going to incorporate it" [Teacher 2] so it can become part of daily classes.

*Theme 5. Appropriate scheduling.*

In addition to making it easier for teachers to teach PA, it also became clear that appropriate scheduling could potentially facilitate *Creating Student Buy-in* and address *Time Constraints* through efficient planning and execution at a time and day when students are likely to attend. This theme is based on 68 quotes, and considers recommendations for appropriate durations and time of day for scheduling PA at school that will garner the most student involvement and work within existing teaching schedules.

First, the duration preference ranged from short spans of time for the mandatory daily PA, to longer bouts for fun, adventurous PA sessions. “Well it’s probably easiest to take like 10, 15 minutes like everyday rather than do like an hour, 45 minutes once or twice a week right?” [Student 6]. Student 12 concurred, “I agree, cuz you go for like 40 minutes or whatever, people just don’t wanna do it anymore.” Teachers waivered between having several long sessions to get the required minutes out of the way, or short easily implemented sessions in class,

...it’s challenging to get it in daily, it almost becomes something more like, how can we put it into a weekly activity, and so “okay you know we’ll try to do something Wednesday” or, or, Friday or something like that, and uh, so it doesn’t often, or it doesn’t always happen at this school on a daily, daily event [Teacher 3].

However, the logistics of having all students attend lengthy sessions was not lost on the teachers, “but I mean, there’s an argument for that too right... little bit here, little bit there” [Teacher 8], which may be particularly true if this is what students prefer. One aspect that was agreed on among teachers was the need for structure and scheduling.

Having a schedule itself, planned ahead of time was deemed helpful by teachers. “I think we’d have to make, maybe two or three times a week where the whole school did something, I mean, we do those on academic days Monday, Tuesday, Thursday and maybe it’s a nice break. So the whole school does something and you know, it’s not just easy as that. So we’d have to schedule, so almost like a lunch calendar” [Teacher 4], that would serve to structure preparation and tracking of students’ PA. This scheduling could further facilitate other themes such as *Student Input*.

Finally, it was very clear that time of day was relevant from a student perspective. The morning was preferred. Mandatory PA at lunch or on breaks was viewed as infringing on students' personal time, but casual activities during these breaks was encouraged. Afternoons were frowned upon, particularly Friday afternoons, because students admit this is a time when skipping of class occurs. One student summed it up this way, "It's Friday afternoon first of all! And, I don't know you've already been at school, so you don't really wanna do anything" [Student 13]. Mornings on the other hand seemed agreeable as illustrated in this conversation among peers:

Actually I think it'd be better if PA was in the morning, get everyone going for school during the whole day. [Student 14]

Yeah. [Student 6]

It's actually a pretty good idea. [Student 14]

It actually makes sense cuz you're more awake in the morning...[Student 6]

It gets you goin', yeah, instead of sleepin' in class and whatnot. [Student 13]

In sum, preplanned and structured activities, two to three times a week with the odd longer adventure session, occurring in the morning, and avoiding student breaks and Fridays was seen as addressing the challenges with teacher scheduling and student attendance, thus furthering ease of implementation for teachers. However, not all recommendations for facilitating PA were related to students and teachers, the issue of PA for these students extended beyond the walls of the school.

### *Meso-Level-Community*

#### *Theme 6. Positive social environment.*

At the meso or interpersonal level, the social aspect of PA may be a facilitator given that students and teachers highlighted time spent with and support from other people in a positive manner as something enjoyable about PA. A positive social environment might also allay esteem issues, unhealthy social influences, and student buy-in barriers discussed in the inhibitors section discussed earlier. Indeed, social support and enjoyment of social connections during PA are commonly cited as motivators for PA involvement and adherence (Riecken, Mark, & Rhodes, in press), and this holds true in the CPO community. The twenty six quotes from students and teachers expressed this theme in their own words, such as:

After the gym you come back and it's like, you know, a whole 'nother person, you get to know that person at their interaction stage like where, you know, they're challenging each other... Yeah, yeah and just a sense, a sense of belonging like so when you're in , I don't know, it just does a lot, I think, especially teen, well, even individuals, if you're, if you're watching them you know, people who do individual exercise, like on the treadmill, I mean there's still that feeling of sort of a team, because you're doing the same thing...

[Teacher 2]

I don't like doing things by myself for too long, I get bored. So, if I am alone then no, but if I am with someone else then yeah. [Student 7]

I like when you can do a group sport, where it is like difficult and you have to laugh at yourself. It is like, you really get to know people when you are able to laugh at each other and have fun. [Student 3]

I think because we are a smaller group we know each other a lot better, and there is not as much pressure to skip class and do all that stuff because we are all always together and wanting to do PE. [Student 1]

Social atmosphere seemed important to allow students to challenge, interact, and support one another, creating a sense of community and belonging. This is in stark contrast to the concerns of embarrassment and self-doubt discussed in the *It's Just Not Me* theme, perhaps because it is not just about 'me' it is about 'us'. In addition, there is clearly interaction with other recommendations, for example, *Fun Through Variety* was a theme that recommended activities be kept fun and fresh, perhaps by having a social twist to the activities will enhance the fun aspect in addition to a variety of student preferred activities.

*Theme 7. Equipment needed.*

Finally, at the organizational level, if all the other facilitators were attended to a lack of equipment for students and staff to use would remain, thus limiting their activity choices. By procuring and allowing access to equipment for scheduled class and informal student use, the CPO may be able to quell the barriers associated with lack of student buy-in, the physical limitations of the facility, and concerns about higher level support through resource provision, as well as make teachers' jobs easier. Equipment could potentially increase options, interest and uptake, and has been a successful addition to classrooms in other school based programs (Naylor, MacDonald, Zebedee, Reed, & MacKay, 2006). Nineteen comments surfaced in relation to this theme. Specific suggestions for types of equipment were made. "So all you would need would be like a couple yoga mats, a couple balancing boards, um, a couple elastics, and you have a ton

of activities right there that you could do” [Teacher 3]. Other equipment could include hand weights, therabands, sports balls, street hockey equipment, and/or “they could stick like a basketball hoop out in the parking lot somewhere” [Student 6]. Other comments referred to the lack of equipment available at the school, and that without equipment a program could not function.

We’d need gear and everything.[Student 1 ]

Maybe like a football or a soccer ball or just something, some different sports balls and stuff like, like maybe a basketball, stuff like we talked about.

Because the equipment here, like, people will play with it right and you can, just tossing the ball back and forth with your friends at least it’s something active...[Student 12]

We would need equipment, like we’re gonna need...” [Teacher 2] “...well we won’t get that, [Teacher 3], ...no. [Teacher 2]

*Theme 8. Think ‘outside’ the box.*

Of the fifty-nine comments related to getting outdoors for activity, thirty were specifically about walking. Walking was something both teachers and students spoke favourably about, “I imagine myself doing this, taking them out for a walk” [Teacher 8];“yeah, I’d go if it was nice outside” [Student 5], particularly if it was social and purposeful (e.g., part of a project, game, or contest). Taking classes and activities outside for a walk or alternate outdoor activity was seen as maximizing PA enjoyment and ease of implementation, as well as mitigating cost and facility limitations, but mostly because “it’s a fun, it’s fresh air” [Teacher 2].

Just take us for a walk and stuff, which is fun, cause we get outside right.

[Student 6]

Not only just the indoor, also outdoor activities, like they get the fresh air, it is beneficial to a person's wellbeing. [Teacher 2]

I think somewhere in there you know walking and hiking has gotta be one of the staples because it's the easiest and the cheapest and we're living in a beautiful area here, like our school's outside trails, it could be very easy for us to get out, walk and back, it's beautiful. [Teacher 4]

### *Macro-Level Facilitators*

#### *Theme 9. Create community connections.*

Although there were no macro-level solutions posed to sort out the perceived policy barriers, another macro-level facilitator did surface as something that was both feasible and beneficial: creating connections between the CPO and the broader community, particularly with local recreation centres. Further, engaging the students within the broader community may address the complex matrix of inhibitors. Thirty-two comments were made to this effect.

Barriers such as *This Place Is Physically Limiting*, and *Teacher Overload* that are situated within the confines of policy, could be assuaged if community partners helped provide space, personnel, and information. This networking could also enhance the facilitators *Take It Easy on Teachers*, *Equipment Needed*, *Positive Social Environment*, and *Create Student Buy-In* if resources, mentoring, activity provision, and programs could be shared.

I would think we'd have to merge it with what we're doing here and what we're doing in the community. [Teacher 3]

I suppose it'd good to you know, to get a list of community resources you know what is available for us at [local recreation centres]. [Teacher 3]

We'd need to get specialized knowledge from the community involved and that'd make it easier for the kids to say 'Oh well you know, that kick boxer guy was cool I'd like to sign up for that class.' [Teacher 1]

The primary partner suggested was the local recreation centre for pool access, gym use, and staff consultation, however, other partners were identified. The nearby elementary school could share a field, the high school in the municipality could allow CPO students to join sports teams, and students could get involved in community events as a learning endeavor:

Um, an example that would like, I dunno, maybe a week ago or month ago we went to Byron's Bay, and we walked around for five and a half hours or so and we picked up garbage and planted trees and trimmed stuff. It wasn't heavy physical activity but we did it for a full day of just walking around and like being active, so, I think when things like that come up we should get involved in the community and it is really good because we are a small school that way everyone goes and we can work our schedule around it. It is easier to do that. [Student 1]

I think also making it connect with community in a sense, but, uhm, it can be fun, I mean ...another thing I can see is the connection, like I say with the community, I'm just thinking about the Irwin Park Project, where we did the restoration of the park, and yeah they got a job done AND it benefitted the park...I think that was a very rich experience. [Teacher 2]

In sum, this is a truly complex issue, involving a variety of players and social strata. While none of the themes can be considered separate from the other, there are distinct issues that can be addressed and program ideas attended to as a starting point for the CPO. These themes are echoed in national information about factors related to PA implementation at various socio-ecological levels: time, money, accessibility, and motivation at the individual level; social support, organization, funding, education, and collaboration at the interpersonal level; and conflicting policy messages, partnership building, and grassroots approaches at the broader policy level (PHAC, 2003b). A summary of the themes is provided below in Table 5, the rows have been colour coded based on social ecological level for practical use and quick reference between facilitators and related inhibitors. In addition, the description column provides links between the facilitators and barriers to illustrate how they relate, and how inhibitors may be addressed.

Figure 1. Schematic of inhibitor themes within a socio-ecological framework

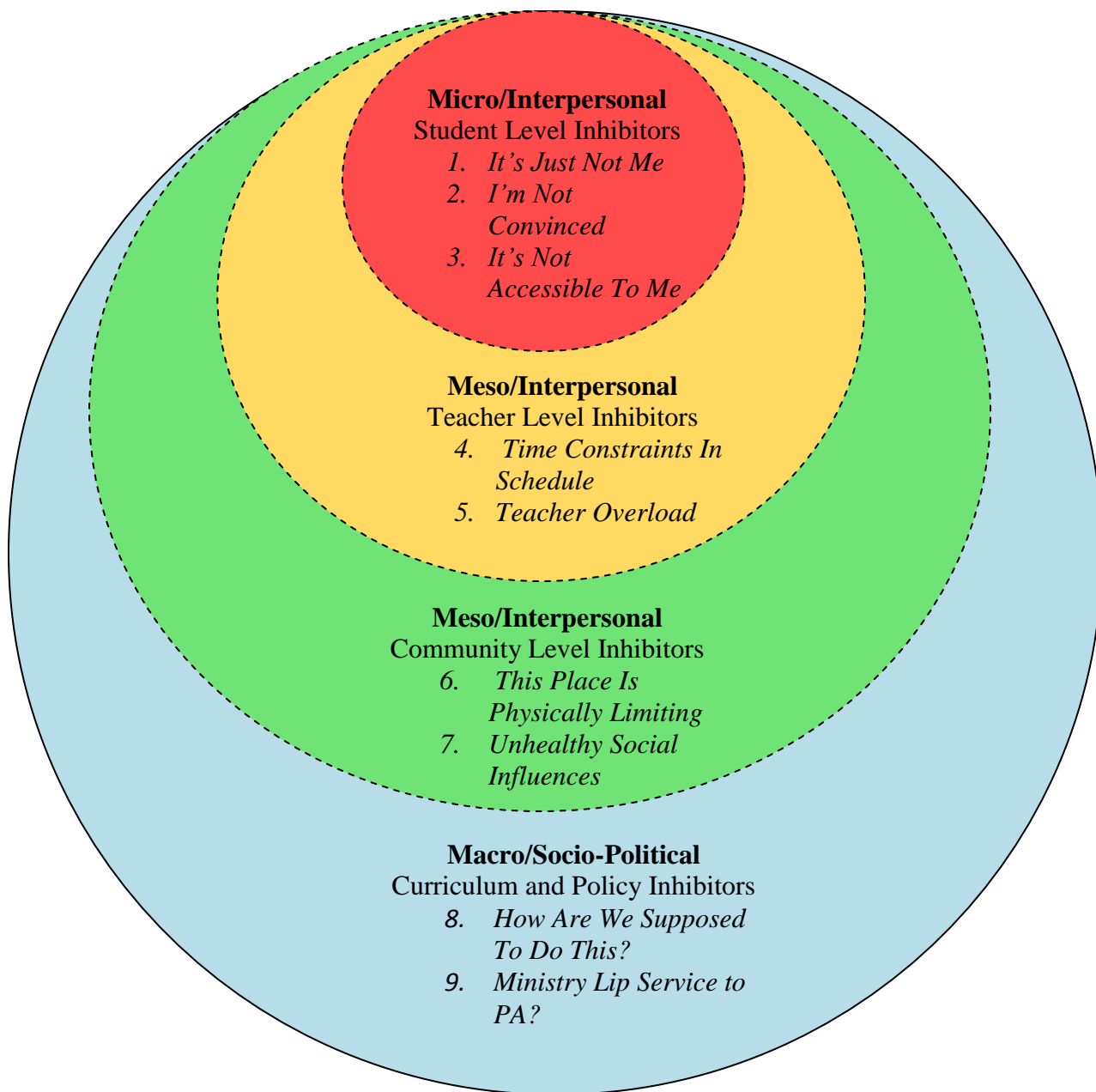


Figure 2. Schematic of facilitator themes within a socio-ecological framework

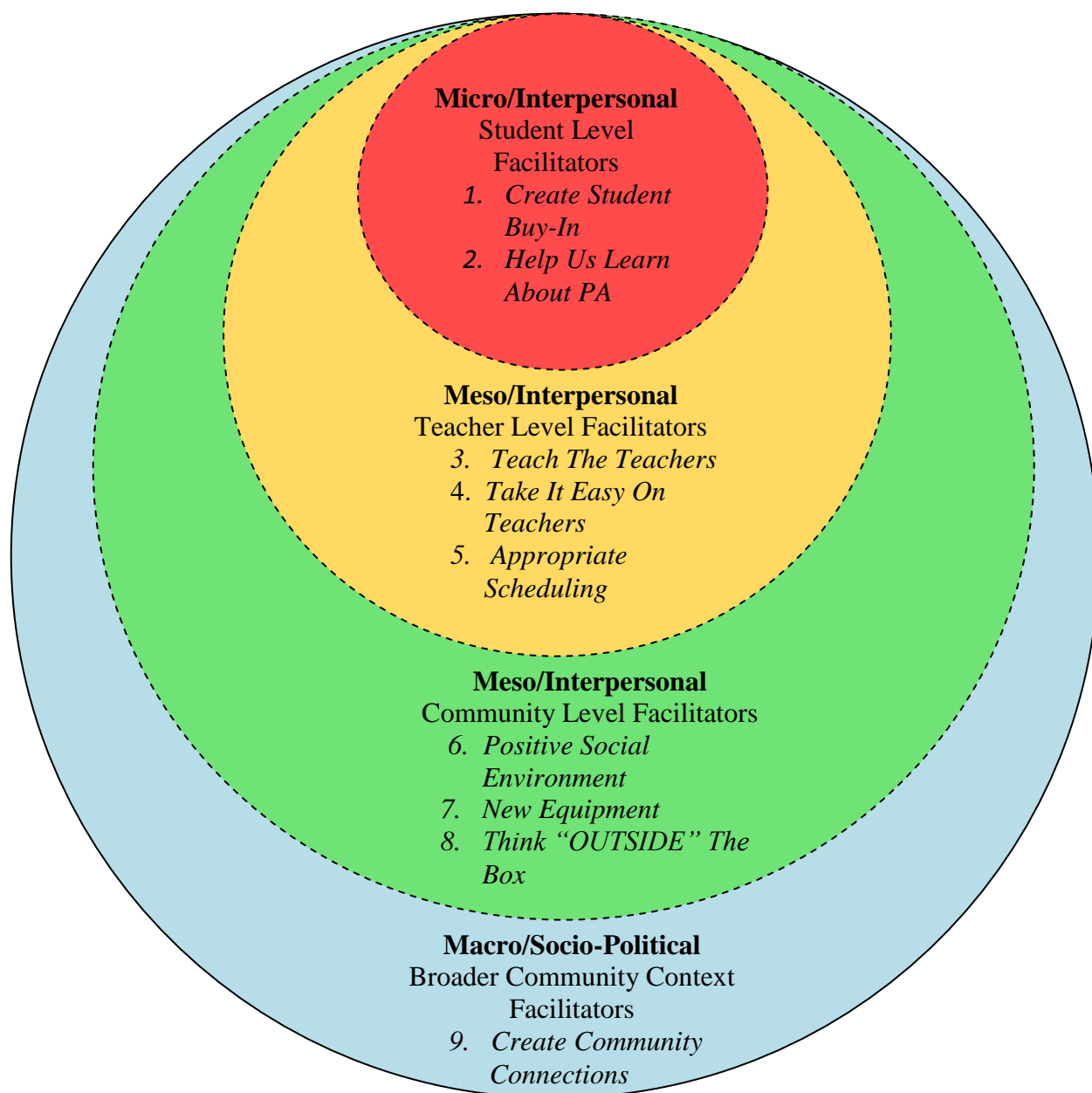


Table 5. Focus Group Themes: PA Inhibitors and Facilitators By SEM Level

Social Ecological Level	Theme <i>subthemes(# related quotes)</i>	#	Description and Recommendation	Supporting Quotes
Micro/Intrapersonal (Student Inhibitors)				
	It Is Just Not Me <ul style="list-style-type: none"> <li>• <i>Efficacy and Esteem (22)</i></li> <li>• <i>Student Diversity (13)</i></li> </ul>	35	General variation in student population related to activity preference, student self confidence, self perception, ability, and skill may hamper involvement.  Potential facilitators: Help Us Learn About PA, Positive Social Environment, Create Community Connections.	Yeah, like guys will talk to T1, who have back issues with sports and stuff and who are like, 'We'll do it later' when it is really because they have never done it before so they don't know how to play. [Student 2]  I think uh self-consciousness is huge, you know like you're, they're already so self-conscious and so if they're in a group and you ask them to do something they don't know they're gonna be good at, probably a thing they won't be good at, you know, even adults freak out about that stuff. [Teacher 1]
	I am not convinced <ul style="list-style-type: none"> <li>• <i>Lack of Student Buy-In (54)</i></li> <li>• <i>Alternative Options and Obligations (24)</i></li> <li>• <i>Only Do PA Because I Have To (6)</i></li> </ul>	84	Lack of student buy-in, alternative options or obligations trumping PA, and participating in PA only when required, depict a lack of motivation on the students' behalf.  Potential related facilitators: Create Student Buy In, Help Us Learn About PA, Appropriate Scheduling, Think OUTSIDE The Box, Positive Social Environment, and Equipment Needed.	Because they have to do something that involves moving. And they have to actually do something and since half the student population smokes chronic and they're all lazy and don't want to do anything. [Student 9]  ...make sure that they're sort of bought into it, because a lot of students we get here are alternate students who may not, may not succeeded elsewhere and, they know that physical activity is good for them but probably think it's more of a choice rather than an obligation to do at school. [Teacher 3]
	It is not accessible to me <ul style="list-style-type: none"> <li>• <i>Limited Money and Resources (35)</i></li> <li>• <i>Limited Personal Access to PA(20)</i></li> </ul>	55	PA involvement is restricted due to cost of involvement in PA, lack of resources (clothing, shoes etc.), and easy access to PA options (equipment, information resources, etc.).  Potential related facilitators: Take It Easy On Teachers, Think OUTSIDE The Box, Equipment Needed, Create Community Connections.	I think, like cost, is a lot. Like you have to have a lot of resources to do recreation, like to go play tennis, or go swimming or go to the gym but all that costs like four or five bucks. Some people doing that like three times a week, adds up that is like \$15 or like over \$60 a month and like sometimes it is just not affordable for people. [Student 1]

				But uh, I know, if something's there you're more inclined to use it, if it's not there, then you know, you don't think about it. [Teacher 6]
<b>Meso-Level (Teacher Inhibitors):</b>				
	Teacher Overload	18	PA in schools and classrooms is an addition to an already taxing workload and set of expectations of teachers.  Potential related facilitators: Teach The Teachers, Take It Easy On Teachers, Appropriate Scheduling, Create Community Connections.	... then we started focusing on the gym ... but then more things got piled on me and T3 and it was tougher and tougher and tougher to get to the gym on Friday afternoons, one more thing I have to do... I'm all for options that sorta stuff, but like at the end of the day, um, how much more can we do? [Teacher 4]
	Time Constraints in Teaching Schedule	33	Limited time in total minutes allotted for teaching time during the day does not allow for addition of 150 minutes of PA per week in school.  Potential related facilitators: Appropriate Scheduling, Take It Easy On Teachers.	You know basically saying we're gonna incorporate 150 minutes into a 1500 minute schedule. [Teacher 3]  It's too much time right... [Student 10]
<b>Meso-Level (Community Inhibitors):</b>				
	This Place is Physically Limiting	34	The facility and location of the CPO is not conducive to PA. Space constraint, small population, and lack of physical proximity to alternate facilities limits PA options.  Potential related facilitators: Think OUTSIDE The Box, Create Community Connections, New Equipment.	... um, unless we have a different facility, there's just no where to do stuff right, so, that would be the problem right there. [Teacher 6]  I think just having somewhere all the time. There is like no where to go when we are bored. [Student, Unidentified]
	Unhealthy Social Influences	13	Peers, family and friends are not only uninterested in PA, but often encourage unhealthy behaviours such as drug and alcohol use or sedentary behaviour.  Potential related facilitators: Create Student Buy In, Help Us Learn About PA, Positive Social Environment.	It goes right back to when they were little and you know parents are busy, most of the time usually working, and TV becomes you know a big thing rather than taking like, if the family isn't into going to do physical things the kids don't get into doing physical things, they become addicted to the TV... I think that's the big problem, because you're trying to break a life style, habits, life habits that have been formed since they were this high, in school, like they haven't been encouraged at home, it's

				<p>pushing against something that's been established. [Teacher 1]</p> <p>Um, distractions like uh, you'd rather be hanging out with friends and they don't really wanna do something active, and just wanna go laze around the house or something, yeah, I can see drugs being a problem too because you get really really drugged up on on everything and you don't really feel like being active, just sit around and do nothing. [Student 6]</p>
Macro-Level (Broader Contextual Inhibitors):				
	<p>Curriculum and Policy</p> <ul style="list-style-type: none"> <li>• <i>How Are We Supposed To DO This?</i> (32)</li> <li>• <i>Ministry Lip Service to PA</i> (24)</li> </ul>	56	<p>Ministry of Education does not truly support PA in schools. Pressure is to maintain and promote academics. No flex in the curriculum to allow for proper PA implementation, nor tangible/visible program support through resources or permanent policy change.</p> <p>Potential Facilitators: Teach The Teachers, Take It Easy On Teachers, New Equipment, Create Community Connections.</p>	<p>...probably teachers would be hesitant about this, is this a fad?... Or is this something they're gonna say next year in cabinet meetings, "Oh that was a great idea but we've gotta rethink this" and scrap the whole thing, which is, I would say is a flip of the coin or I would say more likely than not is what is going to happen... It's not, you know, in the present system it's not, it's not as valued as highly as math and English. [Teacher 3]</p>
Micro Level (Student Level Facilitators):				
	<p>Create Student Buy-In</p> <ul style="list-style-type: none"> <li>• <i>Listen To Students</i> (40)</li> <li>• <i>Create Incentives</i> (67)</li> <li>• <i>Fun Through Variety</i>(11)</li> </ul>	119	<p>Allow for student input about program, create fun and varied PA options based on student preferences, and offer incentives when needed to promote involvement and adherence. May address concerns about student diversity and lack of student buy-in and foster enthusiasm about PA.</p>	<p>At the beginning of each week you could ask the group what they want to do for PE for the day you are going to do it. [Student 9]</p> <p>They need to take it away from traditional activities; that's the stuff that they've been doing from kindergarten to present day, that they're already bored of that they already know what they do or don't want to do, they need to make it different and fun and simple. In order for people, either the students or teachers to buy in. [Teacher 5]</p>
	<p>Help Us Learn About PA</p> <ul style="list-style-type: none"> <li>• <i>Educate Us About PA</i> (18)</li> </ul>	85	<p>Enhance students' ability to use and understand PA info. Expand knowledge of benefits, psychological outcomes, and potential information outlets. Educate</p>	<p>[There's] not enough exposure to it, not enough education around it. [Teacher 7]</p>

	<ul style="list-style-type: none"> <li>• <i>The Body-Mind Connection (34)</i></li> <li>• <i>Accessing PA Info-Embrace and Diversify (33)</i></li> </ul>		<p>about accessing quality PA information by embracing the internet as a preferred source, but diversifying by presenting other credible sources. May address ‘<i>I Am Not Convinced</i>’ and ‘<i>It Is Just Not My Thing</i>’ barriers.</p>	<p>You can usually tell when you’re not active cuz you can feel it, you can feel it in your body and your head, you just feel like, you know, really heavy, and like drowsy and all the time right. What you notice is when you’re active and you’re like, energetic and you’re sweating lots you notice you have more energy, you know? [Student 10]</p>
<p>Teacher Level Facilitators:</p>				
	<p>Teach the Teachers</p>	<p>34</p>	<p>Create structured opportunities for teacher training, participation, and knowledge sharing regarding PA instruction in order to give teachers the tools and information necessary to comfortably and competently incorporate PA into their classes. May address concerns about ‘<i>Teacher Overload</i>’ and ‘<i>How Are We Supposed to Do This?</i>’, understanding of how to incorporate PA, and about how to create student buy-in and learning about PA.</p>	<p>...at our staff meetings discuss it on a monthly basis. Um, planning on what we’re gonna do the following month as far as physical activity goes, bringing our ideas and do it as a school. [Teacher 2]</p> <p>People, people that have um specialized knowledge will just take from the specialized knowledge and integrate it but people like teachers like me... teachers without the personal background of sports aren’t gonna know how to fit that in, or what that looks like. So unless it’s something very simple and knowledge is packaged... [Teacher 1]</p>
	<p>Take it Easy On Teachers</p> <ul style="list-style-type: none"> <li>• <i>Easy Implementation Ideas (15)</i></li> <li>• <i>Support Staff (14)</i></li> <li>• <i>Incorporation Into Regular Lessons (27)</i></li> </ul>	<p>56</p>	<p>Funding for support staff trained in health and wellness, encouraging simple activities, and making existing academic lessons active in some way. May alleviate concerns about ‘<i>Teacher Overload</i>’, ‘<i>Time Constraints</i>’, and ‘<i>How Are We Supposed To Do This?</i>’ in terms of higher level policy support.</p>	<p>Would we be able to hire somebody to incorporate an activity to complement what teachers will do as well, so that it’s not all on just the teachers, that would be awesome, so that it just gives more insight for the staff and as well as the students. [Teacher 2]</p> <p>...or we could take our class work with us outside. [Student 14]</p>
	<p>Appropriate Scheduling</p>	<p>68</p>	<p>Considers recommendations for appropriate durations and time of day for implementing PA in the school that will garner the most student involvement. Preference for DPA seems to be for short bouts throughout the week or longer sessions early in the week . May help create student buy in and address issues of ‘<i>Time Constraints</i>’ .</p>	<p>Most teachers at the beginning of the class they’re reviewing what they did last class, you know for the first 5, 10 minutes any questions? So while you’re addressing those questions, going over the material from the last day, you could be holding stretches. [Teacher 5]</p> <p>...well it’s probably easiest to take like 10, 15 minutes like everyday rather than do like an hour, 45 minutes once or twice a week right?</p>

				[Student 6]
<b>Community Level Facilitators:</b>				
	Positive Social Environment	26	Social aspect of PA and enjoyment of time spent with other people in a safe and positive manner. May address esteem issues, unhealthy social influences, and create another layer for student buy-in.	<p>After the gym you come back and it's like, you know, a whole 'nother person, you get to know that person at their interaction stage like where, you know, they're challenging each other... [Teacher 2]</p> <p>I don't like doing things by myself for too long, I get bored. So, if I am alone then no, but if I am with someone else then yeah. [Student 7]</p>
	Equipment Needed	19	Procure and allow access to equipment (balls, yoga mats, hockey sticks etc.) for class and individual use. This theme included comments about specific equipment as well as general comments about lack of equipment. May be linked to <i>'Student Buy In'</i> , <i>'Take It Easy on Teachers'</i> , <i>'This Place is Physically Limiting'</i> , as well as address accessibility issues, and concerns about higher level support for PA in school.	<p>If you don't have quality equipment, you don't have quality output. [Teacher 6]</p> <p>We'd need gear and everything. [Student 1]</p>
	Think 'Outside' the Box	59	Take classes and activities outside for a walk or alternate outdoor activity. May help to maximize enjoyment, ease of implementation, and to avoid cost and facility limitations.	<p>Just take us for a walk and stuff, which is fun, cause we get outside right. [Student 6]</p> <p>Not only just the indoor, also outdoor activities, like they get the fresh air, it is beneficial to a person's wellbeing. [Teacher 2]</p>
<b>Broader Contextual Facilitators:</b>				
	Create Community Connections	32	Create support through networks with local recreation centres and schools, and engage students in the wider community through community events. May address <i>'This Place Is Physically Limiting'</i> , <i>'Teacher Overload'</i> , and allow for changes to <i>'Take It Easy on Teachers'</i> , <i>'Equipment Needed'</i> and <i>'Positive Social Environment'</i> <i>'Creating Student Buy-In'</i> to be more easily sustained.	<p>I would think we'd have to merge it with what we're doing here and what we're doing in the community. [Teacher 3]</p> <p>We could do community events. Because it is also, well, we're taught that it is really good to get out and help the community and stuff like that and it can be active. [Student 3]</p>

*How the focus group findings were used.*

Based on the initial focus group findings a list of recommendations, preferred activities, and equipment needed was sent to the CPO administration. This list was based on the open coding categories, the student ranking activity, and teacher feedback following the focus group sessions. The complete focus group schematics and findings were sent upon thesis completion for further use in program development.

The focus group findings were used to inform and apply for two grants to help fund the new program development, and to address some of the key concerns and inhibitors that emerged from the focus groups, such as lack of equipment, higher level support, and money, as well as to network in order to create community connections. The first grant was a \$5000 BCRPA Active Communities start up grant to help newly registered active communities begin planning, marketing, or outfitting their community. The second grant that the CPO applied for was the Daily Physical Activity grant for \$1300, which was intended for use in networking and planning with community contacts. Both grants were awarded at the beginning of the school year and spent based on the focus group findings.

The Active Community Grant was used to purchase new equipment for both CPO locations, the current PE teacher was provided with the focus group feedback and given signing authority for the funds by the administration. Equipment purchased included: Frisbees, hand weights, swiss balls, and fitness videos for both locations, as well as skipping ropes, two mesh bags of a variety of sports balls, therabands and tubing, exercise instruction books for therabands and swiss balls, and yoga mats. This equipment was selected to provide a variety of tools and potential activities for teachers to use in their planning and execution of PA within their classes, or for students to use during free time. The books and videos provide instruction and

information in a novel and easily accessible fashion. In addition, a basketball hoop for the parking lot was installed at one location where it was deemed safe to do this, as per student request in the focus groups for a basketball hoop, but also for something active and accessible to do outside on their breaks. Finally, two Wii Fits were purchased for the common areas of both locations for students to use on breaks or as part of extracurricular activity to keep them moving. These were deemed appropriate given some of the feedback from focus groups that some students may prefer screen time to PA, and this technology combines the two. The Wii Fits also provide an opportunity for students to socialize together or practice solo activities, to compete or merely to have fun, in a small space, thus addressing some of the concerns for variety, social environments, student diversity, and facility limitations. Although this technology is a video game of sorts, it has been shown to have positive effects both physiologically and in terms of attitude towards PA (Mark & Rhodes, 2009).

The DPA Grant was used to make connections with the community in several ways. It covered the cost of travel and overtime for a teacher to attend meetings with various community organizations to discuss opportunities for partnership in getting CPO students more active. It also covered the cost of refreshments for meeting attendees. Monies left over were to be set aside for the purchase of public transit tickets for use by teachers wishing to take students out into the community for activities. The summary of these meetings, sent by the teacher involved in organizing these sessions, can be seen in Appendix H.

### *Process Evaluation*

The process evaluation was conducted to inform the CPO administration about progress made over the year, and future directions to take. To remind readers, this involved the baseline and

follow up as well as the formal TRACE Process Evaluation. The results from the repeated measures survey was used to augment the TRACE evaluation and to help inform the administration of PA related trends over the year, as was feedback from the students about PA at the school. The survey acted as a form of member checking as well keeping the program on track and to validate the process evaluation, and focus group recommendations. A summary of the survey results from the CPO can be found in Table 6. It should be noted that there was a great deal of attrition for the survey from baseline (N = 67) to follow-up (N = 25), which would be of special concern if we were attempting to systematically address a scientific hypothesis, however, the purpose was to provide feedback about trends and student preference. In this regard the survey was helpful despite the low numbers, and in fact showed significance for several variables.

Based on all the information gathered over the year, including data from the focus groups, survey, networking meetings, as well as equipment procured and current activities that the administration was aware of, the official process evaluation was completed to form the final piece of information for this community. The ten sections of the TRACE tool were completed: Building Commitment, Assessing The Environment, Cultivating Partnerships, Plans and Policies, Opportunities and Participation, Communication and Education, Community Identity and Involvement, Collaboration and Partnerships, Monitoring, and Evaluation.

The results from this yielded five categories and a score for each of these categories. Overall, the CPO was found to be “Half Way There” with a total of 64/120 points, indicating that although work was being done there is still more that can be done to engage community members, spread the word, and support activity within the CPO. The results revealed that the community has work to do in all areas.

Based on the TRACE output, the area requiring the most attention was “How have you spread the word about your ACI?” which considered the community to be Still Finding Their Way. This section contained questions pertinent to knowledge transmission, and related directly to issues of HL and the focus group theme *Help Us Learn About PA*. While media involvement may not be a priority for a small school in terms of spreading the word, others are of import. For example, “Question: There is a high degree of awareness within the community about the benefits of physical activity? Answer: some awareness”, “Question: There are opportunities for stakeholders to learn new skills? Answer: some opportunities” (TRACE, p 4). Thus, enhancing knowledge and opportunities for learning about PA comprises an important focus for future years. This is in keeping with ideas and teaching material put forth at the ministry level for incorporating not only activity itself, but health information into lesson plans (BC Ministry of Education, 2008) in health and career planning, academic courses and electives.

Interestingly, the student survey showed that the only two areas where there was significant change were both related to knowledge. Perceived health literacy scores increased from baseline ( $M = 20.71, SD = 4.29$ ) to follow-up ( $M = 22.58, SD = 5.15$ );  $t(-2.44), p < 0.05$ , as did perceived understanding of the importance of PA from September ( $M = 4.46, SD = 1.60$ ) to June ( $M = 5.54, SD = 1.67$ );  $t(-3.06), p < 0.01$ . There was also a positive, but not statistically significant, trend in perceived knowledge, access, and use of PA related material. While there remains more that can be done to create opportunities to expand HL and knowledge of PA benefits, what was accomplished over the school year appeared to have a positive impact. Some specific areas that may be considered are: fostering pride about activity among CPO members, having visual reminders about PA in the school, and linking students with resources and

opportunities to generate PA knowledge, as these were specific points in the process evaluation where it was indicated that there was room for growth.

It was also noted during the process evaluation, and in keeping with the subtheme of *Student Input*, that marketing to the students via students would be effective by engaging the media arts class and newborn students' council involved in the PA knowledge sharing process. For example, media arts projects are generally in video format and student driven, and could focus loosely on topics related to activity or health from various student perspectives.

In terms of adoption of the PA program (see re-aim.org or Glasgow, Voght, & Boles, 1999), the CPO scored 10/18, and were considered to be Half Way There, on the TRACE category "Where did ACI events and activity happen?" This gauged questions about engagement within the organization and relevant settings. Teacher adoption seemed to vary. The teachers who were formally adopting the program seemed to be largely at one location, whereas teachers at a second location seemed interested and were getting involved informally, that is to say having PA opportunities available but not structured. Perhaps it was because the student body at the second location, which tended to be slightly older and more transient in nature, were less conducive to taking PE classes. This is also in keeping with many of the suggestions made by the students during focus groups; students at the second location mentioned many times about casual PA rather than routine mandatory activities. Having said that, teacher involvement and training should be maintained through annual planning meetings.

The TRACE category "How are ACI activities, events, policies and partnerships sustained?" was deemed to be Half Way There as well with a score of 12/21. Although the community did make connections with two local recreation centres, and began networking using the DPA grant monies, much of this was still considered to be in the planning stages rather than

fully operational and sustained within the CPO. Thus, my community contact gave a high rating for collaboration across a breadth of community partners, but acknowledged that the contributions of the partners had not yet been established. In order to maintain the PA program and the initial connections made, this is an area that will need to move from the planning to operational stage, and the CPO may want to consider inviting volunteers sector into their fold. The administrator, my contact, summed this up in the qualifying notes that the “[CPO] is in the process of establishing DPA as part of the school culture for students. Teachers are establishing relationships with various agencies to create opportunities for students to participate in DPA. [The CPO] does not have facilities for DPA” (TRACE, p. 1).

In terms of effectiveness, for the TRACE category “What is happening, when is it happening and with whom?” the CPO scored 16/30, but were still considered to be Half Way There. Responses in this category indicate that considerations have been made to provide a variety of opportunities such as indoor/outdoor and structured/informal, but plans to address additional space are limited. Opportunities for PA included the new equipment discussed in the above section for formal/informal and indoor/outdoor PA, promotion and expansion of the CPO student vegetable and perennial garden. In addition a logbook for tracking PA was introduced for the students to journal their PA minutes inside and outside of school in order to meet the graduation requirement for DPA. If we look at how well the program is unfolding in terms of short term impact, we see several interesting trends. In addition to the significant increase in perceived HL and perceived understanding of the importance of PA among community members, there were also non-significant increases in: affective and instrumental attitudes, access to PA information, feeling knowledgeable, total number of sources accessed, knowing how to use PA information. Total minutes of MVPA also increased, approaching significance,

from September (M = 526.60, SD = 557.63) to June (M=817.0, SD = 674.69),  $t(-1.97)$ ,  $p = 0.06$ .

As summary of these results can be found in Table 6.

Table 6

*Dependent Sample Survey Results From September 2008 to June 2009*

	n	Baseline (Sept.)		Follow-Up (June)			t	p
		Mean	SD	Mean	SD	95% CI		
Total Min MVPA	25	526.60	557.63	817.00	674.69	(-)593.94 - 13.14	-1.97	0.06
Total Min/Week PA	25	1172.40	1241.95	1502.80	1568.90	(-)943.69 – 282.89	-1.12	0.28
Perceived HL	24	20.71	4.29	22.58	5.15	(-)3.47 – (-)0.28	-2.44	0.02*
Getting PA Information	24	4.96	1.60	5.54	1.67	(-)1.38 – 0.21	-1.52	0.14
Understanding Importance of PA	25	5.36	1.25	5.92	1.22	(-)0.94 – (-) 0.18	-3.05	0.00**
Perceived Knowledge	25	5.08	1.50	5.60	1.55	(-)1.22 – 0.96	-1.50	0.15
Know How To Use PA Information	25	5.32	1.41	5.64	1.35	(-)0.78 – 0.14	-1.45	0.16
Number of PA Information Sources	25	2.48	1.61	2.84	1.55	(-)1.03 – 0.31	-1.10	0.28
TPB Model	23	54.39	7.52	53.52	10.51	(-)3.28 – 5.02	0.43	0.67
Instrumental Attitude	25	5.96	0.79	6.04	1.14	(-)0.58 – 0.42	-0.33	0.74
Affective Attitude	25	5.30	1.44	5.34	1.62	(-)0.58 – 0.50	-0.15	0.88
PBC	25	5.70	0.98	5.40	1.38	(-)0.36 – 0.96	0.94	0.34
SN	25	5.42	0.95	4.86	1.22	(-)0.012- 1.13	2.02	0.06
PA Intention	23	4.83	1.56	4.26	2.09	(-)0.23 – 1.36	1.48	0.15

\*indicates statistical significance  $p < 0.05$ , \*\* indicates statistical significance  $p < 0.01$

Only participants who completed both baseline and follow-up surveys were used in the analysis

In contrast, PBC, SN, intention to exercise, and motivation to exercise showed nonsignificant decreases from Time 1 to Time 2. Subjective Norm was approaching significance ( $p = 0.06$ ), perhaps suggesting that social support, modeling, and mentorship in the PA realm could be an area to work on. These results show increases in both of the key variables discussed throughout this thesis, HL and PA, however, many of the TPB variables remained static or decreased among the community members. Perhaps this is because, once again a piece of the overall puzzle is missing, or that the TPB is not a good fit for explaining the complex HL-PA relationship as discussed earlier. According to Symons Downs and Hausenblas (2005), the components influencing PA behaviour in the TPB (that is PBC and intention), account for 21% of PA behaviour variance, supporting these findings that there must be other factors at work, perhaps those such as policy and context. These survey data help to inform the overall process evaluation, but also address questions regarding tracking in the process evaluation itself. For example, one TRACE question asks “The proportion of the population that is active is increasing” to which the community contact wrote a comment, “There is evidence suggesting that PA is increasing amongst youth.”

The final section in the process evaluation is related to Reach, or who is being affected by the program and who still needs to be targeted. The TRACE category “Who did you Reach with ACI events and activities?” received a score of 18/33, which still is qualified as “Half Way There” but is the category in which the CPO scored the highest. Many of the questions related to Reach were answered with “In the planning stages”, as that is where the CPO currently is for their DPA program, but attention is being paid to the diversity among the students in terms of ability, economic status, and preferences. Although Reach often has to do with the absolute number of people participating or targeted in a given program, this was not a question that the

CPO could answer at this time. Next year, with the use of log books, tracking involvement will be easier. However, twenty-five, or roughly 20%, of the students in programs requiring DPA did complete follow-up surveys to provide feedback about the initial phases of the program. Some of the feedback follows here.

When asked about their access to PA programs per month students reported attending a recreation centre approximately five times per month ( $M = 5.44$ ) and participating in PA at the school approximately four times per month ( $M = 3.78$ ). Based on their involvement in school PA they were asked to rate their satisfaction and enjoyment of PA over the year, the average response was 'neutral' for both satisfaction and enjoyment. The responses ranged from Very Unsatisfied and Very Unenjoyable to Very Satisfied and Very Enjoyable, indicating that while the program in its current state is reaching some students, we are missing the mark when it comes to other students. This could be based on motivation and enjoyment of exercise varying generally in the population, however, the follow-up survey responses provide suggestions for areas that could be addressed to enhance more students' enjoyment of DPA.

Some of the responses that were listed in relation to the question "What do like most about the daily physical activity program at school?" included: the casual nature of the program, games, the teachers, flexibility, getting course credits, having fun, getting snacks, learning new skills, losing weight, socializing, and not having to do it every day. When it came to what would make the program better in future years students stated such things as: having more variety, doing more PA in general, sharing the field with the nearby elementary, attending sporting events as spectators, group event training (for example, a run group to train for a spring ten kilometer race), maintain access to a gym facility, better planning and execution by teachers, more student choice, explanation of DPA options and tracking, having music, and getting away

from the school for activities. Not only do these ideas provide an interesting list for the CPO administration and an opportunity for student voice, they also serve as a very accurate form of member checking for the focus group findings. Given the overlap of many of the surveyed comments with the focus group themes, indicates areas to work on in future years. Recall that a process evaluation is meant to inform a community about where they have been, what has been accomplished, and how to proceed (Creswell, 2008).

A final point of discussion in the process evaluation results is based around the concept of maintenance, and where to go from here in terms of next steps to take. At the time of the process evaluation some plans for the following year addressed many of the issues brought up in the focus groups and the process evaluation. First, an agreement was made with the municipal recreation providers to use two indoor spaces, Centennial Centre and Eagle Creek, for PA in the following academic year. Similarly, there was a plan to increase use of a nearby recreation centre at Royal Roads University for structured exercise sessions. In keeping with maintenance and collaboration, the administration also planned to contact the University of Victoria's Faculty of Education to enquire about hosting student teachers in the physical education program for their required practicum, this would provide an opportunity for student teachers to learn in an alternative setting, plan PA in a creative manner, and would help alleviate teacher workload. Given the positive feedback from staff and the discussions that were generated as a result of including DPA in the minutes of the annual staff training day in September, this will be kept on the agenda as a topic in future years. As mentioned earlier, steps were being taken to get students involved in PA knowledge transmission via students' council and media arts partaking in PA promotion. Finally, the administrator acknowledged a need to reexamine the budget and to shuffle funds to mitigate the financial and time costs for students to get involved and for staff

to plan. Because this school offers an alternative program, it follows a business model, which according to the administration means that the school is funded via the Ministry of Education per head. Operating the school as a business means that there is often a surplus, or 'profit', which the Ministry of Education reclaims, however, the CPO can spend the surplus on any necessity or ministry requirement. Daily physical activity is now a ministry requirement for the CPO. Given that equipment was purchased with grant money, it was deemed prudent to spend any additional funds on other aspects that would facilitate PA involvement. The administrator stated that a minimum of \$5000 had been allocated for the following year for transportation so teachers could take students to parks, recreation centres, community events, and to bring in guest instructors.

Maintenance, planning and sustainability are part of the process evaluation purpose, the PRECEDE-PROCEED Model, but also of action research. Thus, at this junction in the process evaluation I assessed how to further sustain the collaboration with my CPO colleagues now that the research component was completed while still leaving them fully independent. As a burgeoning academic and professional, I have the opportunity to teach courses; in these courses my teaching philosophy is to use applied projects and opportunities for service learning to engage my students in the community. These teaching methods align well with action research, and provide a window of opportunity to give back to the CPO while benefiting the post secondary students in my courses. Thus, with the permission of my department director, a project that is included in my Active Health course gives the option for students to connect with one of the CPO teachers to help with PA in their class. Teachers email me ideas for PA projects or activities, and Active Health students can sign up to do this for their group project.

Based on the process evaluation and the steps planned for future terms at the CPO, it seemed that the community members were heard, changes are being made, and over time the PA

program will evolve to be something special and unique to the CPO based on the voices of the students and staff.

## CHAPTER 5. DISCUSSION

### 5.1 Study 1 Discussion

#### *Physical Activity and Health Literacy*

This exploratory study showed that HL and PA were significantly correlated, at a medium effect size, even when controlling for common covariates. This finding supports previous research which found that individuals with lower levels of HL were less active (Wolf et al., 2007) and shows that this relationship holds true for a younger age group, using a different standardized measure of health literacy, and using objective PA measures. Knowing that this effect holds across measurement tools and demographics gives weight to the argument that this is a population health issue that needs more in depth exploration, rather than an effect potentially related to underlying measurement error related to readability of PA surveys, or the over representation of older adults as sample populations, who are known to be at greater risk of low health literacy and inactivity than other segments of the population (CCL, 2008).

Establishing this link between HL and PA is relevant to health promoters, researchers and educators. Knowing that those with lower levels of health literacy are at greater risk of sedentary behaviour emphasizes concerns about access to PA resources and opportunities. In a society that increasingly puts responsibility on individuals to take control of their own health, we must make sure that all people have equal opportunity to make informed decisions about health behaviours such as PA. The WHO (1986) suggests that health must be equitable and health promotion should be about improving personal control over modifiable health components. Thus, access to and understanding of PA information and knowledge must not be an additional barrier to engaging in regular activity. Creating fewer inequities in health is a major goal of public health (CCDPC & PHAC, 2011; WHO, 1986) thus removing barriers such as HL constraints for

populations at risk for inactivity is one potential avenue for improving PA, and thus long term health, outcomes (CFLRI, 2004).

Furthermore, given the link between HL and socio-economic and demographic factors, addressing the issue of HL in the PA domain may help to target some of the populations at risk for inactivity (such as those with lower levels of educational attainment and lower incomes) in a novel way such as creating HL sensitive PA material and interventions, and focusing on community based action research methods within local communities to develop tools, resources, access, and knowledge in a meaningful and appropriate manner. In addition addressing HL directly within schools and physical education curricula to improve on this skill set from a young age may be beneficial. In British Columbia the curriculum currently addresses HL as part of the rationale for the healthy schools Performance Standards put forth by the BC Ministry of Education (2010). A more overt discussion of this with teachers and administrators could be beneficial. Although the concept of comprehensive school health is encouraged, curricula and guidelines tend to focus health behaviours within health-related classes (e.g., Planning 10). Given that public schools are generally accessible to all residents of a province, integrating HL skills across disciplines within schools and focusing specifically on developing these skills, as educators do with basic literacy, may be a way of increasing HL.

The finding that HL is related to PA knowledge and literacy highlights this issue further. In addition to the basic link between HL and PA, this finding identifies potential avenues for change. For example, by increasing HL in general, content based literacy related specifically to PA may be affected. Thus, improving HL may enhance our ability to understand more complex healthy living concepts put forth through marketing and educational efforts. The findings from this study suggest that PA literacy is unique in content and represents one of the specific lifestyle

contexts within which HL needs to be improved, pointing to new areas to explore in the future. For example, this finding is relevant because it shows a need for standardized HL tool development related to lifestyle behaviours. If PA knowledge and literacy are a discrete component of HL it may be related to a specific skill set, just as health literacy is related to, but different from, general literacy. This would mean a PA-specific tool would be helpful. Many of the existing tools are very clinical in nature (Murphy et al., 1993; Parker et al., 1995) and lack direct relevance to healthy living factors such as PA. Inclusion of PA literacy components in future tool development, as well as inclusion of more in-depth components of health literacy such as ‘understanding’, ‘utilizing’ and ‘communicating’ (CCL, 2008) and to address components of critical literacy would allow for more accurate measurement and better understanding of this phenomenon. Progress is being made in this area, for example the Newest Vital Sign (Weiss, Mays, Martz, Castro, DeWalt, Pignone, Mockbee, & Hale, 2005) is a tool that poses applied questions related to nutrition; a similar tool that is tested and standardized around PA content would be beneficial. Begoray and Kwan (2012) suggest that new HL measurement move even farther to include components related to each of the facets of HL: accessing, understanding, appraising, and communicating health information. These authors specifically suggest that future HL measurement could include an evaluation of the complexity of information, the success level of the information search, the processes of understanding health information, the inclusion of critical and evaluative thinking about the trustworthiness of information, and the inclusion of a variety of health communication scenarios. The authors’ suggestions could well be applied in tools in terms of healthy living and PA as well as medical experiences.

The knowledge issue is also of interest when we reconsider that having a PA “information base may provide both motivation and ability to defend one’s view” (Petty et al., 1997, p. 618), given that instrumental attitudes, that is the attitudes associated with a knowledge of outcomes, were significantly tied to motivation to exercise. Thus, our knowledge and assessment of the risks and benefits of regular PA is connected to our motivation to engage in the behaviour itself. If lack of this knowledge is linked to motivation, people’s ability to make informed decisions about their health is compromised.

This connection between HL and PA is also relevant to the emerging topic of physical literacy. Physical literacy is the ability to move physically with competence and confidence in order to develop as a healthy individual; as well as to understand and communicate these movements and their purpose (Mandigo, Francis, Lodewyk, & Lopez, 2009; PHE Canada, 2011). High physical literacy allows a person to make healthy active choices in daily life and to be motivated to engage in related health behaviours such as physical activity. This concept is fairly new and thus is not explored in great detail in the HL domain, however, it could be another layer to the complex relationship of HL and healthy lifestyles that should be explored in greater detail. It would be of great utility to conduct research using newly developed physical literacy measurements (Tremblay & Katz, 2010) to further tease apart the connections between HL and PA. If we consider the definitions of HL discussed throughout this project in comparison to a recent definition of physical literacy, there are clear similarities: “Physical literacy can be described as the ability to capitalize on our movement potential to make a significant contribution to the quality of life” (Whitehead, 2007, p. 11). Recommendations exist to incorporate physical literacy into schools (PHE Canada, 2011; Whitehead, 2007), however,

integrating it into the broader community via collaborative research, recreation facilities and other community outreach opportunities may also be effective.

*Physical Activity, Health Literacy, and the Theory of Planned Behaviour*

Given that this is a relatively new area of study and theoretical frameworks have not yet been developed, the Theory of Planned Behaviour (Ajzen, 1991) was used to explore the HL-PA relationship in more depth. Other research has shown that knowledge, self-efficacy, and beliefs about one's disease may mediate the relationship between HL and health outcomes (Berkman et al., 2011). Although the TPB components were not found to mediate the relationship between HL and PA as hypothesized, this was still a fruitful analysis. Health literacy was found to be significantly correlated with many of the key components of the TPB. Attitude towards PA did not surface as a significant correlate of PA after controlling for covariates as previously thought. However, of particular interest is the emergence of PBC as a correlate of HL level. The interest here is two-fold.

First, PBC is a variable related to personal confidence, efficacy and control over a behaviour (Ajzen, 2002), in this case PA behaviour (Rhodes, Blanchard, & Matheson, 2006). This construct is about volitional involvement and barriers related to a behaviour; the higher the PBC score the more control one feels over engaging in a behaviour. Given the positive correlation between HL and PBC in this study, we know that those in higher HL levels report greater sense of control and efficacy over PA behaviour regardless of income, education and age. Thus, we can infer that barriers to engaging in PA are experienced to a greater degree among those with low HL. This is congruent with previous literature that recognized self efficacy - one's beliefs about one's ability to do something - as an important factor in HL development

(Nutbeam, 2008). Again, there are bridges to the concept of physical literacy here. Whitehead (2007) states that a physically literate individual “moves with poise, economy and confidence in a wide variety of physically challenging situations” (np). Perhaps then, the sense of confidence felt by people with varying levels of HL is related to their physical awareness, capacities and perceived control.

Second, if one examines Control Beliefs (beliefs about barriers), as a whole they are significantly positively correlated with HL when socioeconomic and demographic factors are not controlled for ( $r = 0.28, p < 0.05$ ); after controlling for these covariates the relationship is no longer significant. However, disentangling the Control Beliefs into discrete barriers one emerges as a significant correlate of HL, ‘Difficulty Reading’. When participants were asked if *It would be easy to be active regularly even if I had difficulty reading* those with lower HL scores were more likely to report this as a barrier ( $r = 0.37, p < 0.01$ ). Furthermore, ‘Difficulty Reading’ was also correlated with ‘Motivation to engage in PA’ ( $r = 0.29, p < 0.05$ ) as well as ‘Instrumental Attitudes related to PA’ ( $r = 0.32, p < 0.05$ ). Recall that ‘Instrumental Attitudes’ are those related to beliefs associated with the benefits or harms of a behaviour (Rhodes, Blanchard, & Matheson, 2006). Although many Canadian adults believe in the benefits of PA and are aware of optimal amounts of PA needed to achieve these benefits (CFLRI, 2008), the findings of my study may tell us that for those who experience ‘Difficulty Reading’ as a barrier to PA may not be, or perhaps hold inaccurate information about risks of being inactive in relation to disease and injury prevention, thus suggesting that current health promotion information may not be reaching this population. Similarly, although REALM Level was significantly correlated with PBC and Difficulty Reading, the latter two were not correlated significantly with each other after controlling for covariates, indicating that ‘Difficulty Reading’ is a unique variable in the

HL-PA context. No research was found explicitly examining this relationship of difficulty reading as a barrier to PA. However, Rimmer and colleagues (2010) found that not knowing *how* to exercise was a significant personal barrier to HL and PA could very well be an antecedent to this. Given the exploratory nature of this study, further research is required to better understand the mechanisms behind these relationships, and again any potential links to physical literacy. It may be of interest to consider the Extended Parallel Process Model (see Witte & Allen, 2000) as an orientation for exploring how these variables relate. This model posits that health behaviour can be affected by health promotion through persuasion of perceived threat and perceived efficacy related to the health behaviour. Here a person evaluates their personal risk of adverse health outcomes due to inaction, their personal capability to engage in the recommended health behaviour, and the effectiveness of this behaviour; higher perceived threat and efficacy leads to greater persuasion through health messages. Indeed because this model also conceptualizes appraisal, understanding, and evaluation of health information as pathways for behaviour change, it may be relevant to the issues of PBC and Difficulty Reading in the HL-PA relationship, and inform the content and framing of health messages.

These findings of difficulty reading as a potential PA barrier are also congruent with CCL's (2008) report that showed that *Daily Reading* had the strongest effect on HL, and provides insight into the disparity surrounding understanding and use of Canadian Physical Activity Guidelines in the general population. As aforementioned, 54% of Canadians are aware that PA guidelines of some sort exist, but only 37% of Canadians know of the Canada Physical Activity Guide. Among the latter, 41% report personal access to the guide and tend to be in higher income and education brackets (CFLRI, 2004), arguably due to the notion that difficulty reading serves as a barrier to accessing physical activity information.

The Public Health Agency of Canada (PHAC) (2011) recently addressed this issue at a roundtable with community organizations and physical activity experts to discuss developing and successfully communicating new PA guidelines. The guidelines were based on the newest scientific data regarding exercise physiology and created the core of the message. However, it was concluded that dissemination of that core message needed to be targeted and tailored to be effective, and that subpopulations needed direct attention so the PA guidelines were framed as relevant and accessible to them. Many of the recommendations were applicable to targeting communities with low health literacy. “The guidelines on physical activity should be clear, concise, concrete, and direct; and they should be targeted to specific populations...any targeted messages associated with the guidelines must be simple, specific, non-intimidating and tailored...simple language is an absolute must” (PHAC, 2011, p. 6).

In addition to these general recommendations several specific ideas were put forth, related to customizing PA information, that would be relevant in the HL discussion. First, providing guidelines and tools (such as guide templates, branding options etc.) to intermediate community groups such as schools. These community groups will best be able to identify, segment, and work with their target audience in customizing PA material. Second, using a train-the-trainer model, by identifying champions or representatives within a community group and teaching them about PA requirements allows for increased knowledge sharing and peer to peer teaching. This concept is in line with the focus group themes *Help Us Learn About PA*, and *Teach the Teachers*. Third, focus on inspiring, motivating, and promoting enjoyment of PA rather than pushing a sense of obligation; this concept is reflected in the theme *Create Student Buy-In*. In relation to this sense of enjoyment and tailored communication specific suggestions included: mobile phones and social media applications, videos, humorous messages, visual

information and branding, interactive websites, and peer teaching. These suggestions align well with the sub-theme *Accessing PA Information-Embrace and Diversify*. Finally, specific recommendations were made by the PHAC panel to address the language used to make it user friendly to a variety of reading levels, ensuring it is jargon free, larger in font size, non-redundant, and formatted to highlight key points. This may aid in addressing the PA barrier of *Difficulty Reading* identified in Study 1. In sum, “[t]he guidelines set the foundation for change but it is the *implementation* of the guidelines-the ways in which they are used and for whom- that will make the difference to the extent of their uptake” (PHAC, 2011, p. 12).

This issue of limited access to health promotion material is also seen in relation to nutritional information. Zoellner and colleagues (2009) found a majority of participants were unaware of new American nutrition guidelines and did not recognize their branding images. Nutritional literacy was also positively correlated with seeking and accessing American nutritional information via various media channels such as radio, television, magazines, health care professionals and the internet. Those with lower literacy skills accessed information and trusted several media sources less than more health literate individuals. However, television and health care professionals were the most trusted sources and internet the least trusted. In addition, those with lower literacy skills reported significantly more hours of television viewing than higher literacy individuals, these findings indicate that perhaps the most effective form of media to promote healthy living might be television.

The internet, however, is the favoured source of information for Canadians, 73% use it for personal information, and it can be a useful tool (CCL, 2010). It is important to note that a ‘digital divide’ exists between those with higher levels of education (84% of whom used the

internet regularly) versus those with less education (58% used the internet), indicating that part of helping students learn effectively about health behaviour should include internet skills.

Using the internet to access health information is highly dependent on other demographic factors, in addition to higher levels of education, individuals who are female, young adults, and urban residents are more likely to use and feeling comfortable using the internet (Lustria et al., 2011). However, a greater underlying issue is educating community members about valid sources of information and having an appropriate amount of skepticism about health information. The Canadian Council on Learning (2010) reports that individuals with higher levels of education have more concerns about the credibility and accuracy of health information than those with lower levels of education. Given similar issues of access to and understanding of PA information, and concerns about reading as a barrier, perhaps it is not just an issue of readability of information, but also the medium used to disseminate the information. In fact, there is a call for health promoters to leverage a broad range of technologies for greater outreach to a wider breadth of literacy levels (Paasche-Orlow & Wolf, 2010). Tailoring information in terms of content, but also using preferred (and trusted) media channels may be needed to promote PA.

Research regarding the understanding and creation of tailored health material would be prudent. Health information dissemination can be effective at reaching target populations in a relevant and personally meaningful way when material are tailored in terms of content and the medium. Tailoring of health information is not a new concept and has been shown to be effective for a variety of health behaviours including physical activity (Noar, Harrington, VanStee, & Aldrich, 2011). Although health promotion material that is sensitive to HL levels is well received and successful (Bell, Patel, & Malasanos, 2006; Yajima, 2001), HL has not been adequately addressed as a component of health promotion and program tailoring. The findings of

this study in conjunction with previous research highlight the need for future exploration of HL tailoring of PA promotional material and education. Nutbeam (2008) calls exactly for this in his latest conceptual model of HL. This model includes tailored health information, communication, and education as an initial step towards improved HL, empowerment and improved health outcomes.

Given the findings highlighting PBC, HL and PA in conjunction with the finding that the TPB model was not correlated with PA behaviour in this sample, suggests that perhaps further examination of this relationship using an alternative behavioural model may be helpful. However, research has challenged the utility of behavioural theories in explaining complex health behaviours, given the lack of consensus among constructs and the issue that much of the research conducted using these theories, including the TPB, is conducted to support the theory itself rather than to understand the actual health outcome (Noar & Zimmerman, 2005) and may lack in efficacy outside of controlled academic settings (Crosby & Noar, 2010). Further, there is concern that when data do not support the theory as “authors tended to offer various explanations, none of which included that theory might be incorrect” (Noar & Zimmerman, 2005, p. 280). Others have specifically criticized the TPB in the exercise domain (Smith-Gordon, 2008), while other studies support only the PBC as a concrete predictor in exercise behaviour (Armitage, 2005) or view TPB components as only a relevant piece of a larger socio-ecological scope (Williams & Kumanyika, 2002). Alternately it could be that there needs to be better understanding and theory development in the HL domain given that “one challenge to the use of theory in intervention development may actually be a lack of appropriate theories [regarding HL]” (Johnson et al., 2011, p. 27). Or it could simply be that the TPB was not the best fit model for this population.

Given that the control construct was particularly relevant, perhaps use of a model more centred around efficacy and personal barriers would be more effective at explaining the HL-PA relationship from a theoretical standpoint. For example, Social Cognitive Theory can be applied in a health context and focuses on self-efficacy, or how the beliefs one has about his/her capabilities determine how he/she feels, thinks, motivates themselves and behaves. Behaviour is then modified based on cognitive, motivational, affective and selection processes to increase self-efficacy. In addition to self-efficacy, this model examines knowledge as a key component as well, something that is clearly an issue based on the findings of the current study (Bandura, 2004). This model is commonly used in the PA domain and may be of interest in future exploration of this topic. Because “[a] health literate individual possesses...a confidence that they have the right to ask for what they need in order to stay healthy” (CCDPC & PHAC, 2011, p. 11), health promotion and education strategies must attend to this. Similarly, the Extended Parallel Processes Theory (Witte & Allen, 2000), as discussed earlier in this chapter, may also provide insight into the control issue surrounding HL and PA given the effects that threat and efficacy appraisal can have on behaviour change.

Alternately, we may need to look beyond individual level theories which tend to focus on cognitive and affective components. One could argue that behavioural theories such as the TPB relate to broader social issues and environmental context via their constructs. For example, a person’s perceived volitional control and confidence (PBC) in a behaviour may be linked to personal skill but also to factors outside themselves such as access to facilities or partner support. Crosby and Noar (2010) make the point that behavioural theories may lose efficacy as they are applied in real world settings, rather than controlled academic trials, and often are only partially applied or relevant to the health issue being researched. They believe that best practice in health

research and interventions must transcend beyond the individual and that research and health theory should be “practice based and largely ecological in nature” (p. 259).

Others might argue that although individual theories have their utility and are commonly used in PA research, that for an issue such as HL that is so embedded in context, these theories are too narrow in scope. It is of interest to note that health literacy educators have used questions regarding attitude, knowledge, future intentions, and empowerment to assess critical health literacy (Mogford et al., 2010), which are similar to the attitudes, instrumental attitudes, intention and PBC of the TPB theory. However, Mogford and colleagues framed these questions in terms of activism and understanding the social determinants of health, so perhaps the wording and underlying scope of the TPB questions was too narrow in relation to HL.

Regardless, one cannot ignore that HL goes beyond the individual and relates to our ability to interact and succeed in society in a healthy way. It is about creating healthy people and healthy communities. For example, nutrition interventions that build on social networks and are relevant to local culture tend to be effective among populations with lower levels of literacy (Macario et al., 1998), perhaps similar considerations with PA would be effective. The WHO (2011, np) states that “health literacy goes beyond a narrow concept of health education and individual behaviour-oriented communication, and addresses the environmental, political and social factors that determine health.” Nutbeam (2008) also supports this notion that we need to move away from HL as a purely individual issue. He states that HL as an asset is enhanced not only through health education and knowledge improvement, but also through understanding the social determinants of health and social skills surrounding HL. He considers HL to be an issue of empowerment at the individual and societal levels. Whitehead (2007) echoes this notion of social relevance when it comes to physical literacy as well:

As humans we all exhibit this potential, however it's specific expression will be particular to the culture in which we live...[and] a physically literate individual has a well established sense of self as embodied in the world. This together with an articulate interaction with the environment engenders positive self-esteem and confidence (p. 11).

Thus, theorists in this domain agree that both individual and social domains are relevant; as such, perhaps a more appropriate theoretical approach in which to examine the HL- PA relationship is one that takes a myriad of personal and societal factors into account.

Exploring social marketing concepts as a potential map for tailoring HL sensitive information may be an effective option. Social marketing advocates highlight the utility of applying commercial marketing techniques in complex social situations related to health as a way to reach target audiences by appropriate placement and framing of health promotion 'products', while being attentive to the needs and involvement of the audience throughout the product development process (Wharf Higgins, 2011). Although fairly recent, social marketing concepts have been used effectively in relation to PA (Wharf Higgins, 2011). Social marketing concepts may help to bridge gaps in knowledge translation and address components of health beyond education and attitude change by engaging the public and putting a commercial spin on the presentation of health information (Andreasen, 2004; Wharf Higgins, 2011). This marketing theory looks beyond the individual and "is designed to influence the voluntary behaviour of target audiences in order to improve their personal welfare and that of the society of which they are a part" (Andreasen, 2004, p 296); it is 'social' both in terms of social responsibility and social context. In relation to PA and nutrition, not only has social marketing been identified as a fundamental additional to behavioural theories for meaningful and effective research, but three

specific recommendations regarding application among marginalized populations are identified (Williams & Kumanyika, 2010): a) knowing what the target group needs based on their perspectives, b) knowing what the target market knows about health behaviour, and c) realizing that those needs and knowledge are not static. The literature reveals the disappointment of health communication interventions in helping people to change their health practices, arguably due to both the inappropriateness of the communication effort, and their irrelevance to people's lives (*Choosing Health*, 2004; Neuhauser & Kreps, 2003). Generic, one-way messages from experts about disease risks has been ineffective in engaging people to improve their health:

At the heart of the matter is a difficult question: What kind of communication promotes behaviour change? Research suggests that it must be participatory, deeply meaningful, empathetic, empowering, interactive, personally relevant, contextually situated, credible and convenient (Neuhauser & Kreps, 2003, p. 18).

This is reminiscent of not only the argument for tailoring health information, but also of the need for participant involvement in its design.

A Social Ecological Framework might be another model to consider, alone or in conjunction with the concepts of social marketing, in future research. This model is distinguished from other models in the PA domain in that it is inclusive of environmental and policy variables relevant to healthy living. "Rather than positing that behaviour is influenced by a narrow range of psychosocial variables, ecological models incorporate a wide range of influences at many levels" (Sallis, Cervero, Ascher, Kraft, & Kerr, 2006, p. 299). This model has been applied to health literacy and posits that there are many levels which influence health literacy, and health, outcomes (Wharf Higgins, Begoray, & MacDonald, 2009) and include: intrapersonal factors (personal characteristics, knowledge and abilities); interpersonal factors (social interactions,

support and context); and community (broader environmental, structural and socio-political influences). In keeping with how the qualitative data in this study were interpreted, others' research has shown that all three levels are very relevant to PA as well (Sallis, Cervero, Ascher, Kraft, & Kerr, 2006; Sallis & Owen, 1997; Wharf Higgins, Rickert, & Naylor, 2006). To consider the micro, meso and macro contexts related to HL and PA allows one to conceptualize healthy living and health literacy as a holistic concept, rather than a series of personal risk factors. In particular that there is a need to attend cultural and societal components in order to foster health values and knowledge (Kickbusch, 2008). This flexible and broad view allows for some of the issues highlighted in the discussion such as tailoring, collaboration with communities, attention to at risk groups within context, addressing a variety of barriers related to PA, and attending to the various components of HL frameworks.

### *Education, Health Literacy, and Physical Activity*

Schools are one potential interpersonal/meso context that provide an avenue for increasing health literacy via peers and formal education. Education was a variable originally included as a control variable but which yielded some interesting results as a predictor of PA. It is widely known that education is linked to PA involvement (CFLRI, 2004) and has been studied in relation to HL as well (Wharf Higgins et al., 2009, Vamos & Hayos, 2010). In my study a regression analysis found that HL is actually a mediator of that relationship and explains more than 40% of variance between education and PA behaviour. This finding highlights what has been stated elsewhere in the literature, that HL and education are in fact separate (Kickbusch, 2001), that education does not account for all variation (Hemming & Langille, 2006), and may help explain why education level does not translate perfectly to HL level (TenHave et al., 1997).

More specifically, it illustrates that HL falls between education actions and healthy living outcomes as previously theorized (Nutbeam, 2000; Rootman & Ronson, 2005), but also illustrates these divisions specifically in relation to PA. The Canadian Council on Learning (2008) also reported that education was the second strongest predictor of HL, thus further supporting this finding. The relationship between HL and the PAKA (knowledge of PA) questions provides further support for this argument. Recall, that the PAKA scores were only significantly linked to HL scores when SES and education factors were not controlled for; perhaps indicating that education is more about knowledge alone, while HL encapsulates the broader components such as access, communication, and utilization. These relationships also provide an initial explanation for the PA disparity that exists in relation to educational attainment. This mediating relationship also lends credence to the new definitions of health literacy that move beyond basic literacy skills common in education, such as reading and numeracy, to broader working definitions such as “Health literacy is the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life course” (Rootman & El Bibhety, 2008, p.11). Furthermore, this finding that HL may be the mediating factor between education and PA helps to explain findings that education level is related to access and understanding of PA information (CFLRI 2003, 2010).

As a whole these findings suggest that we be cognizant of HL in relation to PA when creating health promotion or educational material, or perhaps even change the way we conceptualize health promotion methods. This pathway from education to PA via HL highlights education as a launching pad of sorts for increasing health literacy and thus healthy lifestyle behaviours. Perhaps education needs to be viewed as a verb and a noun, thinking of educating

people but also thinking of education as a system and a physical community in which the culture of healthy living can be cultivated. Not only do people possess varying degrees of health literacy, but so too can systems (CCDPC & PHAC, 2011). When we enter the health care or health promotion system, it expects and assumes that we have the knowledge, skills and capacities to negotiate its complex landscape - cluttered with jargon, medical terms, and over reliance on written information. It is often not a user-friendly environment, as the following vignette illustrates:

Signs and directions posted for employees and visitors outside and within institutions are often inadequate. As Baker and colleagues noted in a study based on patient focus groups at two public hospitals, many of the patients did not benefit from signs indicating that the nephrology unit was straight ahead. The nephrologists, however, most likely knew where to go (Health Literacy: A Prescription to End Confusion, 2004, p. 22).

Working within an educational context, as discussed earlier, addressing issues of access, understanding, beliefs and values may well improve HL related to PA and thus affect PA itself. The inclusion of HL skills can be done both formally (integrated and evaluated within the curriculum) and informally (healthy school culture, health examples integrated into regular lessons and non-health classes, healthy role models, workplace wellness for teachers etc.). A school, however, is only one part of a greater social environment in which HL skills can be fostered. In order to maximize the opportunity to create life-long skills and to reach the greatest number of people these formal and informal changes in other contexts is needed. Health literacy skills could be developed via sports teams, recreation centres, municipal organizations,

community centres and clubs, and engage champions in the community to disseminate knowledge. An expert panel on HL made recommendations for just this, a diverse approach to integrating HL into the lives of Canadians, by involving various systems and organizations; stating that a health literate Canada includes “collaborative efforts by the health, social service and education systems and by the governmental, not-for-profit and private sectors to promote and facilitate health literacy” (Rootman & El Bihbety, 2008, p. 23). A variety of approaches, social engagement, cultural shift and personal skill development will lay the path for improved health literacy (Nutbeam, 2008).

## 5.2 Study 2 Discussion

Study one provided support that there is indeed a connection between HL and PA at the individual level. Perceived Behavioural Control was identified as an important factor, in particular the control belief ‘Difficulty Reading’, indicating that empowerment and enhancement of control and ability may be effective means for addressing PA in low HL groups not only in terms of reading PA material but truly understanding and applying the information, because “[b]eing able to read a food label is one thing, understanding why a Macdonald's is so cheap, filling and ubiquitous is another” (Wills, 2009, p. 4).

The use of a social ecological model was identified as a potential avenue for better understanding of this phenomenon. And, finally, education was shown to be an important factor as well, suggesting educational settings may be one potential setting to address PA among low HL populations. Taking these specific findings into consideration, and building on the early phases of the PRECEDE-PROCEED Model, which look at background information in relation to a community such as social diagnoses and epidemiological assessment, we moved on to Study 2.

Study 2 addressed the latter phases of the PRECEDE-PROCEED Model by examining factors specific to the CPO, planning, implementing, and completing a process evaluation for the launch of a new PA program within an alternative education setting. The purpose of Study 2 was to provide a platform to empower and engage all levels within the CPO in PA planning at the school, to create an opportunity for networking and knowledge generation, and to establish the beginnings of a sustainable program to enhance HL and PA related to PA. As such, this study was not seeking statistical significance nor generalizability within the scientific community. Rather, as a PAR study, the expectation was that the findings be applicable to the CPO while following rigorous methods (Patton, 2002; Trickett et al., 2011). Nonetheless, the findings do relate to other literature in this domain, literature which helps to provide structure to our findings, and helps to illustrate recommendations for how to proceed in the future.

My discussion begins with the focus group findings. That time, motivation, and obligations were at the core of several of the inhibitor themes is common in PA research, and to others in this age range. For example, new parents often cite these as barriers to PA (Bellows-Riecken & Rhodes, 2008), and other young adults note time conflicts and obligations as hampering their enjoyment of PA (PHAC, 2003b). Similarly, the CPO members noted that cost and lack of ability inhibited their PA. Canadians cite these same barriers: for 26% of the population lack of skill is a concern and 42% report financial reasons inhibits their PA involvement (CFLRI, 2010). However, of particular interest in this study were the findings related specifically to the components of HL. Other PAR research among students has noted similar trends to those cited by my CPO members; limited choices, poor personal skills, lack of resources, limited expertise among school staff (Okley et al., 2011; Enright & O'Sullivan, 2010) were some of the barriers experienced in relation to PA in other communities.

Accessibility surfaced in varying forms as both an inhibitor theme (*It's Not Accessible To Me*) and as a facilitator (*Help Us Learn-Accessing PA Information*). In the survey obtaining and understanding PA information showed an increase from September to June, indicating access to information was something that had been considered in the initial year. These findings are fitting given that access is a key component across HL definitions (CCL, 2008), and is considered necessary in order to enhance HL. Generally access to information is the focus in HL discussion and definitions (Nutbeam, 2000) and so it should be too in the PA domain given that only 41% of Canadians report having access to PA guidelines (CFLRI, 2004) and 22% are not aware of options for PA participation (CFLRI, 2010). Accessibility is also cited as a challenge to healthy living among Canadians, as is low literacy skills (PHAC, 2003b). Recommendations made to increase PA in the community include increasing access to information through campaigns, media, and classroom based information provision (Rabin et al., 2006).

In the focus groups, accessing PA information was discussed in the context of helping students learn about PA, and the recommendation was to embrace students' preferential use of the internet by making them critical users of this media source and to diversify their source options beyond those found online. Other research supports these qualitative findings. Zoellner et al. (2009) found that nutritional literacy was associated with access to and use of media sources, and although those with lower HL used the internet for general purposes it was the least trusted for health information. It was suggested in this study that television, newspapers, health care professional, and magazines were considered more user-friendly. However, research cautions about creating a digital divide or sense of information overload by relying too heavily on the internet to search for health information (Wathen & Harris, 2007). Perhaps inclusion of a broad variety of sources and education around identifying and utilizing credible sources would

be beneficial. Accessing health information is recognized on the BC Ministry of Education website as part of their brief discussion on HL, however, the tools and resources associated with these topics are limited. For students in higher grades there is one teaching tool for HL which involves a concept map of what students' associate with health as a topic; there is no specific recommendation for addressing increased access to health information, or PA, here. There is a lesson plan outline, entitled *Burning Question*, which addresses accessing and critiquing information in general, and asks students to locate various websites and analyze them based on a predetermined list of criteria for credible sources ([www.bced.gov.bc.ca/health](http://www.bced.gov.bc.ca/health)). Other tool kits are available for public use, and could be applied in the CPO setting for use among students for educational purposes or for staff training. For example, the Alberta Centre for Active Living ([www.centre4activeliving.ca](http://www.centre4activeliving.ca)) has created a free access, online tool kit that provides worksheet, goal setting tables, and educational material related to PA in plain language that can be easily downloaded and used.

Research provides support for additions such as these in curricula to increase awareness of and access to health information (Brey, Clark, & Wantz, 2007). Mogford and colleagues (2010) apply this approach of consciousness raising to teaching critical literacy in schools. In their work with students and teachers they suggest that building knowledge not only around health outcomes but also around understanding, applying, and taking action around social determinants of health is an effective way to incorporate HL into the curriculum and to build HL in the community. Asking questions of students about what health is, how it is inequitable, and what the "cause-of-the-causes" (p. 7) are helps students to map their health outcomes and understand them at a deeper level. "The exercises teach the students to identify population level health outcomes and realize that health problems are distributed in socially, economically, and

politically patterned ways” (p. 7), which can help them create direction, connection, and goals for their own health. Although this research was not specifically applied to PA, there is opportunity here for educators to do so within schools or PA curriculums. This type of education, and critical thinking in regard to accessing and delving into health information, also speaks to Nutbeam’s (2000) call for increased critical literacy skills and could go hand in hand with developing computer or media literacy skills, as this ability to evaluate the validity and reliability of health sources and information is a component necessary for building *critical health literacy* (Chinn, 2011).

Use of credible computer based tools to help high school level students navigate new information has been successful in the nutrition domain (Donovan, 2005). Similarly, low literacy groups have been provided access to nutritional information via newsletters with culturally relevant, locally contextualized information and tips (Struemper & Marshall, 1999), as well as by training volunteer community members to be certified to lead nutrition workshops in their communities (Kolasa, Peery, Harris, & Shovelin, 2001). This last point is one that may be of interest to the CPO and adheres to the tenets of action research by enhancing capabilities and sustainability among community members. A potential area to explore in the CPO might be training students to lead a fitness class or outdoor excursion, this allows for student input, reduces workload for teachers, and would provide variety. To take this one step further, perhaps the CPO could contact BC Parks and Recreation (BCRPA), the provincial fitness certification board and creators of the Active Communities Initiative, to see about including a fitness leader certification class within their school year as an option for completing their daily physical activity requirement, a process which would accomplish three things. First, students would need to learn about fitness, the body, and PA as part of the certification process using material already

composed by BCRPA, thus increasing access to, knowledge of, and use of PA information. Second, it would create opportunities for students to explore and lead activities enjoyable to them. Third, it provides an actual certification to add to their resumes and personal experience, thus further preparing them for the real world. This concept has been posed to the current PE teacher, who replied in email communication “Brilliant idea! I will do this with PE11!” (personal communication, 2011).

Lack of access to information regarding opportunities for PA, suitability of programs offered, and instruction available have also been cited as PA barriers for Canadians, particularly those with low levels of education (CFLRI, 2010). For example, 47% of those surveyed stated that lack of information about local opportunities for PA involvement was a barrier for them, and 28% noted that they experienced difficulty finding appropriate instruction. These factors highlight the diversity of what needs to be considered in our definition of access. The CFLRI report on goes on to state that Canadians also reported that program and facility availability and suitability as barriers (31%), and like our CPO, scheduling was an inhibitor to access too (38%). Access is then not merely about locating information, but access to all resources necessary for active living.

Indeed Kickbusch and Nutbeam’s (1998) glossary of health promotion terms they state, “by improving people’s access to health information and their capacity to use it effectively health literacy is crucial to empowerment” (p. 357). Mitic (2003) discusses the importance of awareness raising in changing risky health behaviours among young adults, postulating that a lack of knowledge leads to uninformed health behaviour choices, and that changes in curriculum and knowledge transfer in educational settings may create a pathway for health behaviour change. However, he goes on to state that “[w]hile it is necessary to provide information, that

alone is usually not sufficient in changing individual or collective behaviour” (p. 13); marketing social norms and addressing the environmental context is also necessary. Thus, access cannot be just about information, it must also include access to other resources necessary for engagement in health behaviour (Nutbeam, 2000). It has been noted that for people to make healthy PA choices, awareness and information dissemination need to be accessible through sustained campaigns and education. So too does access to PA opportunities themselves, given that lack of facilities is a key barrier for PA involvement (Department of Health, 2004). Health literacy is about empowerment and capability, however, one can be informed but still marginalized. Similarly, information does not necessarily translate into a health behaviour; one can have access to information without using it, motivation and ability are also integral (Peerson & Saunders, 2009). For example, in anti-smoking campaigns based on providing information to young people researchers note that people “may have generalized the message that smoking is bad for health, and a cause for all illnesses. This suggested that smoking education interventions succeed in delivering a message that smoking has negative health implications but fails to enable choice” (Mazanov & Byrne, 2007, p.179). Information alone is not enough.

Not only was this evident in the quotes related to lack of access and proximity to PA options and opportunity, this was also seen in the broader contextual level themes from the CPO focus groups; physical limitations of space were a major concern among teachers and students. Furthermore, the need for improved accessibility in the CPO was also made evident in the TRACE findings during the process evaluation; the section regarding adoption of PA across various settings and among staff was the category requiring the most work, followed closely by the category related to maintenance of PA involvement. Clearly, the students, staff and administration are aware that accessibility to PA facilities is also an issue. Recall one student

said “I think it really depends on whether you have access to things around the school, then it would probably be possible” [Student 2]. This is discussed in great detail in the literature regarding the built environment. Approximately 24% of Canadians believe that it is too difficult to get to a place where they can be active, and 41% state that facility maintenance is a barrier to their PA involvement, particularly those with less than a high school education (CFLRI, 2004). A published review (Humple et al., 2002) also found that accessibility of equipment and facilities, as well as facility aesthetics, impacted participation in PA. While these findings are very general, they are not unusual, as proximity and access to facilities and PA opportunities is also noted in specific studies.

Research has shown that built environment interacts with some of the individual variables we have discussed, such as ability, to affect PA involvement. Specifically, there is a significant interaction between built environment, competence and autonomy, as well as between convenience of PA opportunity competence, thus people have a greater sense of satisfaction and PA involvement when they perceive convenient and accessible neighbourhood characteristics (Gay & Dowda, 2011). These findings echo the sentiments of the focus group themes and process evaluation concerns about easy access to facilities, and may be part of the reason why CPO students reported an average response of ‘neutral’ when asked how satisfied they were with the PA program thus far in the follow up survey. In this feedback survey, students reported attending 3.76 PA sessions at school per month, and 5.44 sessions per month at the local recreation centre, and suggested that access to more and varied facilities and options would be an improvement. Clearly the CPO students were making better use of community recreation centres than what was offered at their school, another reason to maintain collaboration with those community partners with whom the CPO connected during this program development.

Maintaining this partnership is further supported by the fact that students who attend a school in close proximity to PA facilities, particularly parks and recreation centres, are significantly more active than students in community environments less conducive to PA (Trilk, Ward, Dowda, Pfeiffer, Porter, Hibbert, & Pate, 2010). Similarly, PA interventions that address improving access to places for PA and information have been successful (Howell, Tucker, & Liburd, 2011), including interventions within schools (Sallis et al., 2003). Sallis and colleagues (2003) used an ecological model to address the PA environment at schools; increasing access to equipment, knowledgeable staff, indoor and outdoor opportunities, and extracurricular options were all part of a successful school-based intervention. These were also visible in the themes of the CPO focus groups and in some of the changes made in the initial year, and were partially addressed in the process evaluation in questions pertaining to adoption and implementation. However, another component critical to initiating and sustaining PA that is mentioned in the ecological literature is social support and collaboration (Sallis et al., 2003). This is an area that the CPO could work on to improve based on our findings, because “[e]nabling occurs when there is a supportive environment and access to information about life skills in such a way that the individuals are able to make healthy choices” (PHAC, 2001, n.p.). This is supported by a recent systematic review of HL and health outcomes, which suggests that social support and norms may, along with knowledge and efficacy, moderate/mediate the pathway between HL and health outcomes (Berkman et al., 2011).

The CPO focus group results clearly identified that positive social interactions and community connection were important to students and staff, and at the administrative level the process evaluation showed that some strides had been made in terms of creating social support for PA and making connections with potential partners for broader support as well. Yet, there

was a decrease in subjective norm measures from baseline to follow up in the CPO feedback survey, which although non-significant statistically, still identifies an area for further growth. A social circle enveloping PA helps make PA more enjoyable (Riecken, Marks, & Rhodes, in press), and engaging in social support as a core part of PA interventions is necessary for success (Greaves, Sheppard, Abraham, Hardeman, Roden, Evans, & Schwartz, 2011; PHAC, 2003b). Furthermore, it appears that personal and structural social support can buffer the impact of HL on health outcomes (Lee, Arozullah, & Cho, 2004). Support from health professionals, media, friends and family can provide informational and moral support in developing a healthy lifestyle.

A sense of belonging and being supported originating from participation in social groups may enable an individual to face a stressful situation that would otherwise seem overwhelming thereby bolstering efforts to cope with low health literacy...[and] structural support may compensate for the negative impact of low health literacy by forcing individuals to behave in accordance with the health norms and standards of a social group (Lee, Arozullah, & Cho, 2004, p. 1314).

Thus, in addition to access to credible PA information and physical proximity to PA opportunities, the CPO may want to focus on strengthening the social aspect of PA in the school as part of the PA environment and school culture. Schechter and Lynch (2011) discuss how to effectively incorporate HL into teaching adult learners. Many of the concepts are illustrative of what has been discussed to this point, but provide specific notions of how to change teaching format to address HL and health education as part of school culture and community. Application rather than retention of information, personal relevance, looking past functional literacy skills,

aiding in student health goal clarification, health mentors, community linkage into the school culture, and addressing barriers are all put forth as useful strategies for HL development among adult learners.

One option to increase social support for PA and social connections among students and across the community may be to blur the lines between recreation centres and schools as recreation providers. The *Choosing Health, Choosing Activity* publication (2004) suggests that extending the use of schools as community PA facilities may help to shape a support PA environment and create a culture of activity. This has been done in Greater Victoria between municipalities and local schools, so the precedent has been set, and could be explored by the CPO and the municipality in which they reside. Similarly, to relieve some of the barriers expressed by teachers and to improve on the adoption and maintenance aspects of the process evaluation, collaboration could be made beyond recreation centres to alleviate staff burden. The CPO currently has a school nurse who provides health information, and who was mentioned several times in focus groups as a provider of social support for health, however, utilizing other health care professionals could also be beneficial (Choosing Health, 2004). For example, physiotherapists, nutritionists, exercise and wellness academics, personal trainers, and others could be approached as guest instructors. Based on this notion of social support through community connection, another option may be to create a co-op position or practicum position for post secondary students training to be PE teachers or recreation and health planners. Following the process evaluation, contact was made with the local college's Sport, Exercise and Wellness Department regarding providing a practicum opportunity for a DPA specialist at the CPO. This is in preliminary phases of discussion, but steps are being made to improve on community connection.

Although this issue of access to facilities and social support may seem disconnected from the HL debate, it is actually a key component of critical literacy. Building social capital, that is to say building networks and collective action towards a common goal, is central to the newer concepts of health literacy (Chinn, 2011; Nutbeam, 2000).

Beyond access, at the core of HL is the notion of empowerment. Health literacy is about the ability to have control over and make informed decisions about one's health on a daily basis (Nutbeam, 2008), this implies involvement. So too does PA research, and more specifically sport and exercise education, relate to empowerment through social connection, collective identity and action, enhanced health, improved wellbeing, and capacity development (Lawson, 2005). How then does it relate to the CPO's program? It relates in several ways. First, student input was a factor expressed in the focus groups through the theme *Create Student Buy In* and through the questions regarding Reach, Maintenance and Adoption in the process evaluation. Allowing the participants or community members to have input and ownership over PA planning in some manner is important, and has been successful in other PAR collaborations related to increasing PA involvement and access (Frisby & Millan, 2002; Choosing Health, 2004). If empowerment relates to power distribution (Lawson, 2005) sharing the decision making and planning process with students where appropriate could be beneficial. This could be as simple as collectively planning activities on a calendar as other PAR initiatives have done (Frisby & Millan, 2002) or having a vote as the CPO students suggested. It is about enabling the students in the PA domain, or creating space for student voices, as others have done with other populations in PAR research related to cardio-vascular health (Young & Wharf Higgins, 2010).

Previous PAR research related to PA among students paralleled much of what the CPO members stated as key facilitators, many of which are about capacity building. Social activities,

proper gear, and a supportive environment exemplify some of these facilitators, but more specifically, giving students the power of choice and decision making seems to be key (Okley et al., 2011). Enright and O'Sullivan (2010) identified a few successful tactics used to transfer decision making power to students, while still allowing for necessary guidance by teachers. First, they implemented "curriculum negotiation" which allows students to take an active role each year in modifying and designing the educational program to ensure an alignment of the PA program with the students' needs and wants, thus creating autonomy and control for students; a form of participatory learning that is effective for adult learners as well in terms of health education and improved health literacy (Schecter & Lynch, 2011). Second, the school created "taster sessions" (p. 212) which involved a ten week period with a different activity to try each week based on student input. During these ten weeks students were also given roles to run the classes (warm up leader, music disc jockey, referee, attendance taker etc.). Again, these additions allowed for students to not only learn about PA, but to take ownership over their PA at school.

Third, Lawson (2005) identifies not only power but also resources and collaboration as key facets in empowerment. Money, knowledge, assistance, networks and collective engagement towards a common goal are all relevant to empowerment and empowering people to become active (Lawson, 2005), and were all voiced by focus group members and addressed in some fashion in the process evaluation. Acknowledging the themes brought up by CPO members in the focus groups will not only help to create a PA program but also help to build capacity among the CPO students and staff.

Reflecting on the discussion thus far based on the focus group themes and the gaps identified by the process evaluation, key areas that the CPO could address in future phases of the

DPA program development include: creating access to information and PA opportunity, social support and networking to create a culture of PA, and empowerment through student voice and community collaboration. Although the focus of the CPO was on PA programming, interestingly many of the suggestions made via focus group themes are also relevant to increasing HL in schools and families. Flecha, Garcia, and Rudd (2011) reviewed the success of several school based programs using focus groups and identified several successful approaches used to increase HL, all of which echo the sentiments of my CPO. Attention to community needs and input, accounting for local background and interests, creating dialogue with the broader surrounding community were all themes deemed useful in HL enhancement.

There are two areas of thought to explore from this point forward. Thinking back to Study 1 and the suggestions made based on the finding that lower HL was associated significantly with PA, tailoring health information or programs was a recommendation made for PA programs in relation to health literacy sensitive situations. Although the purpose of this collaboration in Study 2 was to generate ideas for a CPO specific program, further tailoring the CPO PA program could be a way to address the focus areas of access, student input, and collaboration and a way to improve Reach and Efficacy across the student body (Noar, Harrington, van Stee, & Aldrich, 2011). For example, engaging students' council in planning meetings, and exploring creative ways to improve access and empowerment as discussed throughout, such as certifying students as fitness leaders and creating networks within and beyond recreation circles. Tailoring to each individual may be counterproductive and infeasible in this community, for example it would create a more intense workload for staff and strain already limited money and resources. However, Noar and colleagues (2011) posit that tailoring lifestyle interventions exists on a continuum from personalized communication to targeted

intervention. Targeting the specific needs of the CPO members from year to year could be beneficial, for example input on activity suggestions could be generated each fall within classes or by students' council and training opportunities could be offered each academic year.

PAR collaborators have sought to tailor and develop PA interventions in communities and can provide insight into some options that could be included here to address the focus group suggestions, and to move the CPO from *Half Way There* to *Well On Your Way* on the TRACE process evaluation. Intervention components in other communities related to PA differed greatly due to community diversity and program purpose, however, it was common among the interventions to have group workshops for idea generation (Wharf Higgins & Reed, 2001; Frisby & Millar, 2002) or basic health education (Armstrong, 2000; Goldfinger et al., 2008; Paradis et al., 2005; Bradley & Puoane, 2007). Trained volunteers from the target community were often the partners who worked with the greater community by leading health education (Kim et al., 2004) or providing exercise session instruction (Bradley & Puoane, 2007). In the CPO this could be achieved by certifying students as fitness leaders or having them plan a DPA session. Other research promoted a particular sport to increase involvement (Vail et al., 2007), a tactic that may work if students were able to make suggestions at the onset regarding preferred activities. Regardless having these key contacts in the community and member input built trust and sustainability in the programs.

Inclusion of not only the school, but families, friends, and the private sector is encouraged in the literature (Neira & de Onis, 2006) and can be helpful in health education and health literacy building among adult learners (Schechter & Lynch, 2011). Although the CPO has initiated contact with the broader community inclusion of family in DPA planning was not

considered but could include invitations to walking groups, education sessions, or other events for families (MacAuley et al., 1997).

Other experiences in the literature focused less on the site of the intervention and more on the specific resources utilized or made available to the community members. Community gardens (Armstrong, 2000), personal participant step tracking using loaned pedometers (Paradis et al., 2005), plays about healthy living (Bradley & Puoane, 2007), and workout audio-tapes with instructions and music (Pazoki et al., 2007) were some unique concepts emerging from the PAR research for PA interventions. Each of these suggestions is feasible within the CPO facility, and with the exception of the plays, was suggested in the focus groups. More standard intervention methods such as print material (Daniel et al., 1999; Paradis et al., 2005; Pazoki et al., 2007), and personal trainers (Pazoki et al., 2007) were also included in the PAR literature and could be relevant in increasing Reach within the CPO.

The PAR research parallels much of what has been suggested and included in the CPO PA program, and the items that we highlighted earlier (empowerment through student input, collaboration, and access to information and opportunity) ring clear across the research as areas of focus. Physical activity and recreation were viewed not only as a means to improve health, but a mechanism for social connection, personal growth, and improved quality of life. Much like the CPO members, “participants articulated their interest in becoming part of the community, and echoing sentiments of other youth, saw recreation as a means for citizens to get to know and respect one another” (Wharf Higgins & Reed, 2001, p. 451).

Although I was unable to find PAR interventions specifically related to PA among low health literate communities or adult learners, Murphy et al. (1996) worked with adult learners at an alternative learning centre to develop a nutritional curriculum. Their focus groups revealed

that they desired a program that allowed for social interaction, family involvement, hands on activities, and was specific to their wants. These desires were used to create colourful and plain language materials, applied learning experiences, and fun projects that involved the health concepts they learned. This sounds startlingly similar to some of the ideas suggested by the CPO focus group members for PA, which is promising, since Murphy et al. (1996) showed that the adult learners who were in the program showed significant increases in knowledge and ability to understand related material.

Clearly there is a bounty of ideas for what can be achieved in a community PA program, and the CPO has taken the steps to begin implementing many of these ideas, based not on the literature but from the input of staff and students. However, based on the focus groups and process evaluation we know there is room for further development. Perhaps at this stage considering a comprehensive school health model might help focus and organize the ideas they have. This concept, also called health promoting schools,

...refers to a multifaceted approach that includes teaching health knowledge and skills in the classroom, creating health-enabling social and physical environments and facilitating links with parents, local agencies and the wider community to support optimal health and learning. Experience and research indicate that, while results vary between programs, such a comprehensive approach to school health promotion can influence the health-related knowledge, attitudes and behaviours of students, and alleviate factors that compromise health (Canadian Association for School Health, 2007, p. 1).

A comprehensive school health model dictates several concepts. First, health information and education happens at multiple levels: students, families, teachers, and administrators are provided information about healthy living thus creating knowledge and values regarding health. Resources and services are not just to be made accessible at the school, community involvement in provision of resources and expertise is a key tenet. Finally, a health promoting school creates formal and informal supportive environments via role models, peer support groups, and workplace wellness initiatives for staff. At the heart of this concept is the necessity for partnership among school staff and students, the ministry, the private and public sectors, and families in order to create a culture of health and wellness, of which PA is a part. This multifaceted approach has been shown to be effective (Canadian Association for School Health, 2007). The WHO (2006) states that a health promoting school addresses six areas: 1) school health policies, 2) the physical environment of the school, 3) the social environment of the school, 4) school/community relationships, 5) the development of personal health skills, 6) school health services. The Public Health Agency of Canada (2008) also identifies Comprehensive School Health as an effective and equitable means of health promotion and identifies environment; curriculum; healthy school policy; and partnerships and services in the school environment as central components. One can see the overlap here with what has already been accomplished at the CPO. A large barrier faced by the CPO related to ministry support, and many of the items of the process evaluation which the CPO scored lower on related to ministry issues (such as funding and stability). The comprehensive school health model has been proposed in the health literacy literature as a mechanism to improve staff and student knowledge of a variety of health education issues (Vamos, 2005). Although there were no specific suggestions from focus group members for how to overcome this barrier, initiating discussions

about Comprehensive School Health Models for alternative and adult education facilities might be a good starting point. Ministry of Education establishing a Comprehensive School Health Model for alternative and adult education facilities would address much of what has been discussed in this thesis, from employee trust in ministry mandates to supporting the ministry call for improved health literacy in schools. Furthermore, it would provide the opportunity to create a tailored approach to promoting PA within this community of unique learners and varied health literate people. It would require collaboration within and outside of the school, and student and family input would be necessary. Comprehensive School Health has four basic strategies that can be used to promote and facilitate health within the school community: teaching and learning, health and support services, supportive social environment, and healthy physical environment (Canadian Association For School Health, 2007). These components might directly address some of the inhibitors and facilitators identified in the focus groups.

For example, teaching and learning “is the basic way students and staffs receive information about health, wellness, health risks and health issues” (p. 2) and encourages formal and informal learning opportunities for both groups within the school, as well as pre-service and in service training for teachers to prepare them for implementation of health concepts and curriculum. The themes *I Am Just Not Convinced*, *Help Us Learn About PA*, *Teach the Teachers*, and *Take It Easy on Teachers* relate here. Health and support services relate to the availability and accessibility of health and other support services...that can lead to long-term learning difficulties if not addressed. Many of these services are appropriately delivered through the school. Others should be delivered through public health, social service organizations, government/non-government agencies and other local agencies and community partners (p. 2).

This component speaks to the themes *It Is Not Accessible To Me*, *Think OUTSIDE The Box*, *This Space IS Physically Limiting*, *Create Community Connections*, *How Are We Supposed To Do This*, and *Ministry Lip Service*. The notion that formal connections with and contributions from the provincial government recreation and health care providers and the private sector, may provide opportunities to access equipment, space, and program development is directly relevant to the CPO particularly in relation to the recommendation that these services include recreation and afterschool programs for students (Canadian Association for School Health, 2007).

Supportive social environment “refers to the mental health and social support available within the school and in relation to the home and community” (p. 2) and may be inclusive of positive role models, peer teaching, student input, and staff wellness; all evident in the quotes of the CPO (such as *Creating Student Buy In* and *Positive Social Environment*) as well as seen as effective in PA promotion within schools (Okley et al., 2011). Finally, healthy physical environments not only address safety and hygiene, but also “a health-promoting environment [that] enables healthier choices [through] multiple opportunities for physical activity through sport and extracurricular activities, and accessible and sustainable environments that promote physical activity” (p. 3). Like the other CSH components this relates to the SEM levels of the focus groups, in particular *It Is Not Accessible To Me* and *This Place Is Physically Limiting*, changes to the physical environment would make PA more proximal to students and staff as an option during and outside of class time.

Although at first glance the Comprehensive School Health model seems like a significant leap to make from the focus group suggestions and process evaluation findings, it is a concept grounded in each of the themes, and areas for improvement speak to a health promoting school format. This type of PA promotion in schools is not new to British Columbia. The successful

Action Schools!BC program for elementary schools (Naylor et al., 2006) uses these basic tenets to engage the whole school and community to improve PA for students. Like Okley et al. (2011) the AS!BC program engages a PA representative or ‘champion’ at each school, but also delivers workshops and training to teachers and staff, provides simple kits with classroom suitable equipment and activities, school-wide activity and event suggestions, links to nutritional information, resources for family activity, and more. Research supports Action Schools!BC (<http://www.actionschoolsbc.ca/>) as a best practice ( Naylor, MacDonald, Warburton, Reed, & McKay, 2008) , and has potential to be adapted to suit higher level students and adult and alternative learners.

Similarly, Marx and colleagues (2007) used a similar approach to developing health education for elementary, middle, and senior schools to improve HL. This study moved through a series of phases working with teachers, policy makers, and stakeholders to identify areas within the curriculum and school community that could be used to enhance health, then created a series of modules for use within schools. The concepts and skills on which the program was centred included: accessing information, analyzing influences, self-management, interpersonal communication, decision making, goal setting, and advocacy. These concept areas were then applied to a series of health issues including PA. The development process included ongoing surveys and feedback as well as opportunities for staff training and development and symposiums to share how the program concepts and modules had been implemented locally. Much like the concepts of Okley et al. (2011) who developed a basic multi-site program for PA programming within the school context designed to be adapted and modified to fit community contexts, the AS!BC and Marx`s health education program provide core tools and resources that can be worked with to be made relevant to a specific student body. Although these programs

were developed to address PA involvement, access, and value among students in grades K-12 within a regular school setting, there is evidence that such programs could be adapted for an adult or alternative learning environment; indeed that a systems approach that considers existing K-12 programs is exactly what is needed for adult learners to improve HL (Miller et al., 2012).

Not only would such a model align with the needs of the CPO, but it would address some of the points brought up in Study 1. A health promoting school is meant to enhance knowledge and access to healthy living opportunities via education, and to increase efficacy of teachers and students in relation to healthy living, thereby addressing the highlights of Study 1. Indeed a comprehensive school health model is currently being piloted at the high school level. Funded by the Canadian Cancer Society, the Health Promoting Secondary Schools study is examining how the PE 10 and Planning 10 curricula can be used to support high school students' PA and health education practices in the context of a supportive school environment. Although the study's focus concerns behavioural outcomes that stop short of measuring HL, it may offer insights into the accessing and understanding elements of a health literate study body.

Thinking of the CPO project in relation to broader concepts helps to provide another layer of rationale for this research. Although the purpose of PAR research is not to generalize findings, like other PAR collaborations this venture "has provided key insights into how the communities most negatively affected by health disparities can contribute their knowledge in attempts to understand and address multiple levels of influence on health" (Trickett et al., 2011, p.1411). The information established with this community adds to the literature about PA interventions, provided voice to adult learners in this field of research, and provided an argument for the need to support comprehensive school health models in alternative education settings. For those interested in hybridizing action research with traditional experimental designs (Katz, et al.,

2011), this study could be used to create and test a HL tailored PA intervention for adult learners on a broader scale or to test a pilot comprehensive alternative-school health model program. Although this may seem to dilute the PAR principles, it is a possible step for utilizing and disseminating the voices of those involved in this action research study to a wider academic audience (Katz et al., 2011).

Perhaps at the very core of much of this discussion is the issue of social determinants of health, as they connect to empowerment, connection, access, and inclusion. Importantly the social determinants of health are not only related to the individual, but to all levels within a community or society. Together, conditions of childhood, education, gender, income, food availability, working conditions, housing, and health/social services impact overall health status, arguably more than biomedical and behavioural risk factors (Raphael, 2004).

Social determinants of health are the economic and social conditions that influence the health of individuals, communities, and jurisdictions as a whole.

Social determinants of health determine whether individuals stay healthy...[and] also determine the extent to which a person possesses the physical, social, and personal resources to identify and achieve personal aspirations, satisfy needs, and cope with the environment (Raphael, 2004, p. 1).

The health literacy-physical activity discussion may link at various points to the social determinants of health discourse, be it as an issue of empowerment or capability, education and difficulty reading, access to opportunity and information, physical ability and confidence, money and resources, social support, or policy trends and backing. Within Study 1 and the themes of the focus group data two threads seemed to be consistent. First, HL as an empowerment or control issue for individuals to

engage in PA (as seen through correlations to the PBC and PA knowledge in Study 1 and themes such as *It's Just Not Me, It Is Not Accessible-Money and Resources, Help Us Learn, Teach The Teachers* and *How Are We Supposed to Do This?*). Second, as an issue of access to PA equipment, support, and opportunity (as seen in the themes *It Is Not Accessible to Me-Limited Personal Access, This Place is Physically Limiting, New Equipment, Positive Social Environment, and Create Social Connections*, as well as the feedback from the repeated measures survey).

Further, Raphael (2004) notes that while healthy living behaviours, such as PA, are relevant to key public health issues in Canada including cardio-vascular disease and diabetes, the circumstances and conditions of our lives are better predictors of health status and life expectancy. In addition, Raphael argues that health behaviour choices (such as inactivity or poor nutrition) may be responsible for symptoms of poor health, but it is cultural and material contexts that determine those lifestyle behaviours. And, over time, the exposures to varying degrees of positive or negative social determinants accumulates as we move across the life course.

These notions of access, education, and such, as well as difference of health across settings, and increased risk and change over the life course are reminiscent of key concepts in health literacy, notably Rootman and Gordon El-Biheby's (2008) definition of HL. As well, critical health literacy demands an understanding of social determinants of health in order to be meaningfully involved in both one's health and an advocate for others' health (Chinn, 2011).

Findings from this study, and considering evidence that those with lower levels of income, education, and social support are at risk for lower HL and PA levels,

suggest that a unique interaction, or pathway, is at play: cumulatively the social determinants of health founds one's level health literacy and in turn physical activity knowledge and practice. Rather than understanding HL as a repackaging of existing constructs related to health, such as a social determinant of health or tenet of health promotion, perhaps they pivot around HL as a cluster to affect healthy living choices. The findings in my studies would support this thought, for example the mediation of education and PA by HL. This concept would also be congruent with some of the existing models of HL, such as those posed by Nutbeam (2000) and Rootman and Ronson (2005), which place aspects of social determinants of health as antecedents to HL, which in turn affects lifestyle choices. In fact, Ronson and Rootman (2004) do just this arguing links exist between social determinants of health and literacy, identifying pathways related to income, working conditions, gender, culture and early life. Exploring these social determinants in isolation and combination, particularly as they relate to control and access, in future research may illuminate both the HL and PA domains.

### *5.3 Summary and Conclusions*

#### *Dissertation Purpose and Scope*

This dissertation was intended to explore the concepts HL and PA among young adults, using mixed methods, and applying an established theory and framework to guide the research. First the relationship between HL and PA was tested using the components of the TPB as mediating factors. Second, an action research project was completed working with a local community partner organization, whose members were at risk of low HL, to develop a PA

program. The PRECEED-PROCEDE Model was used as a guide through various phases of development, including focus groups, surveys, and a process evaluation.

### *Study 1 Limitations*

The findings of this study advance our understanding of the HL-PA relationship, however, the limitations should be made transparent. This study had a relatively small sample size ( $N = 65$ ) which can be a concern for mediation and power analyses. This remains the case even though a post hoc power analysis revealed a power of 0.70 for correlations and 0.98 for the successful mediation analysis (Faul et al., 2009). Furthermore, statistical significance was obtained in the analysis indicating no Type II error, thus suggesting that although the sample size was small statistical power was not an issue. Further, it should be noted that because a cross sectional design was used for pragmatic reasons, cause and effect relationships cannot be presumed. Limitations of the accelerometer device, such as the underestimation of non-ambulatory motion, must also be considered. In addition, although the HL measurement tool REALM is a standardized and recognized clinical tool, and user-friendly for its target population, it is limited by the fact that it only assesses pronunciation of health related words. Finally, a comparative analysis of HL across gender was not conducted.

Findings should be considered as exploratory in nature and are reflective of the purpose of this study. Future research in this field may include: 1) examining the tailoring of PA material for a variety of health literacy levels, 2) exploration of HL and PA using broader theoretical frameworks to better understand the relationship at the interpersonal and social levels, 3) creation and testing of broader HL tools related to healthy living and comprehensive HL definitions, 4) examination of how physical literacy and health literacy relate in the PA domain, 5) further

examination of the education-HL-PA relationship, and working with populations known to be or potentially at risk for low HL using an action research design to enhance PA.

### *Study 2 Challenges*

Although the advantages of action research are prolific and were discussed in detail in the introduction, the challenges of engaging in action research are numerable as well. Time, sharing power in research direction, acknowledging each collaborator as an expert in their own right, wariness among community members (Benoit, Jansson, Millar, & Phillips, 2005), defining one's definition of truth and knowledge (Fals Borda, 2001), and reconciling scientific rigor with community needs and input (Allison & Rootman, 1996; Frankish, Kwan, Ratner, Wharf Higgins, & Larsen, 2002) are all challenges cited in the action research literature. This study, while a very positive and fruitful experience, nevertheless had its hurdles and complications.

As others before me, it was a new experience to relinquish control over part of this project that was to become my dissertation to another person. Although full of excitement about the project and trust in the CPO contact with whom I collaborated, it was a new process to have research questions and ideas developed from a source outside of my academic circle, and to have the process evaluation completed by someone other than myself. In hindsight, the expertise that the community contact contributed was invaluable, the research questions pointed and applied, and the process evaluation strictly answered from an internal perspective. Similarly, this involvement in action research required me to truly define my etiological and ontological perspective, a personal challenge but informative scholastic journey that involved a great deal of introspection.

Although these broad challenges were present, they were more about personal growth and were not in fact inhibitory to research progress in any way. Some of the more specific issues

that arose tended to be related to timeline or methods. Time is something that I had not considered to be out of my planning ability, however, as with other experiences in the literature (Wharf Higgins, 2006) the pace of work and timeline were driven by the CPO. Schedule constraints included: the beginning and end of the school year, availability of staff and students, and maintaining the need to complete measures within a particular window of time in order to apply the findings in a meaningful way both for the CPO program development and for a timely dissertation defense. Similarly, ideally I would have liked to continue working with them as the program progressed into more concrete phases of development, and although we have maintained contact, and share information and ideas on a regular basis, my formal involvement as a research collaborator ended after the initial year.

Also related to planning, time, and more importantly personal connection, was a serious concern that arose and outweighed the importance of the PA program and the research. Approximately half way into this collaboration the CPO administrator who acted as the gatekeeper to the community, a pillar in the school, and a true advocate for the development of the PA program, was diagnosed with an advanced and aggressive form of cancer, turning the school on its head for a few months. In the sadness and reorganization that followed her sick leave the project was put on hold. This CPO contact had been the driving force behind the collaboration, had helped organize the focus groups, had begun promoting PA at staff meetings, and was organizing the initiative from within the community. The replacement administrator took on the role with great gusto and grace, amidst a tower of responsibilities and backlog of work this administrator also took on the role as collaborator in this project. However, the background information about what had been done and why had not been passed along, and so in many ways we were back at the beginning.

For the most part the trust and support of the project among staff was apparent, however, when it came to class involvement several instructors continually opted out, leaving students to have to come forward on their own rather than in class time. The teachers who did participate were continually helpful in making the project run smoothly by opening their classrooms for discussion with students, and joining the focus group sessions themselves. However, had the other teachers been more receptive to the project perhaps more students would have engaged as well. This may be a reflection of the need to create a culture of PA at the school and to educate teachers as well as students.

In terms of methods, the greatest challenge was related to attrition. Because of the way the academic year falls within the calendar year and the nature of the programs at the school, many of the students who were in classes in the fall, had graduated or dropped out by June when follow-up surveys were conducted, thus the number of usable surveys for feedback was low. Given the applied purpose of the research and the desire of the CPO to have a survey, this was not something that could be shifted.

On a personal level, I had some difficulty finding funding in the early stages of this research, often receiving feedback that my hypotheses or contribution to state of scientific knowledge was not clear. Because the research was an evolving entity, only part of which I was in control of at any given time, it was hard to provide a concrete picture of where the study was headed until shortly before we launched. Similarly, the project itself does not fit neatly into the standard format of dissertations at my institution, and has required some creative organization and patience in order to make it flow with Study 1 (which launched me into this topic area).

### *Findings*

In sum, this research program allowed for an experience in both descriptive, exploratory research in the emerging topic area of health literacy and physical activity. This study established that HL is in fact linked significantly to PA. In relation to theoretical constructs, the Theory of Planned Behaviour was not found to mediate the relationship between HL and PA, however, given the significance of certain constructs additional research may be warranted. One's volitional, or perceived control (PBC), over PA behaviour may be of particular import, and more specifically reading ability as a control belief proved to be a significant correlate to HL as well and should be examined in greater depth. Physical literacy could move beyond concepts of physical competence and confidence to include HL concepts related to PA; a form of physical activity literacy. Finally, HL mediated the relationship between education and PA, supporting the notion that education and health literacy are separate predictors, as well as the need for health literacy to be addressed specifically in PA promotion. This latter finding also helps to explain *why* education is a predictor of PA, if the HL variable was being lumped in.

Based on these findings and the personal connections made in Study 1, Study 2 focused on collaboration with a community in need of a PA program. In working with the learners and staff of an alternative learning centre, several themes and levels of feedback illuminated the needs of this community. The focus group discussions produced two sets of themes, inhibitors to and facilitators of PA. These themes naturally evolved to fit the various levels of the socio-ecological framework: micro level (intrapersonal, student level), meso (interpersonal, social connections with teachers and community), macro level (broader socio-political factors). Inhibitors that were identified by community as related to the students (intrapersonal) ranged

from issues of motivation, interest, efficacy and self-esteem, obligations to life demands, and personal access to resources.

At the intrapersonal level teacher workload, limited time for PA in the school schedule, physical limitations of the space allotted, and unhealthy social relationships were all identified as inhibiting PA implementation successfully at the CPO. Issues with Ministry of Education guidelines, consistency, and support created concern in regard to potential macro, or socio-political level, inhibitors; teachers in particular were concerned about how feasible these new PA requirements were and how staff were supposed to proceed without support, funds, and direction from the government. Much of what was said in the focus groups was full of optimism and insight as well. Some of the facilitators suggested in relation to the student level included promoting fun and variable activity choices, student input in activity selection and planning, and incentives for engaging in PA. Teaching the teachers about PA to expand their overall knowledge and comfort with the topic, providing support in the form of teaching assistants versed in PA, and addressing cramped daily schedules were ideas put forth as meso-teacher level facilitators. The meso-level extended to the community as well here, and suggestions were made that the CPO take activities outside as often as possible, create positive social connections for students, and purchase new and much needed PA equipment. Finally, it was suggested via the theme *Create Community Connections* that the CPO needed to look outside their own staff and organization to the greater community for support and collaboration in order to be successful at implementing a PA program. The core of Study 2 can be illustrated with the following quote about health in our communities:

The changes in understanding included the recognition that the society we construct together has an impact on our health, and that, as individuals and

through our institutions and organizations or governance, we create the conditions that foster or harm [health, through actions to]... advocate for macro level policy, enable people in their microspheres, and mediate among institutions and organizations at the meso-level (Saan & Wise, 2011, p189-190)

### *Future Directions*

Based on the findings of Study 1 and Study 2 there are several potential avenues that could be explored. Further teasing apart of the Education-HL-PA interaction would be beneficial to better understand how to appropriately incorporate HL and PA into public education, as well as to better understand why this mediation effect exists. Given the findings connecting HL to PA and to PA knowledge, further examining how physical literacy fits into the puzzle is another logical step to move forward with research in this area. Similarly, physical literacy may have overlap with health literacy when it comes to PA, thus it may be prudent to expand our current definitions and application of physical literacy to reflect this. Further research testing different theoretical frameworks or behavioural models may be helpful in shedding light on how HL effects PA behaviour. In addition, advanced development of HL tools to be inclusive not only of the multiple components of HL itself, but also of healthy lifestyle questions, including those related to PA, would help in accurate measurement. Finally, for those interested in testing PA interventions experimentally, developing and testing an intervention that is HL sensitive, particularly in terms of reading ability and developing a sense of control over PA behaviour is another possible direction.

Study 2 provided an opportunity to work in the community and identify personal, social, and contextual issues related to PA in a potentially low HL group of community members. Future research with alternative learning organizations or other institutions working with

potentially low HL community members in a PA program may consider opportunities for member input into program components, knowledge sharing about PA among staff and students, and variety and flexibility in activity content to appease diverse wants within the community. Access, in terms of information and physical proximity may be the greatest way to increase overall HL and considerations of staff time and workload must be considered, and community collaborations can help alleviate staff stress over implementing PA as well as create the variety and role modeling called for by students. Similarly, the connections between social determinants of health, HL, and PA might also be explored to tease out causal pathways, particularly in relation to control and access. For example, studying public and private educational institutions where issues of social class, income, privilege, structural and social support differ systematically, may clarify and elucidate the role and relationship of key social determinants of health to health literacy and physical activity, and also provide rich comparative contexts to gather student perspectives. Further use of mixed methods and action research designs, as well as prospective or longitudinal and comparative studies are recommended to advance the literature.

A comprehensive school health model may be an effective choice in planning and may be a straightforward way of engaging the school (or other organization) in collaboration with the broader community as well as broaching the subject with higher ups such as the Ministry of Education. This dialogue would not only help create lines of communication about the needs and concerns of the community at hand, but also could help to convey the import of HL in educational settings and in relation to healthy living. Healthy people 2010 (Hixon & Chapman, 2000) highlights such collaboration as necessary for improved and equitable population health calling for “development of a shared vision of quality of health and quality of life for all communities” (p. 1975). Similarly, future research collaborations might consider developing a

comprehensive school health tool kit, such as those available for elementary schools (Naylor et al., 2006), for higher grades and more specifically for alternative education settings. Through prolonged this type of collaboration, knowledge sharing, capacity building, and increased accessibility to healthy living opportunities perhaps “the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life course” (CCL, 2008, p. 9) will be realized among more Canadians.

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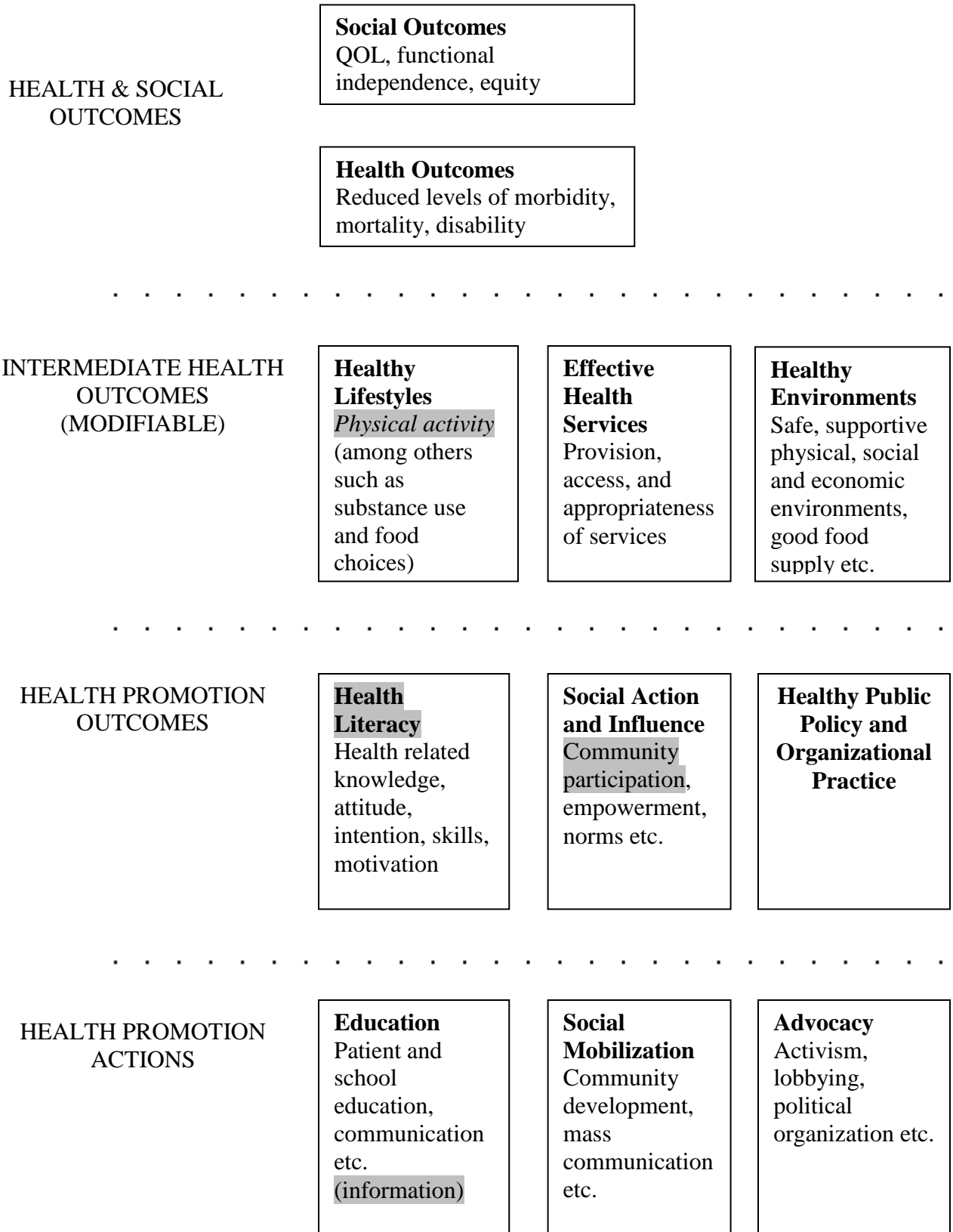
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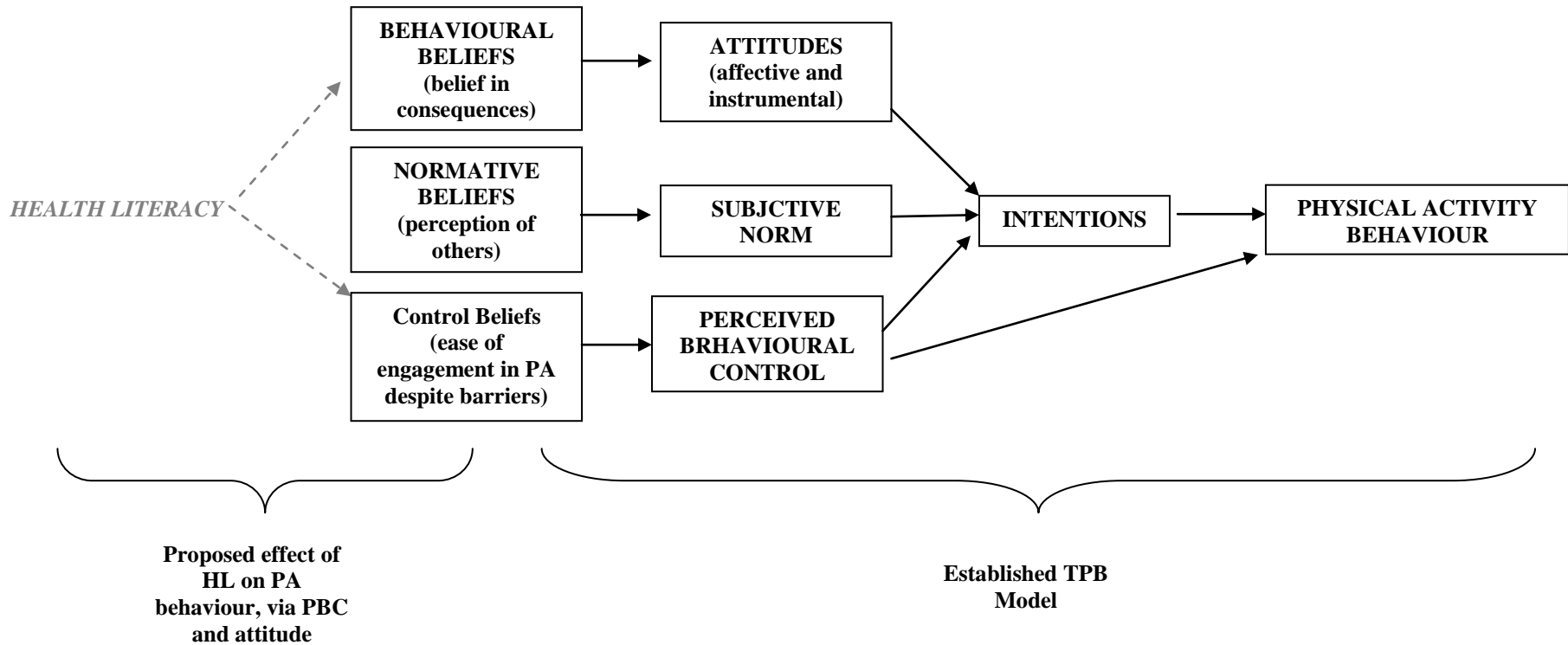
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Appendix A, Health Literacy Flow Chart Adapted From Nutbeam (2000, p. 262)



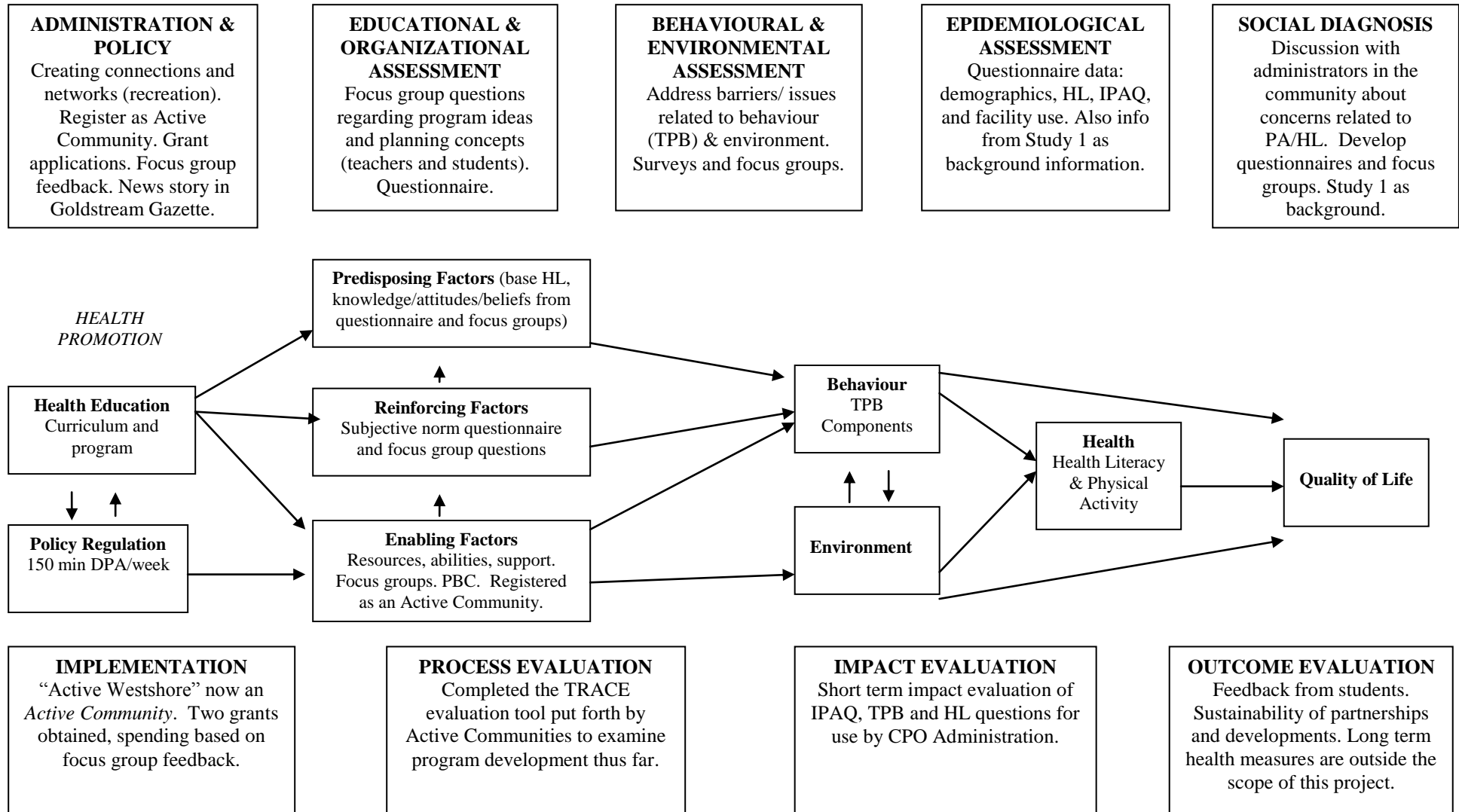
Appendix B, Basic Schematic of the Theory of Planned Behaviour



\*Note this is a basic schematic to illustrate where HL fits in conceptually. For simplicity detail related to specific beliefs and pathway strength is not included here.

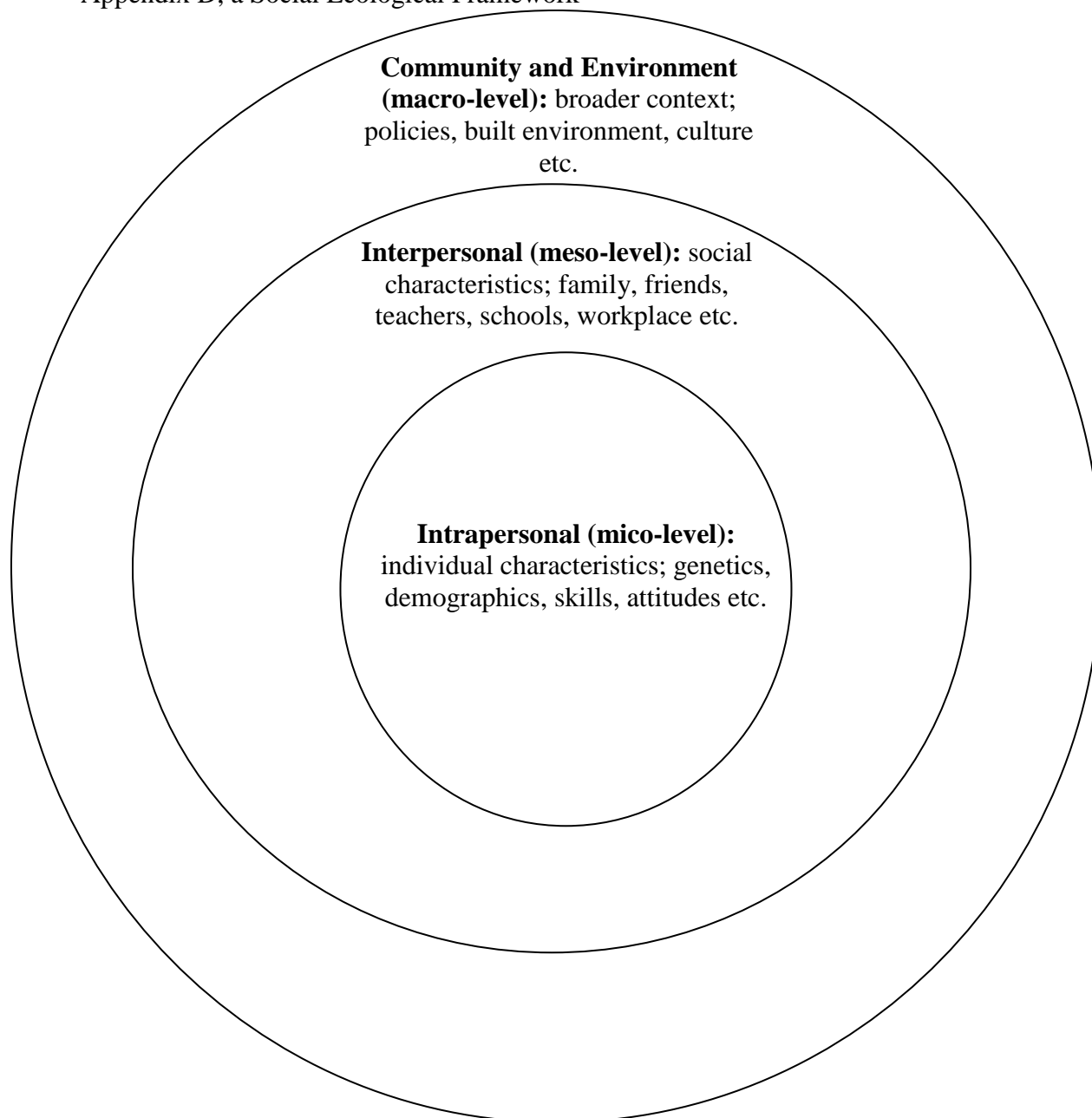
Appendix C, Application of the PRECEDE-PROCEED MODEL PRECEDE

PRECEDE



PROCEED

## Appendix D, a Social Ecological Framework



## Appendix E, Focus Group Questions

### **Physical Activity, Health Literacy, and Adult Learners: A Community Based Participatory Research Project**

#### **I. WELCOME AND INTRODUCTION**

Moderator introduces herself and the assistant moderator.

“Thank you for coming to our discussion today. The purpose of our conversation is to learn more about physical activity in your lives and what we can do here at Westshore Center to get people more active. We are also going to talk about health literacy and physical activity.”

#### **II. ORDER OF BUSINESS**

*“The discussion today will last for a maximum of two hours. Before the discussion begins you will be asked to read and sign the consent form and fill out the brief demographic questionnaire. After the discussion, you will receive a \$20 honorarium for your participation.”*

“Please help yourself to the snacks and drinks. We will have a formal break half way through our discussion.”

#### **III. EXPLANATION OF A FOCUS GROUP**

“A focus group is a guided discussion. There are no right or wrong answers. We are interested in hearing about your point of view even if it is different from what others have expressed. While your opinion may differ from others here in this room, it is likely that other people share your opinion.”

#### **IV. GROUP GUIDELINES**

“There are a few guidelines for the group.

- a. *First, we would like to hear from each of you, but only one at a time. We will be audiotaping the discussion because we don't want to miss any comments. If more than one person speaks at a time, it's hard to understand what is being said. So, please speak loudly, and only one person at a time.*
- b. *Please share all information with us. We are interested in both positive and negative comments.*
- c. *Please be specific when you are discussing topics. Use examples whenever you can.*
- d. *I will be guiding the discussion – but I mainly want to hear from all of you. At times I will ask follow-up questions and other times I will direct the conversation to another topic.*

*e. We would like all of you to participate in the discussion. All of your opinions count. It is ok to disagree with what others say, but please be respectful of one another's comments.*

*f. You do not have to speak directly to me. You may direct your comments to other members of the group, again please be respectful of others.*

## **V. CONFIDENTIALITY**

*“We will be on a first name basis today, but there will not be any names attached to the comments in the final reports. You can be assured that your responses are not associated with your name. We ask that whatever is discussed here today stays in this room – please do not repeat specific comments that others make today to your friends or family. Please complete the informed consent and feel free to ask any questions at this time.”*

## **VI. PARTICIPANT INTRODUCTIONS**

4) *“There are name cards in front of each of you. Please write your first name on this card and turn it for everyone to see. This will help everyone in the group remember each other's names. Let's go around the room and introduce ourselves. Please give your first name, and tell us something about yourself.”* (moderator and notetaker also introduce themselves and say one thing they enjoy doing)

**SOCIAL ECOLOGICAL MODEL:** -diagram on board- explain that the questions are going to be looking at multiple factors in their lives and their surroundings that may effect their physical activity and they should keep these different levels in mind during the discussion.

“Intrapersonal” (things relating to individual), “Interpersonal” (things relating to other people, e.g. friends and family), “Community/Environment” (things in your surroundings that affect you, e.g. larger community, policies, infrastructure etc.)

## **VII. INTRAPERSONAL:**

***1. “As I mentioned before, we're here to talk about physical activity and exercise in your daily lives. Are you aware of the current physical activity recommendations by Health Canada? What are your initial thoughts about these recommendations? Are they realistic?”***

This section is done to ensure that we are all understanding what moderate-vigorous activity is, and what the guidelines are for activity recommendations. Each participant gets a copy of CPAG.

Write student comments on flip chart. Write concerns about why the guidelines are (un)realistic. Keep this posted to remind group about what we are discussing and what ‘physical activity’ means.

2. *“Why do you engage in physical activity, even if you only do so sometimes?”*

What are the facilitators of physical activity? What do they enjoy?

**TEACHERS:** What do they think the students would enjoy? If they don't-why not?

3. *“How important is it to you to have PA at Westshore Center?”*

Would students participate in and enjoy PA if it were set up at Westshore?

Share ideas from teachers to gauge student interest.

**TEACHERS:** is it a priority to address exercise and wellness with students?

4. *“How does health literacy, knowledge and awareness affect physical activity for people at Westshore Center? Other personal barriers?”*

**VIII: INTERPERSONAL and COMMUNITY**

5. *“What other factors makes it difficult for you to be physically active?”*

-Try to get a sense of key structural barriers to personal physical activity. What makes it hard? Why don't they participate in PA/exercise?

- **TEACHERS:** What barriers might you experience in implementing PA program?

Are there barriers within the system that would make this difficult?

Are there barriers in current programming that would make adding PA difficult?

6. *“What needs to happen in the community that would help you and your peers at Westshore Learning Center become more physically active?”*

What would help them overcome the barriers?

What things would they like to see changed at Westshore?

Student ownership? How can we get students involved in planning?

**TEACHERS:** How could we integrate PA into existing courses and curriculum? E.g. projects in class that relate to PA? Bonus points for getting involved in PA events?

7. *“What would you like to see happen at Westshore Center to help students be more active?”*

What events? Programs? Things that can be added to existing classes? For teachers-what can be done to make staff more active and more aware of health and wellness issues to share with students?

One time events vs regular PA? What do they prefer? Would they get involved?

***8. What could we do to help increase awareness and understanding of healthy living among Westshore students? How could we get students interested in exercise and wellness?***

***VIV: RANKING ACTIVITY:*** Based on what we have talked about today please rank top five activities or five ideas you'd like see happen at Westshore and five biggest barriers that need to be addressed.

## Appendix F, BC Ministry of Education DPA Guidelines

## Daily Physical Activity

## DPA Program Guide

## The Requirement

Since September 2008, all students from K to 12 have been required to participate in Daily Physical Activity. Physical activity may consist of either instructional or non-instructional activities.

Effective September 2011, schools will have the flexibility to provide students in Grades 8 and 9 with 30 minutes of Daily Physical Activity or follow the 150 minutes of physical activity per week requirement.

Daily Physical Activity is defined as endurance, strength and/or flexibility activities done on a daily basis.

**Kindergarten:** Schools will offer 15 minutes of Daily Physical Activity for half-day Kindergarten, and 30 minutes of Daily Physical Activity for full-day Kindergarten, as part of students' educational program.

**Grades 1-7:** Schools will offer 30 minutes of Daily Physical Activity as part of students' educational program.

**Grades 8-9:** Schools will have the flexibility to provide 30 minutes of Daily Physical Activity as part of students' educational program or students must document and report 150 minutes per week of physical activity at a moderate to vigorous intensity. Schools will determine which requirement (i.e. 30 minutes daily or 150 minutes weekly) is completed by Grade 8 and 9 students.

**Grades 10-12:** Students must document and report a minimum of 150 minutes per week of physical activity, at a moderate to vigorous intensity, as part of their Graduation Transitions program. Tools to keep track of daily physical activity are available on the [DPA Tracking Tools](#) page.

For more information, please review the Program Guide for Daily Physical Activity Kindergarten to Grade 12 in [English](#) (PDF, 516KB) or [French](#) (PDF, 210KB), or read our [Questions and Answers](#).



## Appendix G, Networking Grant

**DPA Grant Summary**

Feb. – June 2009

The \$1300.00 that was allotted to WestShore Centre for Learning and Training has been applied in the following areas (listed below). The grant monies have allowed us to create local relationships for physical activities that can be applied and used by our school and associate schools, over the next few years.

**Royal Roads University**

I met with Barb, the manager of the facility, and she has agreed to allow us usage of the facility and all of its rooms each Friday from 9:15- 11:15. She is willing to charge us a set fee of \$55 per session. If we need the entire gym, it is ours and the rest of the equipment and rooms are to be shared with the public; however, if the separate rooms are not booked we are allowed to make use of them, with closed doors.

- Gymnasium
- Weight room
- Aerobics room
- Cardiovascular equipment
- Squash Courts

**Juan de Fuca Recreation Centre**

I went in and met with administration and bookings. They gave me all of the required booking forms and brainstormed future activities. They do have a lot to offer but much of the resources come from outside instructors. We do have access to Curling (in the fall), the pool, weight room, ice rink and fields. There are no special discounts for schools, as their rates are for teenage users. However, with Curling, we can get a good group rate, if we have enough students.

**Cross Fit (Deanna Whitley)**

I met with the owner of the facility and she agreed to have our class in for a session. I will be bringing them back each semester so that all new students can experience new workouts, which they may choose to perform outside of class time, for the purpose of physical development and/or cross training.

- Rowing machines
- Group coaching
- Free weights
- Ropes

**Bikrams Yoga**

I had a discussion with Ken, the owner, and he is willing to let me bring in my class and is willing to give us two sessions for the price of one. The only problem with this is that it costs \$20 per student, which is too much money.

If we have a small class in the future it will be a great place to make use of.

**Canada's Best Karate**

I met with the owner and he is willing to take our group and teach us for 4 weeks for 2 hrs. We will need to give him a donation for his time and efforts but it is well worth it. He will teach the students a mixture of Karate, self defence and kickboxing.

The facility is within walking distance and the idea of going there excites the students!

- Full mats
- Gloves
- Kick mats

### **“Go Row”, program for high risk youth**

Brent is willing to take our students for a 5 week program that teaches students how to row as a team, set-up boats as a team, and clean up the equipment and facility as a team. This program takes place on Royal Roads Campus, down at the boat house, which is situated at Esquimalt Lagoon.

This program is free for schools and groups with high risk youth and we fit the criteria.

- Boats
- Paddles
- Coaches motor boat
- Boat house
- Post workout snacks
- Life jackets

### **WestShore Parks and Recreation Centennial Centre**

We went in and had a couple meetings with Amy, a teenage program coordinator. She is willing to forward our school all future information associated with the community and teenage youth programs. She is also willing to call instructors so that we can set up meetings and hopefully, future classes. These classes are going to take place at the Centennials Park building in their fitness room. We have been granted permission to use the rooms for free, but will have to pay the instructors for their time. These costs will vary depending on the instructor and class being offered. In return, if the Recreation Centre needs classrooms they will be granted free access to ours, if they are not booked.

On more perk, we have also been permitted to use their games room when we need to coordinate group cohesion exercises and team building activities between our two school programs.

- Fitness room
- Weights
- Mats
- Games room
- Kitchen
- Game tables
- Instructors

### **Eagle Creek Recreation Centre**

Gerry was a great help. He is interested in working with students and schools within the Sooke District. There are many perks for us at the facility. We are able to go in and use the dry floor and turf fields for free, any time that we would like. All that we have to do is book 30 days in advance so that we are on the monthly schedule. They do not have much

equipment at this point but when they do get more, we will have rental access to everything. For now, they have inline skates that have access to and will only have to pay \$2.50 per pair, per session. We are also allowed to make use of the ice arena when it is in. As well, we have access to the golf course at a discounted rate, we just need to call in and book ahead of time. This would be great for a team building activity at the beginning of the year!

- Indoor arena
- Turf Field
- Ice Arena
- Golf Course
- Inline Skates

NOTE: Provided via email from CPO contact

## Appendix H, Letter



Dear \_\_\_\_\_,

My name is Kai Riecken I am a doctoral student at the University of Victoria. I am currently recruiting adults (age 18-35) to participate in a study regarding health literacy and health behaviour. A diverse sample of Victoria and Duncan residents with varying literacy levels, fitness levels, education/training, and economic status is needed for this study. It is very important that we get a wide variety of people, including those not generally interested in health. Recruiting participants of varying literacy levels can be challenging and it is our hope that you may be able to help in this regard.

Involvement in this research is very important, since health literacy can be central to health and wellbeing. Health literacy is one's ability to access, understand, use, and communicate health information. Studies have shown links between health literacy and clinical behaviour (such as medication use), but health literacy and lifestyle behaviour is not well understood. This link needs to be examined given the general reliance on print material and common use of jargon in health promotion material, to better understand the effects of health literacy on healthy lifestyles.

This is a very exciting study, spanning all of Greater Victoria and Duncan, and the information will be used to inform the development of more thorough and equitable health promotion methods. This study is the first of 3 related studies looking at this topic. Following the completion of this initial pilot study some learners and community organizations will be invited to help in the participatory research process in the months following this study through qualitative interviews and collaborative intervention development should they wish to do so.

**Participants will receive \$10 each as a token of thanks for their time and involvement on this initial study as well as a print out of their own accelerometer information.**

There are a few brief measures used in this initial study:

- A questionnaire that has questions about demographics, familiarity with physical activity, health literacy, attitudes towards physical activity, and health related quality of life. Takes 15-30 minutes and is conducted in person at UVic or another community location.
- All participants will be loaned a GT1M Activity Monitor (an accelerometer, which is similar to a pedometer, but measures all types of motion not just step counts) to wear for 7-days. The accelerometer is a small device that attaches to a belt and is worn during waking hours. A log book will be provided for you to make notes in about the accelerometer, and instructions will be provided when you come in to our lab. Doing this will take around 5-10 min per day (to put the accelerometer on, take it off, make any brief notes needed in the log book should the participant choose to do so).

All the measurements used are safe and standardized. This is a fun and exciting study that will yield important health promotion information. Participants can withdraw from the study at any time without explanation or consequence, and confidentiality of individual data is ensured. At this time I am recruiting only for the initial study. If you would be willing to spread the word verbally to your students or allow me to come in to any adult group session/class you might have so I can recruit face-to-face this would be a great help. This will allow us to reach individuals who we may miss with other recruitment efforts.

Thank you for your time, and feel free to call \_\_\_\_\_ or \_\_\_\_\_ for further information. I will phone to follow-up in the near future.

Sincerely, Kai HB Riecken



## **Reading Into Physical Activity: Health Literacy and Healthy Lifestyles**

**Kai Riecken, PhD (c)  
University of Victoria  
School of Exercise Science, Physical, & Health  
Education**

**ID NUMBER** \_\_\_\_\_

DATE \_\_\_\_\_

<b>DEMOGRAPHICS</b>
---------------------

1. Age (Please fill-in): \_\_\_\_\_
2. Gender: Male  Female  **Please check one**
3. Ethnicity/Race (Please fill-in): \_\_\_\_\_
4. Marital Status: **Please check only one**
  - Single
  - Commonlaw/Married
  - Divorced
  - Other \_\_\_\_\_ (please specify)
5. What is the highest level of education that you completed? **Please check only one.**
  - 8<sup>th</sup> grade or less                       Vocational school or some college
  - Some high school                       College / University degree
  - High school diploma                       Professional or graduate degree
6. What is your job situation? **Please check one that fits you best.**
  - Homemaker                       Retired                       Paid full-time employment/self-employed
  - Paid part-time employment/self-employed                       Temporarily unemployed
  - Student

Please state what your job is (e.g. waiter) \_\_\_\_\_
7. What is your annual household income (total income per year)?  
\$ \_\_\_\_\_ per year
8. What is your monthly household income (total income per month)?  
\$ \_\_\_\_\_ per month
9. Height (Please fill-in):  
\_\_\_\_\_ m \_\_\_\_\_ cm                      **OR**                      \_\_\_\_\_ feet \_\_\_\_\_ inches  
Weight (Please fill-in):  
\_\_\_\_\_ kgs                      **OR**                      \_\_\_\_\_ lbs

**10. Parental status (check one):**

Non-parent (no children)

Parent

Expecting first child

## **PHYSICAL ACTIVITY APPRAISAL SURVEY:**

### **PART 1: Please answer the following questions as accurately and honestly as you can.**

- 1) Do you seek out/look for physical activity information? Yes  No   
-If no please state why \_\_\_\_\_
- 2) Where do you find out about physical activity information?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 3) Do you generally understand physical activity information?  
Yes  No
- 4) Do you generally understand other health promotion material (such as smoking and nutritional campaigns)?  
Yes  No
- 5) Have you heard of Canada's Physical Activity Guide to Healthy Living?  
Yes  No
- 6) If yes, have you read and used the information in this guide?  
Yes  No  N/A
- 7) What amount of moderate physical activity is recommended for adults your age?  
\_\_\_\_\_ Minutes Per Day
- 8) List as many benefits of regular physical activity as you can think of (Max of 10):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### **PART 2: Please answer the following questions based on the information provided in Canada's Physical Activity Guide (CPAG). See attached in email Todd.**

- 1 a) I need to do \_\_\_\_\_ 10 minute sessions of vigorous activity per day to benefit my health?
- b) What activities would be considered moderate-vigorous (name 3)?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 2) If you usually go jogging for 30 minutes per day but your doctor has advised you to do something less strenuous how many minutes of stretching would you have to do to make up for the jogging?  
\_\_\_\_\_ Minutes

3) Based on the information on this guide flexibility and endurance are the same type of activity.  
True  False

4) This guide states that being inactive can put both my **mental** and **physical** health at risk.  
True  False

-Please explain your answer to question 4:

---

---

**PART 3:** The following 6 words can be found in Canada’s Physical Activity Guide and in the REALM survey you completed earlier. Please define these 6 words as best you can:

- STRESS:  
\_\_\_\_\_
- OBESITY:  
\_\_\_\_\_
- DIABETES:  
\_\_\_\_\_
- OSTEOPOROSIS:  
\_\_\_\_\_
- DEPRESSION:  
\_\_\_\_\_
- CANCER:  
\_\_\_\_\_  
\_\_\_\_\_



**TPB: PHYSICAL ACTIVITY ATTITUDES**

We are going to ask you about your beliefs about **engaging in physical activity**, and what you think about them within the context of a typical week over **the next 3 months**.

⇒ **Engaging in physical activity on a regular basis**

This can be defined as **EITHER**:

**30 minutes** of **moderate-intensity** activity **on at least 5 days** per week

**OR 20 minutes** of **vigorous** activity **on at least 3 days** per week.

⇒ **Moderate-intensity physical activity:**

This includes activities like brisk walking, tennis, easy bicycling, or dancing; such activities may work up a light perspiration but are not exhausting. To reach the 30 minutes per day standard, several shorter bouts of 10 minutes or more can be accumulated. For example, two 15-minute or three 10-minute walks in a given day would meet the 30-minute standard.

Note: Typical **weight training** (free weight, weight machines) and **other resistance** activities (such as push-ups, sit-ups) should be considered as **moderate-intensity** activity. Count only the minutes that you are actually active. For example, during a 1.5 hour workout, you may only be lifting for 30 minutes!

⇒ **Vigorous-intensity physical activity:**

This includes activities like running, aerobics, fast bicycling, or basketball. Such activities cause significant sweating and large increases in breathing and heart rate. The 20-minute per day standard should be achieved in a single bout.

⇒ **Please feel free to ask any questions at this time to be sure we are clear about what ‘regular physical activity’ is defined as. If at anytime a question or word needs to be clarified please ask.**

The following questions ask you to rate how you feel about exercising regularly on 6 different scales. Please pay careful attention to the words and descriptors for every possible response and place an “X” over the line that best represents how you feel about exercising regularly. Please answer all items from a) to f).

1. For me, exercising regularly over the next 3 months would be:

- a) \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
 extremely      quite      slightly      neutral      slightly      quite      extremely  
 harmful      harmful      harmful           beneficial      beneficial      beneficial
- b) \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
 extremely      quite      slightly      neutral      slightly      quite      extremely  
 useless      useless      useless           useful      useful      useful
- c) \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
 extremely      quite      slightly      neutral      slightly      quite      extremely  
 unimportant      unimportant      unimportant           important      important      important
- d) \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
 extremely      quite      slightly      neutral      slightly      quite      extremely  
 unenjoyable      unenjoyable      unenjoyable           enjoyable      enjoyable      enjoyable
- e) \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
 extremely      quite      slightly      neutral      slightly      quite      extremely  
 boring      boring      boring           fun      fun      fun
- f) \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
 extremely      quite      slightly      neutral      slightly      quite      extremely  
 painful      painful      painful           pleasurable      pleasurable      pleasurable

This next set of questions ask you about other people in your life. Pay careful attention to each scale and place an “X” over the line that best represents what you think about their feelings. Please answer all items from 2-5.

2. I think that if I were to exercise regularly over the next 3 months, most people who are important to me would be:

a) \_\_\_\_\_  
extremely      quite      slightly      neutral      slightly      quite      extremely  
disapproving    disapproving    disapproving                    approving    approving    approving

b) \_\_\_\_\_  
extremely      quite      slightly      neutral      slightly      quite      extremely  
unsupportive    unsupportive    unsupportive                    supportive    supportive    supportive

c) \_\_\_\_\_  
extremely      quite      slightly      neutral      slightly      quite      extremely  
discouraging    discouraging    discouraging                    encouraging    encouraging    encouraging

3. I think that over the next 3 months, most people who are important to me will themselves be:

\_\_\_\_\_  
extremely      quite      slightly      neutral      slightly      quite      extremely  
inactive      inactive      inactive                    active      active      active

4. I think that over the next 3 months, most people who are important to me will themselves exercise regularly.

\_\_\_\_\_  
extremely      quite      slightly      neutral      slightly      quite      extremely  
disagree      disagree      disagree                    agree      agree      agree

5. I think that over the next 3 months, the exercise levels of most people who are important to me will be:

\_\_\_\_\_  
extremely      quite      slightly      neutral      slightly      quite      extremely  
low      low      low                    high      high      high

**This next set of questions asks you to rate how likely you feel it is that you will be able to exercise regularly over the next 3 months if you really wanted to. Pay careful attention to the words and descriptors at the end of each scale and place an “X” over the line that best represents your feelings.**

6. If you really wanted to, how controllable would it be for you to exercise regularly over the next 3 months?

\_\_\_\_\_  
extremely      quite      slightly      neutral      slightly      quite      extremely  
uncontrollable    uncontrollable    uncontrollable                    controllable    controllable    controllable

7. If you really wanted to, how easy/difficult would it be for you to exercise regularly over the next 3 months?

_____	_____	_____	_____	_____	_____	_____
extremely	quite	slightly	neutral	slightly	quite	extremely
difficult	difficult	difficult		easy	easy	easy

8. If you really wanted to, how confident are you that you could exercise regularly over the next 3 months?

_____	_____	_____	_____	_____	_____	_____
extremely	quite	slightly	neutral	slightly	quite	extremely
unconfident	unconfident	unconfident		confident	confident	confident

9. If you really wanted to, do you feel you would have complete control over whether or not you exercised over the next 3 months?

_____	_____	_____	_____	_____	_____	_____
extremely	quite	slightly	neutral	slightly	quite	extremely
untrue	untrue	untrue		true	true	true

**This next set of questions ask you to rate how motivated you are to exercise regularly over the next month. Pay careful attention to the words and descriptors at the end of each scale and place an “X” over the line that best represents your motivation.**

10. How motivated are you to exercise regularly over the next 3 months?

_____	_____	_____	_____	_____	_____	_____
extremely	quite	slightly	neutral	slightly	quite	extremely
unmotivated	unmotivated	unmotivated		motivated	motivated	motivated

11. How determined are you to exercise regularly over the next 3 months?

_____	_____	_____	_____	_____	_____	_____
extremely	quite	slightly	neutral	slightly	quite	extremely
undetermined	undetermined	undetermined		determined	determined	determined

12. How committed are you to exercising regularly over the next 3 months?

_____	_____	_____	_____	_____	_____	_____
extremely	quite	slightly	neutral	slightly	quite	extremely
uncommitted	uncommitted	uncommitted		committed	committed	committed

13. I intend to exercise \_\_\_\_\_ times per week over the next 3 months.

**In the next section is a list of benefits that people have suggested will occur if you engage in regular physical activity. Please show how much you agree or disagree with each statement by circling a number using the scale provided.**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
14. During the next <b>3 months</b> , if I engage in regular physical activity, it will definitely...					
(a) increase my energy	1	2	3	4	5
(b) make me feel better	1	2	3	4	5
(c) reduce chance of disease	1	2	3	4	5
(d) improve my self-esteem	1	2	3	4	5
(e) improve my social life	1	2	3	4	5
(f) relieve stress	1	2	3	4	5
(g) get me out of the house	1	2	3	4	5
(h) control weight	1	2	3	4	5
(i) improve fitness	1	2	3	4	5

**In this section is a list of barriers that people have suggested may prevent you from engaging in regular exercise. Please show how much you agree or disagree with each statement by circling a number using the scale provided. Remember, think whether each of the items below would affect your decision if you wanted to engage in the task.**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
IF I WANTED TO...					
15. During the next <b>3 months</b> , it will be <b>extremely easy</b> for me to <b>be active regularly</b> even if...					
(a) I have to do house-related work	1	2	3	4	5
(b) I have to work (job)	1	2	3	4	5
(c) I don't have time	1	2	3	4	5
(d) I feel too tired	1	2	3	4	5
(e) I don't have easy access to facilities	1	2	3	4	5
(f) I have no one to do activity with	1	2	3	4	5
(g) I have cost/financial concerns	1	2	3	4	5
(h) I have health problems	1	2	3	4	5
(i) The weather is bad	1	2	3	4	5
(j) There are difficult instructions/ jargon	1	2	3	4	5
(k) I have difficulty reading	1	2	3	4	5

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16. During the next <b>3 months</b> , the following people will <b>definitely think</b> I should <b>be active regularly</b> .					
(a) extended family	1	2	3	4	5

(b) friends	1	2	3	4	5
(c) health care worker (e.g., doctor, nurse, etc.)	1	2	3	4	5
(d) partner	1	2	3	4	5

**THANK YOU FOR YOUR TIME AND HELP WITH THIS STUDY!!**

[CPO]



**DAILY PHYSICAL ACTIVITY SURVEY**  
**June 2009**

Kai Rieken, PhD(c)  
University of Victoria

OR

\_\_\_\_\_, Vice Principal  
WCLT

DATE \_\_\_\_\_

ID # \_\_\_\_\_

PHYSICAL ACTIVITY SURVEY:

This survey will help us find out about the kinds of physical activities that you do as part of your everyday life. Please answer each question even if you do not think of yourself as an active person. Think about what you do at work, at home, to get from place to place, and in your spare time for leisure or exercise.

---

Think about all the **vigorous (intense)** activities that you did in the **past 7 days**. **Vigorous** physical activities are those that take hard effort, make you breathe much harder than normal, and that make you sweat. For example, heavy digging, running, or fast bicycling would be intense.

Think *only* about those activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, jogging, or fast bicycling?

\_\_\_\_\_ **days per week**

No vigorous physical activities    **→ Skip to question 3**

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

\_\_\_\_\_ **hours per day**

\_\_\_\_\_ **minutes per day**

Don't know/Not sure

Now, think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities are activities that take a medium level of physical effort and make you breathe somewhat harder than normal. For example, carrying light loads, dancing, swimming, golf etc.

Think *only* about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, dancing, or doubles tennis? Do not include walking.

\_\_\_\_\_ **days per week**

No moderate physical activities → **Skip to question 5**

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

\_\_\_\_\_ **hours per day**

\_\_\_\_\_ **minutes per day**

Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to get from place to place, and any other walking that you might do just for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

\_\_\_\_\_ **days per week**

No walking → **Skip to question 7**

6. How much time did you usually spend **walking** on one of those days?

\_\_\_\_\_ **hours per day**

\_\_\_\_\_ **minutes per day**

Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing school work and during your free time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television or use the computer.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

\_\_\_\_\_ **hours per day**

\_\_\_\_\_ **minutes per day**

Don't know/Not sure

### **YOUR DAILY PHYSICAL ACTIVITY:**

1. How often do you go to a recreation centre to do physical activities?

\_\_\_\_\_times per week **OR** \_\_\_\_\_times per month **OR** \_\_\_\_\_times per year

2. Which recreation centre do you go to the most?

\_\_\_\_\_

3. I take part in physical activities offered through Westshore Centre

Yes  No

4. How often do you participate in physical activities at or with school?

\_\_\_\_\_times per week **OR** \_\_\_\_\_times per year

5. How satisfied are you with the daily physical activity opportunities offered at Westshore Centre for Learning and Training? (**tick one**)

Very  
Unsatisfied

Somewhat  
Unsatisfied

Neutral

Somewhat  
Satisfied

Very  
Satisfied

6. What do you like most about the daily physical activity at school?

\_\_\_\_\_  
\_\_\_\_\_

7. What would you change about the physical activity program at school?

\_\_\_\_\_  
\_\_\_\_\_

8. What would help you enjoy physical activity at school more?

\_\_\_\_\_  
\_\_\_\_\_

9. How enjoyable do you find the daily physical activity opportunities offered at Westshore Centre for Learning and Training? **(tick one)**

Very Unenjoyable	Somewhat Unenjoyable	Neutral	Somewhat Enjoyable	Very Enjoyable
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PHYSICAL ACTIVITY AND YOU:

1. For me, exercising regularly over the next 3 months would be (tick one box below):

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
very harmful	quite harmful	slightly harmful	neutral	slightly beneficial	quite beneficial	very beneficial

2. For me, exercising regularly over the next 3 months would be (tick one box below):

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
very unimportant	quite unimportant	slightly unimportant	neutral	slightly important	quite important	very important

3. For me, exercising regularly over the next 3 months would be (tick one box below):

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
very unenjoyable	quite unenjoyable	slightly unenjoyable	neutral	slightly enjoyable	quite enjoyable	very enjoyable

4. For me, exercising regularly over the next 3 months would be (tick one box below):

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
very boring	quite boring	slightly boring	neutral	slightly fun	quite fun	very fun

5. How motivated are you to exercise regularly over the next 3 months?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
very unmotivated	quite unmotivated	slightly unmotivated	neutral	slightly motivated	quite motivated	very motivated

6. If you **really wanted** to, do you feel you would have complete control over whether or not you exercised regularly over the next 3 months?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
very untrue	quite untrue	slightly untrue	neutral	slightly true	quite true	very true

7. If **you really wanted to**, how easy/difficult would it be for you to exercise regularly over the next 3 months?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
very difficult	quite difficult	slightly difficult	neutral	slightly easy	quite easy	very easy

8. I think that if I were to exercise regularly over the next 3 months most people who are important to me (for example family and friends) would be...

- |                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| very                     | quite                    | slightly                 | neutral                  | slightly                 | quite                    | very                     |
| unsupportive             | unsupportive             | unsupportive             |                          | supportive               | supportive               | supportive               |

9. Over the next 3 months I think that most people who are important to me will be...

- |                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| very                     | quite                    | slightly                 | neutral                  | slightly                 | quite                    | very                     |
| inactive                 | inactive                 | inactive                 |                          | active                   | active                   | active                   |

10. I intend to exercise on \_\_\_\_\_ days (0-7) per week over the next month.

11. For me, **getting** information about physical activity (such as exercise instructions, professional advice, benefits of exercise etc.) is...

- |                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| very                     | quite                    | slightly                 | neutral                  | slightly                 | quite                    | very                     |
| difficult                | difficult                | difficult                |                          | easy                     | easy                     | easy                     |

12. For me, **understanding** information about the importance of physical activity is...

- |                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| very                     | quite                    | slightly                 | neutral                  | slightly                 | quite                    | very                     |
| difficult                | difficult                | difficult                |                          | easy                     | easy                     | easy                     |

13. I feel that I am **knowledgeable** about physical activity.

- |                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| very                     | quite                    | slightly                 | neutral                  | slightly                 | quite                    | very                     |
| untrue                   | untrue                   | untrue                   |                          | true                     | true                     | true                     |

14. I know **how to use information** about physical activity to become more active...

- |                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| very                     | quite                    | slightly                 | neutral                  | slightly                 | quite                    | very                     |
| untrue                   | untrue                   | untrue                   |                          | true                     | true                     | true                     |

15. Where do you go to get information about health and physical activity?

- Internet
- Teachers/School
- Recreation Centre
- Friends
- Family
- Books/Magazines
- Other \_\_\_\_\_
- I don't know where to get information about health and physical activity

## ABOUT YOU:

1. What grade are you in? GRADE: \_\_\_\_\_
2. What language do you speak most often at home? \_\_\_\_\_
3. During the past four weeks, how often did you skip school? Do not include doctor's appointments or being sick.
  - Never
  - 1-2 times
  - 3-5 times
  - Six or more times
4. How do you rate your writing skills in general?
  - Poor
  - Moderate
  - Good
  - Excellent
5. How do you rate your reading skills in general?
  - Poor
  - Moderate
  - Good
  - Excellent
6. How do you rate your math skills in general?
  - Poor
  - Moderate
  - Good
  - Excellent
7. Please select the one statement that best describes your overall experiences in **trying to find information related to health.**
  - I haven't looked for health information much at all.
  - I have looked for health information, and seldom find what I am looking for.
  - I have looked for health information, and sometimes find what I'm looking for.
  - I have looked for health information, and usually find what I am looking for.
8. Please select the one statement that best describes your overall experiences in **trying to understand health information that you read about and hear.**
  - I don't read or hear about health information much at all.

- I am able to understand a little of the health information that I read about and hear.
- I am able to understand some of the health information that I read about and hear.
- I am able to understand most of the health information that I read about and hear.

**9. Please select the statement that best describes your overall experiences in trying to judge the quality of the health information that you read about and hear.**

- I generally don't try to judge the quality of health information that I read about and hear.
- I have tried to judge the quality of health information, and seldom felt that I was able to judge how good it was.
- I have tried to judge the quality of health information, and sometimes felt that I was able to judge how good it was.
- I have tried to judge the quality of health information, and often felt that I was able to judge how good it was.

**10. Please select the one statement that best describes your overall experiences in trying to communicate health information to other people.**

- I generally don't try to communicate health information to other people.
- I have tried to communicate health information to other people, and seldom felt that I had communicated it well.
- I have tried to communicate health information to other people, and sometimes felt that I had communicated it well.
- I have tried to communicate health information to other people, and often felt that I had communicated it well.

**11. In an average week, how much time do you spend on each of the following activities when you are not in class? Fill in one square for each line.**

	Less			More
	than	1-2	2-4	than
	No time	1 hour	hours	4 hours

- a) Watch TV or play video games.....
- d) I do jobs at home.....
- e) I work at a paid job.....
- g) I read a book for enjoyment.....
- h) I use the internet.....
- i) I do homework.....

**14) Which income level best fits your family? (choose one only)**

- Very poor
- Poor

- Neither poor nor wealthy
- Wealthy
- Very wealthy
- Not sure

**THANK YOU!**

**Please return the questionnaire to Westshore Centre and enter a  
draw for an iPod**