Exploring Exercise and Youth with a Disability

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Graduate Program in Health and Rehabilitation Sciences
A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy
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EXPLORING EXERCISE AND YOUTH WITH A DISABILITY

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by

Kimberly B. Simpson

Graduate Program in Health and Rehabilitation Science

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy

The School of Graduate and Postdoctoral Studies
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London, Ontario, Canada

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Abstract

The purpose of this dissertation was to explore the exercise participation of youth with a disability. The studies are grounded in self-determination theory (SDT) (Deci & Ryan, 1985) and follow the General Model of Program planning (GMPP). The first study in this dissertation involved assessment interviews to explore exercise and youth with a disability. In the assessment interviews (Study 1), youth highlighted their desire for physical activity opportunities that promoted their independence, socializing with peers, and success in reaching fitness goals in a community based setting. The interviews with youth matched the central tenants of SDT that being: autonomy, relatedness and competence.

The next two studies in this dissertation (study 2 and study 3) are consistent with the intervention and evaluation phases of health promotion program planning. Both studies used a twelve session intervention study to measure the achievement of exercise goals and performance of exercise skills in an adapted fitness centre. From the SDT framework, the twelve session exercise intervention design promoted autonomy, competence and relatedness. Participants (n=10) were involved in the selection of exercise goals for twelve session visits. Each session was self-directed and recorded for study purposes. During the twelve session intervention, all participants achieved their fitness goals measures by Goal Attainment Scaling (GAS) and improved in the performance of exercise skills as measured by the Performance Quality Rating Scale (PQRS). All participants saw significant achievement in their fitness goals and their motor skill performance.

The final study explored the motivation to exercise for youth with a disability. Using the Behavioural Regulation in Exercise Questionnaire (BREQ 2), youth completed an on-line questionnaire exploring their behavioural regulation in exercise. This group of youth, who
identified themselves as exercisers, had low levels of amotivation. Participants scored highest in integrated regulations with statements like “I participate in exercise because it has become a fundamental part of who I am”. These findings are important considering the numerous previous studies that have identified the additional barriers to exercise for this group compared to their same-age able bodied peers.

Keywords

Adapted Physical Activity, Adapted Exercise, Disability, Self-Determination Theory, Youth with a Disability
Co-Authorship

This dissertation is my original work. I would, however, like to acknowledge the important contributions and collaborations of Dr. Angie Mandich, my doctoral research advisor. Angie has provided direction, suggestions and insight to all aspects of the studies in this dissertation. I would also like to thank Dr. Andrew Johnson for his statistical guidance in study 2 and 3.
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CHAPTER I

Introduction and Purpose

Physical Activity and Child Health

The link between regular physical activity and enhanced health are well documented and include health benefits such as improved cardiovascular health, muscular strength, endurance, flexibility and posture (Pate et al., 1995; Warburton, Nicol, & Bredin, 2006; World Health Organization, 2010). There is compelling evidence that physical activity can also prevent primary and secondary chronic conditions such as cardiovascular disease, diabetes, cancer, hypertension, obesity, depression, osteoporosis and premature death (Lee & Skerrett, 2001; Paffenbarger, 2000; Warburton et al., 2006; World Health Organization, 2010). Additionally, regular physical activity participation has been shown to improve individuals’ psychological health, well being and perceived quality of life (Ge et al., 2010; Graham, Kremer, & Wheeler, 2008). This reported relationship between exercise and psychological health has been used to recommend exercise as a therapeutic treatment for psychological problems such as depression (Ge et al., 2010). Despite this overwhelming amount of positive evidence for individuals to exercise, there is still a significant segment of the global population who are not physically active enough to achieve the positive health benefits of exercise and physical activity therefore, increasing health risk and disease (Bonow, 2002; WHO, 2010). Colley et al. (2011), report that only 15% of adults who are meeting the physical activity recommendation and the majority (69%) of Canadian adults’ waking hours are spent in sedentary pursuits.
As a cohort, children and youth are spending more time in sedentary activities and lacking adequate amounts of physical activity. In fact, according to Statistics Canada, estimates of physical activity for children are at an all time low (Statistics Canada, 2009; Colley et al., 2011). This low level of physical activity among children is one of the contributing factors to the rising rates of obesity in school-aged children (Active Healthy Kids Canada, 2011; Boyce, 2004; Nettle & Sprogis, 2011). The Public Health Agency of Canada lists the increase in time spent watching television, playing video games, using a computer, and the diminished priority of physical education in Canadian schools, as the major reasons for the growing rates of inactivity in children (Public Health Agency of Canada, 2009). Colley and colleagues report that Canadian children are sedentary about 8.5 hours a day and only 7% of children accumulate the recommended 60 minutes of daily moderate-vigorous physical activity (Colley, Garriguet, Janssen, Craig, Clarke, & Tremblay, 2011). When children are not participating in regular physical activity they also lack opportunities to build fundamental movement skills while learning to coordinate physical movements. It has been shown that play, games, and other physical activities are opportunities to build and maintain physical health, contribute to the development of movement and co-ordination and help control feelings of anxiety and depression (Active Healthy Kids Canada, 2011; World Health Organization, 2010). Additionally, involvement in properly guided physical activity and sports can encourage the adoption of other healthy behaviours such as a healthy diet, adequate rest, and better health safety practices (Pate, Heath, Dowda, & Trost, 1996). The Canadian Society of Exercise Physiology (CSEP, 2011) has developed guidelines for children and youth with specific recommendations for the amount of time spent in physical activity and amount of time in sedentary activity daily. It recommends
that children aged 12 to 17 years old should participate in 60 minutes of moderate to vigorous physical activity daily and limit recreational screen time to no more than 2 hours per day.

**Physical Activity and Youth with a Disability**

Children with a disability are at risk for physical inactivity. The World Health Organization (WHO) reports that 10% of the world’s children have a disability and suggests a approximately of 2.5% of children aged 0-14 years with moderate to severe levels of sensory, physical, and intellectual impairments. An additional 8% can be expected to have learning or behavioural difficulties, or both (UNICEF, 2007). In Canada, an estimated total of 30.3% of school-aged Canadian children aged 6-11 years have one or more chronic physical health conditions/impairments, while 3.6% have activity-limiting conditions (McDougall et al., 2004). Children with a disability are less likely to be involved in regular physical activity and are more likely to spend leisure and recreation time enjoying sedentary activities. Researchers report that children with disabilities spend more time in quiet recreational activities, have fewer social engagements, and experience less variation in physical activities (Canadian Institute for Child Health, 1994). This inactivity can be detrimental to health as people with a disability experience a ‘cycle of de-conditioning’ in which physical functioning deteriorates leading to a further reduction in physical activities (Painter, 1994). This de-conditioning not only prevents the promotion of health but also leads to secondary disabilities as a result of inactivity (Cooper et al., 1999; Durstine et al., 2000). Stevens et al. (1996) reported that when it comes to other health behaviours, children with disabilities are less likely than their peers to smoke, drink, and use drugs, but are more likely to have unhealthy eating patterns and engage in sedentary leisure activities.
Physical fitness is considered one of the most important health markers, as well as a predictor of mortality and cardiovascular disease for all causes which can be greatly influenced by environmental factors (Ortega, Ruiz, Castillo, & Sjöström, 2008). However, for youth with a disability little is known about these health outcomes. Murphy and Carbone (2008) report that overall, participation in physical activity and sports for children with disabilities can have multiple positive effects, including decreased complications of immobility. Longmuir and Bar-Or (2000) found that youth with visual impairments or physical disabilities, specifically cerebral palsy and muscular dystrophy, have significantly lower levels of habitual physical activity, consider themselves less fit relative to their peers, and report more limitations for physical activity participation. Overall, the low levels of physical ability were attributed to motor impairments associated with physical disabilities. Despite the physical and developmental barriers associated with chronic conditions, youth with a disability continue to participate in organized sport, such as the Paralympics and Special Olympics and in introductory physical activity and exercise programs such as wheelchair sports clubs, cerebral palsy sports organizations, and sport for the blind.

Youth with a disability report several barriers to their participation in physical activity programs. Menear and Shapiro (2004) examined the barriers to physical activity and exercise for students with a disability. These disability-related barriers are influenced by the type of the disability and accessibility issues are both physical (environmental) and programmatic (staffing) barriers. Other barriers may include transportation, scheduling and cost (Menear & Davis, 2007; Menear & Shapiro, 2004). In a related study, Kang, Zhu, Ragan, and Frogley (2007) used an item questionnaire to uncover the perceived exercise motivation and barriers of youth with a
disability. The authors reported that the most significant barriers for youth with a disability to exercise were two-fold: pain and/or discomfort and lack of time.

**Adapted Physical Activity**

Children with a disability are less likely to be involved in regular physical activity and are more likely to spend leisure and recreation time enjoying sedentary activities. According to Rimmer and Rowland (2008), youth with a disability are not achieving the recommended 60 minutes of physical activity a day and are significantly less active and more obese than their same aged peers. As a result, youth with a disability have a higher prevalence of being overweight and obese compared to their non-disabled peers (Rimmer, Rowland, & Yamaki, 2007).

In exploring the accessibility of fitness centres in the United States, most fitness facilities are not accessible and in fact, were in violation of the Americans with Disabilities Act guidelines for the built environment (Rimmer, Riley, Wang, & Rauworth, 2005). Similarly in Canada, a recent review of accessible fitness facilities found that most recreation and fitness facilities were also limited in their accessibility for people with disabilities (Arbour-Nicitopoulos & Martin Ginis, 2011). Despite these barriers, researchers have shown that youth with a disability continue to want to participate in a variety of physical activities and have very little notion of their chronic condition limiting their participation (Fereday, MacDougall, Spizzo, Darbyshire, & Schiller, 2009; Heah, Case, Mcguire, & Law, 2007).

Recently, it has been reported that children who are physically mature (pre-adolescence) can begin structured exercise programs, including resistance training (Faigenbaum et al., 2009). The reported benefits of daily exercise for a non-disabled youth are multiple; however, less is
known about these outcomes in youth with a physical disability (Rimmer et al., 2007). To date, researchers have shown that participation in physical activity and sports for children with disabilities can have multiple positive effects, including decreased complications of immobility (Durstine et al., 2000; Murphy & Carbone, 2008). It is proposed that in order to be most effective, adapted physical activity programs should include properly designed and implemented programs of sports and physical activities targeting cardiovascular endurance, flexibility, balance, agility, muscular strength, accessibility, safety, and enjoyment (Murphy & Carbone, 2008). The Canadian Pediatric Society recently released a position statement for physical activity recommendations for children with specific chronic health conditions (e.g., juvenile idiopathic arthritis, hemophilia, asthma and cystic fibrosis) in which it is recommended, “despite chronic disease, each individual has a unique exercise tolerance and physical capacity” (Philpott, Houghton, & Luke, 2010, p.217). Therefore, the exploration of these individual capacities to exercise is important in an environment to target individual preferences, abilities, and goals in a safe, effective way. The literature provides evidence that targeted individualized exercise programs for youth with a disability can improve overall strength and cardiovascular endurance and alleviate and avoid secondary conditions (e.g., lower pain, de-conditioning and fatigue) associated with physical inactivity. However, translating research outcomes from clinical settings to community based opportunities remains an area of research requiring further attention (Rimmer & Rowland, 2008).

**Health Promotion and Disability**

The planning, implementation, and evaluation of health promotion programs is imperative in order to offer effective health promotion programs for everyone. This dissertation
is grounded in the Generalized Model for Program Planning (GMPP; McKenzie, Neiger, & Thackeray, 2009). As shown in Figure 1, the GMPP appears sequential however is not linear in practice, most often moving back and forth between stages toward the end point (Mackenzie, Neiger, & Thackeray, 2009).

The GMPP model of health promotion program planning involves five steps and this dissertation follows this model for health promotion planning for youth with a disability. In the first and fourth studies, assessments were conducted to understand the exercise participation of youth with a disability. In the first study, a qualitative interview explored the participation and preferences for fitness with youth with a disability. In the second and third studies, participants set goals and objectives for their fitness programs. These goals were evaluated following the intervention in goal attainment scaling and video performance analysis. The fourth study sought to further explore the exercise motivation for youth with a disability using an exercise motivation questionnaire.
Figure 1. Generalized Model of Program Planning (Mackenzie, Neiger & Thackeray, 2009).

Unfortunately, there is a paucity of research that explores health promotion for people with disabilities (Patrick, 1997; Rimmer, 1999). Rimmer (1999) explains that the underlying cause for this is the traditional view of health, where health is the absence of disease. In a traditional view of health, an individual with a disability may never be without disease or disability but may benefit from health promotion programs to prevent further complications or the occurrence of secondary conditions; however, there is a health promotion shift underway. Prior to 1990, rehabilitation services for individuals with a disability focused primarily on the medical needs of the individual (King et al., 2002). In this time, the world view on disability focused on diagnostic labels and criteria, and good health was achieved in the absence of disease and pain. Disabilities were classified by characteristics and matched diagnostically using the International Classification of Disease (ICD-10) or the International Classification of Impairments, Disabilities and Handicaps (ICIDH). During the 1990s, there was movement towards function with the development of the International Classification of Function (ICF), developed to replace the ICD and ICIDH. The new focus on function, led to therapeutic programming focused on recreational programs and social skills training in children and youth with a disability to develop specific skills in order to “fix” the child (King et al., 2002). These programs were offered in therapy centres and not in the child’s own environment. Since the 1990s, there has been a rehabilitation service delivery shift to a more holistic view of the child’s needs. This is consistent with the evolution of the definition of health, to a more dynamic holistic view of the individual that incorporates emotional, psychological, social and physical health.

This emerging shift from disease and disability prevention to the prevention of secondary conditions in people with disabilities calls on rehabilitation professionals as an integral
component in community health promotion and will include fitness centres and fitness
professionals as the ideal community service for health promotion for people with a disability
(Rimmer, 1999). As Rimmer (1999) illustrates in his model of health promotion for people with
a disability (Figure 2), there is a need for strong community based partnerships between
rehabilitation centres and fitness centres in order to prevent secondary conditions and promote
physical activity for individuals with a disability. He urges that fitness centres “with their
ambiance and health-oriented focus, have the potential to become a logical extension of the
rehabilitation continuum by offering a location in the person’s natural environment to continue
the recovery process…” (p.498).

In a comprehensive review of exercise interventions for people with a physical or
cognitive disability (1986-2006), Rimmer et al. (2010) found that most exercise interventions
targeted individuals who had a stroke (20%), multiple sclerosis (15%), or intellectual disability
(13%). The interventions involved a mixture of training modalities including aerobic and
strength exercises. The literature highlights that most adapted exercise programs are facilitated
by a physiotherapist in a treatment centre and in most cases exercise is used as a therapeutic tool
for the group (as opposed to a health promotion focus). Program participants are typically
grouped by similar diagnosis, gross motor function ability, and by similar age (Patrick, 1997;
Patrick, Richardson, Starks, Rose, & Kinne, 1997; Rimmer, 1999; Rimmer, Chen, McCubbin,
Drum, & Peterson, 2010). While this may provide useful outcomes for exercise research, it is
not reflective of lifelong individualized participation in physical activity and exercise or health
promotion.
Figure 2. Conceptual Model for Health Promotion for People with Disabilities Adapted from “Health promotion for people with disabilities: The emerging paradigm shift from disability prevention to prevention of secondary conditions” by J. Rimmer in Physical Therapy, 79(5), 495-502.
Exercise Motivation Theory

Theories of motivation for exercise are imperative in the discussion of adapted exercise for youth with a disability. In this dissertation, the Self-Determination Theory (SDT; Deci & Ryan, 1985) was the foundational theory for exploring exercise for youth with a disability (Figure 3). SDT holds considerable appeal as an approach for understanding initiation and persistence for individuals to exercise and using SDT as a framework for investigating exercise motivation is promising in the exercise motivation research conducted to date (Hagger et al., 2007; Wilson, Mack, & Grattan, 2008).

In addition to the literature exploring SDT and exercise, SDT has proved useful in educational contexts for people with a disability (Chambers et al., 2007; Edmunds, Ntoumanis, & Duda, 2006; Gillison, Standage, & Skevington, 2006; Hagger & Chatzisarantis, 2008a). Therefore, it seems fitting to ground the exploration of motivation to exercise for youth with a disability within a framework of SDT.
SDT is a meta-theory of four sub-theories; Cognitive Evaluation Theory (CET); Organismic Integration Theory (OIT); Causality Orientations Theory (COT); and Basic Needs Theory (BNT). Central to SDT is the distinction between autonomous or controlling forms of motivation. CET explores the reasons to support (autonomous) self-determined behaviour or prevent (controlling) self-determined behaviour. OIT explores the process by which people internalize and adopt autonomous or controlling behaviours and adopt them into their sense of self so that they are perpetuated for self-determined autonomous reasons to satisfy basic psychological needs. The COT examines the individual differences in personalities to pursue and engage in self-determined behaviours. The fourth sub-theory, Basic Needs Theory (BNT), explores reasons for self-determined behaviour based on the innate psychological needs of autonomy, relatedness, and competency. Together, these four theories have provided an effective and comprehensive framework for understanding motivation (Hagger & Chatzisarantis, 2007)

The early research in self-determined behaviour focused on intrinsic motivation and rewards, which led to the development of CET (Deci, 1975). This theory suggests that when an external reward is present, behaviour will persist, and when the reward is removed behaviour diminishes. As a result, this requires little intrinsic motivation on behalf of the individual as the external reward is providing all the motivation for the behaviour. CET has a place in many areas of psychology, including the area of sport psychology, but is virtually absent in the area of exercise psychology. This may be a result of the lack of positive reward and amount of intrinsic motivation required to maintain and persist in exercise, such as the maintenance of a low caloric diet or activity requiring prolonged physical effort (Hagger & Chatzisarantis, 2008).
Given that a number of healthy behaviours are not intrinsically appealing, OIT (Deci & Ryan, 1985) seeks to explain how behaviours that are extrinsically motivated. These healthy behaviours are self-regulated and motivated along a continuum of motivational styles, including intrinsic motivation and external regulation. The most critical of these styles in adoption of exercise behaviours are those that are autonomous and adhere over time (Hagger & Chatzisarantis, 2008). Individuals are motivated to exercise either intrinsically or extrinsically along a self-determined continuum. As such, intrinsically motivated exercisers participate in exercise for the pleasure and satisfaction of doing so. At the extrinsic end of the continuum are four extrinsic regulations for exercise, namely: identified, integrated, external, and introjected regulations. Identified and integrated regulations are said to be more autonomous extrinsic regulations and integrated and external are at the controlling end of the continuum for motivation. An identified regulation is represented in an individual’s belief that the behaviour is of personal significance and value, whereas, an integrated regulation refers to a behaviour which the individual feels is an important part of his or her personality and consistent with his or her values. Controlling regulations such as external and introjected are regulations in which the individual seeks to obtain a reward or avoid punishment. With regard to external regulations, the rewards/punishment comes from an external source or other person such as a family member or medical professional. With introjected regulation, the individual has internal rewards/punishment such as feelings of pride versus feelings of guilt in regards to their behaviour (Chatzisarantis, Hagger, Smith, & Sage, 2006; Deci & Ryan, 2002; Hagger & Chatzisarantis, 2007, 2008).
SDT in Exercise, Youth and Healthcare

SDT is important in the exploration of exercise behaviours and has been shown to be essential in understanding the initiation and persistence of exercise behaviours (Hagger & Chatzisarantis, 2007, 2008). SDT studies have shown that people who regularly participate in exercise report more self-determined reasons for exercise involvement (Mullan, Markland, & Sheppard, 1997). Self-determined exercisers report higher rates of physical activity initiation (Kowal & Fortier, 2007), adherence to exercise programs (Fortier & Grenier, 1999), greater interest in participation (Li & Harmer, 1996), and flow (Kowal & Fortier, 2000).

Typically, exercise is not an intrinsically motivating behaviour. Research has focused mainly on the reasons for exercise initiation (goals) and the persistence in exercise (regulations), in particular, which goals are pursued and why (Deci & Ryan, 2002). For instance, some exercisers are motivated for the physical results of exercise participation, while others value the health and fitness benefits. Goal content, as highlighted in a SDT and exercise review by Wilson, Mack, and Grattan (2008), is important in the discussion of exercise motivation. Vansteenkiste and colleagues (2007) examined the motivational role of goal contents within exercise and this research indicated that holding intrinsic (as opposed to extrinsic goals) were associated with sustained exercise behaviour. Vansteenkiste and colleagues explored health behaviour change in severely obese fifth and sixth graders. This group of children adopted a new healthy eating program and were instructed it is important for either intrinsic (health and physical fitness) or extrinsic (physical attractiveness) motives. Both groups showed positive behaviour change but only those instructed in intrinsic motives were sustained over time (Vansteenkiste et al., 2005).
SDT also shows considerable appeal in exploring the satisfaction of basic needs thought to motivate exercise. According to Deci and Ryan (2002), situations in which basic needs of relatedness, autonomy, and competence are fulfilled should sustain behaviour while situations that stifle needs would diminish behaviour. Cross-sectional studies in this area have shown that psychological need fulfillment is associated with more self-determined exercise motives (McDonough & Crocker, 2007; Vlachopoulos & Michailidou, 2006; Wilson, Mack, Muon, & LeBlanc, 2007). Longitudinal studies support the basic needs theory and highlight that the fulfillment of competence, autonomy, and relatedness needs within exercise is dynamic (Edmunds et al., 2007; Wilson, Rodgers, Blanchard, & Gessell, 2003).

SDT has proven a suitable teaching model for promoting positive health outcomes in physical education for youth (Chatzisarantis et al., 2006; Hagger, Chatzisarantis, Barkoukis, Wang, & Baranowski, 2005; Standage & Gillison, 2007; Standage, Duda, & Ntoumanis, 2003). As Standage and Gillison (2007) report, self determination offers an opportunity to increase the general self-esteem and reported levels of health related quality of life (HRQoL) of students in physical education. In this study both autonomy and competence had a positive indirect effect on general self-esteem and HRQoL and relatedness had a positive indirect effect on general self-esteem as a result of HRQoL. This is supportive of previous research proposing that satisfaction of basic psychological needs of autonomy, relatedness and competence leads to improved overall well-being and psychological health in other groups (Gillison et al., 2006; Ryan, Patrick, Deci, & Williams, 2007; Standage & Gillison, 2007).

SDT has been used as a framework for exploring motivation and youth with a disability in education. Specifically, within special education, SDT has been reported as being the most

In education, SDT is frequently used in fostering student participation, providing choices and transitions to adulthood (King et al., 2007). As a result of SDT education programs, people with disabilities who lived and worked in their communities were more self-determined than their peers and self-determination contributed to a more positive quality of life for individuals with intellectual disabilities (Chambers et al., 2007). Wehmeyer and colleagues (1995; 1996) reported that people with intellectual disabilities often lack opportunities to make choices and express preference in their daily life.

Despite many technological advances in healthcare over the last century, there remains one central factor in the diversity of health related outcomes; human behaviour (Schroeder, 2007). An individual’s health and wellbeing are largely shaped by individual decision in health promoting behaviours such as a healthy diet and exercise or health damaging behaviours such as smoking (Ryan, Frederick, Lepes, Rubio, & Sheldon, 2008). SDT focuses on the process by which a person acquires the motivation to initiate and maintain new health behaviours over time and argues that developing a sense of autonomy and competence are critical to the processes by which a person comes to regulate and sustain healthy behaviours (Ryan et al., 2008). Since most health behaviours are not inherently enjoyable or intrinsically motivated, an individual must value and endorse their importance in order for the behaviour to continue over time. There is a growing body of research examining the use of SDT in healthcare. In a review on current research on SDT and its impact on health for individuals with intellectual disabilities, Shogren et al. (2006) suggested the components of SDT may be a key strategy for reducing health
disparities essential in medical healthcare, disability awareness, and public health for this group of individuals. There is a reported link in the literature between education level achieved and employment status of individuals with a disability (Wehmeyer & Palmer, 2003). The ability of SDT to impact employment status suggests the potential of SDT to impact socio-economic status, one of the social determinants of health (Graham, 2005). It would be beneficial for healthcare providers and promoters to be encouraging of self-determination in medical healthcare, in disability awareness, and in public health for this group of individuals (Shogren et al., 2006; Ryan et al., 2007).

**Purpose**

The purpose of this doctoral dissertation was to explore exercise among youth with a disability. To achieve this purpose, four studies were undertaken in Ontario, Canada. The first study involved assessment interviews to explore exercise and youth with a disability. The next two studies involved an individualized exercise program for youth aged 12-18 years (n=10) participating in exercise programs at an adapted fitness centre. Specifically, the second study measured the achievement of exercise-related goals among youth with a disability using Goal Attainment Scaling (GAS; King & McDougall, 2007), and the third assessed the motor skills performance of three chosen fitness goals at pre- and post-test during a 12 week exercise program using the Performance Quality Rating Scale (PQRS; Polatajko & Mandich, 2004). The fourth study explored exercise motivation among youth with a disability (n=5) using the Leisure Time Exercise Questionnaire (LTEQ; Godin & Shephard, 1997) and the Behavioural Regulation in Exercise Questionnaire (BREQ -2; Mullan, Markland, & Ingledew, 1997).
This dissertation was written using the integrated-article format, in which each chapter represents a separate manuscript written for publication in the field of adapted physical activity. Some of the information in this dissertation will be repeated in subsequent chapters. All four studies are thematically related and focus on exploring aspects of adapted exercise and youth with a disability. This recurrent theme throughout and repeated participant sample in studies one and two lead to some repetition of information in the general introduction to this thesis and in subsequent manuscript chapters.

**Operational Definitions**

The following terms are referenced numerous times throughout this dissertation, and are therefore defined in this section in order to provide a point of reference and clarification.

*Physical activity (PA)* is used to reference any bodily movement produced by skeletal muscles that requires energy expenditure (*Global Strategy on Diet, Physical Activity and Health*, 2004; WHO, 2010).

*Disability* refers to activity-limiting conditions that prevent full participation in intellectual, social, emotional, or physical functions or any combination thereof, observed in work, leisure, or daily living tasks (Sherrill, 2004). This definition echoes the worldwide definition from the World Health Organization’s International Classification for Function (ICF), which defines ‘disability’ as an umbrella term for impairments, activity limitations, and participation restrictions. Therefore, disability is an interaction between individuals with a health condition and personal and environmental factors (World Health Organization, 2001).

*Adapted physical activity (APA)* is used to reference “service delivery, pedagogy, coaching, rehabilitation, therapy, training, or empowerment conducted by qualified professionals
to enhance physical activity goal achievement of individuals of all ages with movement
limitations and/or societal restrictions (i.e., attitudinal and environmental barriers)” (Sherrill,
2004, p.4).

*Exercise* refers to physical activity that is planned, structured, repetitive, and purposive
with a purpose of improvement or maintenance of one or more components of physical fitness
(i.e., cardiovascular health, muscular strength, muscular endurance, flexibility or balance).
Although often used interchangeably, is not synonymous with physical activity: it is a
subcategory of physical activity (Caspersen, Powell, & Christenson, 1985). Therefore, *adapted
exercise* is used throughout this dissertation to reference service delivery, pedagogy, coaching,
rehabilitation, therapy, training, or empowerment to enhance exercise goal achievement of
individuals of all ages with a disability.

For the purpose of this dissertation *youth* was defined as individuals between the ages of
12 and 20 years old.
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CHAPTER II

Exploring Adapted Exercise Participation for Youth with a Disability (Study One)

The link between regular physical exercise and improved personal health are well documented; however, there is still a large segment of the world’s population who are not physically active enough to achieve the positive health benefits associated with exercise and physical activity (Warburton et al., 2006; World Health Organization, 2010). The association between regular physical activity and enhanced health include health improvements such as improved cardiovascular health, muscular strength, endurance, flexibility, and posture (American College of Sports Medicine, 2007; Pate et al., 1995; Warburton et al., 2006; World Health Organization, 2010). There is strong evidence to suggest that physical activity can also prevent primary and secondary chronic conditions such as cardiovascular disease, diabetes, cancer, hypertension, obesity, depression, and osteoporosis and premature death (Lee & Skerrett, 2001; Paffenbarger, 2000; Warburton et al., 2006; World Health Organization, 2010). Additionally, regular physical activity participation has been shown to improve individuals’ psychological health, well being, and perceived quality of life (Ge et al., 2010; Graham et al., 2008). This relationship between exercise and psychological health has been a stimulus to recommend exercise as a therapeutic treatment for psychological problems such as depression (Ge et al., 2010). However, it has been shown that adherence to new exercise programs is quite low for those individuals who start to exercise for health benefits (Ryan, Frederick, Lopes, Rubio, & Sheldon, 1997).

This lack of activity is also a factor in the declining health status of North American youth. According to the National Longitudinal Survey of Children and Youth, estimates of
physical activity for children are at an all-time low (Statistics Canada, 2009). The low levels of physical activity among children is one of the contributing factors to the rising rates of obesity in school-aged children (Heitzler, Martin, Duke, & Huhman, 2006; Pate et al., 2006; Public Health Agency of Canada, 2009; T. W. Rowland, 2007; World Health Organization, 2010). The Public Health Agency of Canada (2009) lists the increase in time spent watching television, video games, using a computer, and the diminished priority of physical education in Canadian schools, as the major reasons for the growing rates of inactivity in children. Colley and colleagues report that Canadian children are sedentary about 8.5 hours a day and only 7% of children accumulate the recommended 60 minutes of daily moderate-vigorous physical activity (Colley, Garriguet, Janssen, Craig, Clarke, & Tremblay, 2011). Play, games, and other physical activities are opportunities to build and maintain physical health, to contribute to the development of movement and co-ordination, and to help control feelings of anxiety and depression (Active Healthy Kids Canada, 2011; Pate et al., 2006). Moreover, involvement in properly guided physical activity and sports can encourage the adoption of other healthy behaviours such as a healthy diet, adequate rest, and better health safety practices (Pate et al., 2002).

Children with a disability are particularly at risk for inactivity. They are less likely to be involved in regular physical activity and are more likely to spend leisure and recreation time enjoying sedentary activities (McDougall et al., 2004; Yamaki, Rimmer, Lowry, & Vogel, 2011). An estimated total of 30.3 % of Canadian children aged 6-11 years have one or more chronic physical health conditions/impairments, while 3.6% have activity-limiting conditions (McDougall et al., 2004). This is a large demographic of the child population who are particularly at risk for sedentary behaviours. Previous researchers reported that children with
disabilities spend more time in quiet recreational activities, have fewer social engagements, and experience less variation in physical activities than their same aged peers (Rimmer et al., 2010; Stevens et al., 1996). According to Steele et al. (1996), children with disabilities are less likely than their peers to smoke, drink, and use drugs, but are more likely to have unhealthy eating patterns and engage in sedentary leisure activities.

Physical fitness is considered one of the most important health markers and is a strong predictor of mortality and cardiovascular disease; however, less is known about these outcomes for youth with a disability (Ortega et al., 2008). It has been suggested that children that are physically mature (pre-adolescence) can begin structured exercise programs, including resistance training (Faigenbaum et al., 2009). The reported benefits of daily exercise for a non-disabled youth are multiple; however, less is known about these outcomes in youth with a physical disability (Rimmer et al., 2007). To date, researchers have shown that participation in physical activity and sports among children with disabilities can have multiple positive effects, not the least of which is decreased complications of immobility (Durstine et al., 2000; Murphy & Carbone, 2008). This physical activity should include properly designed and implemented programs of sports and physical activities targeting cardiovascular endurance, flexibility, balance, agility, muscular strength, accessibility, safety, and enjoyment (Murphy & Carbone, 2008).

Longmuir and Bar-Or (2000) found that youth with visual impairments or physical disabilities, specifically cerebral palsy and muscular dystrophy, have significantly lower levels of habitual physical activity, consider themselves less fit relative to their peers, and report more limitations for physical activity participation. Overall, the low levels of physical ability were
attributed mainly to motor impairments associated with physical disabilities. Despite the physical and developmental barriers associated with certain conditions, youth with disabilities continue to participate in organized sport, such as the Paralympics and Special Olympics and in introductory physical activity and exercise programs such as wheelchair sports clubs, cerebral palsy sports organizations, and sport for the blind (Fereday et al., 2009).

In a comprehensive review of exercise interventions for people with a physical or cognitive disability (1986-2006), Rimmer et al. (2010) found that most exercise interventions targeted individuals who had a stroke (20%), multiple sclerosis (15%) or intellectual disability (13%). The interventions involved a mixture of training modalities including aerobic and strength exercises. Moreover, most adapted exercise programs were facilitated by a physiotherapist in a treatment centre and in many circumstances exercise was used as a therapeutic tool for the group for functional gains (Rimmer, 1999; Rimmer et al., 2010). Typically, program participants are grouped by similar diagnosis; gross motor function ability; and by similar age. Most research to date has focused on functional physical outcomes and while this may provide useful outcome for exercise research it is not reflective of lifelong individualized participation in physical activity and exercise (Patrick, 1997; Patrick et al., 1997; Rimmer et al., 2010).

Adolescence is a time for physical and psychological development and increased awareness of self-identity and physical body (Mechanic & Hansell, 1987). As such, it represents a pivotal time to introduce lifelong healthy behaviours (Walker et al., 2002; Walker & Townsend, 1999). Physical activity behaviours developed during adolescence have a long-term influence on lifelong physical activity habits, therefore, exploring opportunities to be more
physically active for youth with a disability could have lifelong positive effects on their health (Daley, 2002).

The purpose of this study was to explore the exercise participation of youth with a disability who exercise in an adapted exercise facility with the use of interviews. Four youth were interviewed in a semi-structured format about their exercise participation. The adapted fitness centre is based in a local children’s treatment centre. This children’s treatment centre is a community based rehabilitation facility with an adapted fitness centre for client use. The adapted fitness centre is a new initiative (2008) to promote physical fitness in youth with a disability. The centre has fully accessible cardiovascular training equipment including: recumbent step, recumbent hand and cycle ergometer, and a treadmill. Each piece of equipment has removable seating for individuals using a wheelchair. For strength training, participants had access to free weights, resistance tubing and cable pulleys. To train balance and flexibility, participants could stretch using an elevated stretching table or floor mats and train balance using balance cushions, stability balls, and discs.

**Method**

This qualitative study used a grounded theory approach. Grounded theory research is subject to rigorous guidelines for the investigation of human experience and the intent of the research is to develop explanatory frameworks that describe the relationships among concepts (Charmaz, 2006). The authors of grounded theory, Glaser and Strauss, do however invite the qualitative researchers to use the framework in their own way (Charmaz, 2006). For the purpose of this study, the principles guiding Grounded Theory research were used due to a lack of testable hypothesis in this relatively new area of research. The use of semi-structured interviews
fits particularly within Grounded Theory research, as they are “open-ended but directed, shaped
but emergent, and paced yet flexible approaches” (Charmaz, 2006 p. 28).

**Participants.** With ethical approval from both the university and the local children’s
treatment centre (Appendices A and B), a heterogeneous sample of youth participants was
invited to participate in this qualitative study (Appendix C). Four youth (one male, three
females) completed the interviews, three had cerebral palsy and one youth an acquired brain
injury, their average age was 13.6 years old. The semi-structured interviews explored their
feelings, experiences, and perspectives about their personal exercise participation in the past,
present, and future. Participants consented to participate as did their primary caregiver
(Appendix D). Interviews proceeded until a point of “redundancy”, the point where additional
members do not justify the additional energy and resources (Guba & Lincoln, 1985, p.233).

**Interviews.** Semi structured interviews were conducted; two “Grand Tour” questions
were used to initiate conversation, followed by several probing follow-up questions. The
interview guide (Appendix E) allowed the researcher to “ensure that the same basic lines of
inquiry are pursued with each person being interviewed” (Patton, 2002, p.343). The guide
contained open-ended questions that which allowed the person being interviewed to talk about
their experiences, feelings, opinions and knowledge (Patton, 2002); this type of qualitative
interviewing provides an open-ended in depth exploration of an aspect of life that the interviewee
has substantial experience and often considerable personal insight (Charmaz, 2006). Following
the interviews, the researcher contacted subjects with a summary of the information from the
interviews. This was used as a member check to ensure the accuracy of the transcribed
interviews. The researcher summarized the interview and ensured information gathered was accurate.

Inductive content analysis was used in the analysis of the data, allowing the patterns, themes and categories of analysis to come from the data, rather than being decided prior to data collection and analysis (Patton, 2002). To further analyze the data, the researcher used computer assisted data processing software, QSR Nvivo 7, in order to transform raw textual material into a format for analysis. The software was used to code and categorize emerging themes. Additionally, investigator triangulation was used in this study; this involved the use of an outside researcher to interpret the themes from the data gathered (Patton, 2002). By using more than one data analyst, confirmability of the study was enhanced by diminishing researcher bias and ensuring coding consistency. Triangulation among researchers confirms that the interpretations and outcomes are embedded in the context of participants and not those of the researcher (Guba & Lincoln, 1985). To enhance the confirmability of the study, the outside researcher, that is, one not involved in the field of study, was used in triangulation of the data and interpretation of findings.

**Results**

Four major themes emerged from the interview data: a social need, a desire to achieve a fitness goal, the need to be independent and wanting to transition to community fitness centres. It is interesting to note that although the participants were asked about their health, the researchers found no consistent themes in their responses and in fact, the youth were much more willing to discuss their exercise and leisure participation than their health.
Exercise is social. Participants commented several times that their choice of activities, including fitness, it was important to socialize with their peers. In exploring previous physical activity participation, Participant G commented that he liked skiing as it was “good family time” and “I met friends”. Participant N and G said they both made new friends from exercising at the adapted fitness centre. Participant R commented that she would eventually transition to using a community gym as she felt it was important to workout with family, “my mom needs to start working out, so why not go with her”.

Exercise goal achievement. All participants commented on changes in their physical fitness as a result of participation in an exercise program. R commented “according to my sister I ride my bike faster”. B acknowledges the changes in his daily activities “I am using a grown-up urinal instead of sitting down and I can get my underwear down and my socks off and my t-shirt on now”. All participants commented on increased fitness levels particularly strength and balance gains.

Exercise independently. It was evident in all the interviews, participants were seeking to be more independent in their physical activity pursuits. In reference to the accessibility of the fitness centre, N comments “everything is easily accessible, so I can still live a healthy lifestyle but in a more easy way” and in comparing traditional therapy to exercise participation she says “here it is more of my design plan”. G echoed similar comments saying the adapted fitness centre “is fit for anyone with any type of disability”. He went on to say “my parents and my support worker have noticed a big change; they say I am more independent and I have the confidence to try new things”.
**Exercise in my community.** All participants mentioned working out in a community setting. When asked about future participation in fitness programs, all four participants commented on eventually wanting to workout in their community. R commented that she would likely go to a community gym because it would be easier to get to as it is closer to home. N commented that she would like to go to a community gym if “they had accessible equipment and people that could assist me”.

**Discussion**

Participation in physical activity is a complex interaction between biological, environmental, social, and psychological influences (Biddle & Mutrie, 2001). For youth with a disability, opportunities may be limited due to personal and environmental barriers to exercise participation (Arbour-Nicitopoulos & Martin Ginis, 2011; Rimmer et al., 2005, 2007). This study explored the perspectives of exercising youth at an accessible fitness centre. The youth clearly expressed their desire for a social, accessible, challenging and community based fitness opportunity. These themes echo the foundations of Self-Determination Theory (Deci & Ryan, 2002). SDT is a theoretical approach to exercise motivation human that has proven effective as an approach for understanding the initiation and persistence for individuals to exercise (Hagger & Chatzisarantis, 2008; Ingledew, Markland, & Sheppard, 2004; Wilson et al., 2008). SDT (Figure 1) proposes that motivation varies in the extent to which it is autonomous (self-determined) or controlling. SDT explains motivational orientations, contextual influences, and interpersonal perceptions for motivation (Hagger & Chatzisarantis, 2008), and it has been shown that using SDT as a framework for investigating exercise motivation is promising in the exercise motivation research conducted to date (Wilson, Mack, & Grattan, 2008). SDT has also been
used in educational contexts for people with a disability (Chambers et al., 2007; Edmunds et al., 2006; Gillison et al., 2006; Hagger & Chatzisarantis, 2008).

Central to SDT are three basic psychological needs for autonomy, competence, and relatedness, and these three needs are essential in understanding the initiation and regulation of behaviour (Deci & Ryan, 2002). In SDT, competence refers to interacting effectively with one’s environment by mastering challenging tasks; autonomy involves feeling free to choose one’s own behaviour, and more importantly, that one’s behaviour emanates from an internal perceived locus of causality; and relatedness refers to feeling meaningfully connected to others within a given social milieu (Rodgers, Wilson, Blanchard, & Gessell, 2003). SDT proposes that all behaviours are a result of an individual’s choice to satisfy a basic psychological need and people are more likely to be intrinsically motivated towards a behaviour if it is satisfying a basic psychological need (Deci, 1975). Research has shown that SDT positively predicts leisure time exercise participation and that all three needs are relevant to the physical activity context; youth want choice, to feel successful, and seek to be accepted by peers in their physical activity pursuits (Edmunds et al., 2006; Standage et al., 2003). Similarly, the participants in this study identified the need for autonomy, relatedness, and competence in their fitness pursuits. They suggest that ideally this would be done in their communities and not in a treatment centre.

These findings are consistent with the Basic Needs Theory (BNT) in SDT. BNT suggest that when the basic psychological needs of autonomy, competence and relatedness are met an individual is more likely to persist with a behaviour. Within a particular context if the three BNT needs are met and not neglected, the outcomes are intrinsic motivation, internalization and a positive experience (Hagger & Chatzisarantis, 2008). In sport and exercise, Kowal and Fortier
(2000), demonstrated that when the basic needs were met in the sport and exercise context that all the basic needs independently contributed to motivation and the experience of flow. Therefore, it is important to provide environments supportive of BNT to promote motivation to exercise for everyone and as the participants of this current study have highlighted, youth with a disability hope for the same supportive environments in their communities in order to exercise and stay physically active.
Conclusions and Future Directions

Research supports the link between greater need satisfaction, more self-determined motives (Kowal & Fortier, 2000), and the presence of a self-determined continuum of exercise regulations (Mullan et al., 1997). Youth succeed in environments supportive of SDT’s basic needs (Edmunds et al., 2006; Hagger & Chatzisarantis, 2008b; Standage et al., 2003). When environments are supportive of the satisfaction of basic psychological needs as suggested by Deci and Ryan (2002), the likelihood of exercise initiation and persistence over time increases (Vlachopoulos & Michailidou, 2006). Therefore, health promoting environments need to embrace an SDT model of service delivery in order to satisfy client basic psychological needs if we hope to see change in health behaviours over time. While the present study provides insightful information regarding the exercise participation of youth with a disability, it is not without limitations. First, a small sample size and the conversational nature of the interviews limit the generalizability of these findings. Specifically, the interviewer was encouraged to keep interviews in a conversational nature in order to facilitate information gathering. This meant that questions were not always asked the same way for each participant based on the flow of the interview. Additionally, the predominately female sample limits the generalizability of these results to the larger population of youth with a disability. Lastly, the youth who participated in this study were likely eager and passionate about health and exercise and therefore, may not represent other youth with a disability. Despite this, the information gathered is valuable in shaping the delivery of health promotion programs for youth with a disability. In healthcare, rehabilitation, and health promotion, practitioners can increase their efficacy by using an evidence-based SDT approach to individual health behaviour change (Ryan et al., 2007). As
explored in this current study, youth with a disability are seeking the same basic psychological need fulfillment in their healthy living pursuits. Recreation professionals, fitness specialists, and rehabilitation specialists can positively influence lifelong healthy behaviours by supporting the competence, autonomy, and relatedness of the youth they work with.
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CHAPTER III

Do youth with a disability achieve individualized fitness goals? A pilot trial (Study Two). ¹

Estimates of the physical activity levels of Canadian children are at an all time low and obesity rates are at an all time high (Active Healthy Kids Canada, 2011; Public Health Agency of Canada, 2009; Statistics Canada, 2009). Youth with a disability are particularly at risk for such inactivity. Youth with a disability are less likely to be involved in regular physical activity and are more likely to spend leisure and recreation time enjoying sedentary activities. Rimmer and Rowland (2008), suggest that youth with a disability are not achieving the WHO recommended 60 minutes of physical activity a day and are significantly less active than other youth. Consequently, youth with a disability have a higher prevalence of overweight compared to their non-disabled peers (Rimmer et al., 2007).

The reasons for the decreased physical activity of this group of youth are multiple, including barriers such as the physical and social accessibility of fitness and recreation centres and activities (Kang, Zhu, Ragan, & Frogley, 2007). In Canada, a recent review of accessible fitness facilities established that most recreation and fitness facilities were significantly limited in their accessibility for people with disabilities (Arbour-Nicitopoulos & Martin Ginis, 2011). Similarly in the United States, most fitness facilities were not accessible and in fact, were in violation of the Americans with Disabilities Act guidelines for the built environment (Rimmer et

¹ A version of this chapter has been submitted to the Journal of Disability and Health
al., 2005). However, despite these barriers, researchers have shown that youth with a disability want to engage in a variety of physical activities (Fereday et al., 2009).

Despite a willingness to participate in physical activities, youth with a disability spend more time in quiet recreational activities, have fewer social engagements, and experience less variation in physical activities leading to less overall physical activity than their same-aged peers (Canadian Institute for Child Health, 1994). It is reported that youth with a disability are less likely than their peers to smoke, drink, and use drugs. However, they are more likely to have unhealthy eating habits and are more likely to engage in sedentary leisure activities (Stevens et al., 1996). This sedentary activity can be particularly harmful for this group since it is reported that people with a disability experience a cycle of de-conditioning (Painter, 1994; Cooper et al., 1999). This cycle suggests that when physical functioning deteriorates, it leads to further reduction in physical activities. This de-conditioning leads to the potential development of secondary conditions such as mobility limitations, extreme levels of physical fitness, fatigue, pain, pressure sores, depression, and social isolation as well as complication related to the primary disability (Liou, Pi-sunyer, & Laferre, 2005; Rimmer et al., 2007).

It is recommended that youth (12-17 years old) participate in 60 minutes of moderate-to-vigorous physical activity daily (Canadian Society of Exercise Physiology, 2011; US Department of Health and Human Services, 2008; World Health Organization, 2010). Recently, it has been suggested that youth that who are physically mature (pre-adolescence) can begin structured exercise programs, including resistance training (Faigenbaum et al., 2009). The reported benefits of daily exercise for a non-disabled youth are multiple, however, less in known about these outcomes in youth with a physical disability (Rimmer et al., 2007). Researchers have shown that
participation in physical activity and sports for children with disabilities can have many positive effects, including decreased complications of immobility (Murphy & Carbone, 2008). Effective physical activity programs should include properly designed and implemented programs of sports and physical activities targeting cardiovascular endurance, flexibility, balance, agility, muscular strength, accessibility, safety, and enjoyment (Murphy & Carbone, 2008). The Canadian Pediatric Society has released a position statement for physical activity recommendations for children with specific chronic health conditions (e.g., juvenile idiopathic arthritis, hemophilia, asthma and cystic fibrosis) in which it is recommended that despite chronic disease, each individual has a unique exercise tolerance and physical capacity (Philpott et al., 2010). There is evidence that exercise programs for youth with a disability can improve overall strength and cardiovascular endurance (Durstine et al., 2000). Researchers have also reported that exercise is important in alleviating and avoiding secondary conditions including lower pain, de-conditioning, and fatigue associated with physical inactivity. However, translating research outcomes from a clinical setting to community-based experiences remains an area of research requiring further attention (Rimmer & Rowland, 2008). Given that the physical activity behaviours developed during adolescence have a long-term influence on lifelong physical activity habits (Daley, 2002), exploring opportunities for youth with a disability to become more physically active could have lifelong positive effects on their health. In adolescence, youth are typically asserting their independence in all areas of their lives therefore, providing a choice to be more physically active in an inclusive, supportive, social fitness setting may prove to enhance the therapeutic outcomes and physical activity levels for this group of youth.
In this study Self-Determination Theory (SDT; Deci & Ryan, 1985, 2002) is the framework that is used to investigate therapy and exercise in which participants were given choice and participated in goal setting in an accessible fitness environment. This is congruent with the Basic Needs Theory of SDT, satisfying three basic psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2002). SDT proposes that all behaviours are a result of an individual’s choice to satisfy basic psychological needs, and people are more likely to be intrinsically motivated towards a behaviour if it is satisfying such needs. Autonomy-supportive environments, as opposed to controlling situations, are assumed to facilitate self-determined motivation (Deci & Ryan, 2002; Hagger et al., 2005, 2007; Vlachopoulos & Michailidou, 2006). Research with youth and leisure time physical activity has shown that SDT positively predicts leisure time exercise participation and that all three needs are relevant to the physical activity context; youth want choice, to feel successful, and seek to be accepted by peers in their physical activity pursuits (Edmunds et al., 2006; Standage et al., 2003). In addition, the satisfaction of the basic need for competency enhances an individual’s well-being and the need for competency can be met through achieving one’s goals (Conroy, Elliot & Coatsworth, 2008).

SDT holds considerable appeal as an approach for understanding the initiation and persistence for individuals to exercise, and the use of SDT as a framework for investigating exercise motivation has proven useful in the exercise motivation research conducted to date (Hagger et al., 2007; Wilson et al., 2008). In addition to the literature exploring SDT and exercise, SDT has been proven useful in educational contexts for people with a disability (Chambers et al., 2007; Edmunds et al., 2006; Gillison et al., 2006; Hagger & Chatzisarantis, 2008a). SDT is important in the exploration of exercise behaviours and has been shown to be
important in understanding the initiation and persistence of exercise behaviours; SDT studies have shown that people who regularly participate in exercise report more self-determined reasons for exercise involvement (Mullan et al., 1997).

The purpose of this pilot study was to evaluate the effectiveness of achieving fitness goals using individualized fitness programs among youth with a disability in a SDT supportive environment. It was hypothesized that in an accessible fitness centre, youth with a disability would achieve individual fitness goals without therapist intervention.

**Method**

Ten youth were recruited from a local children’s treatment centre in a Canadian metropolitan area (population 350,000). The children’s treatment centre is a community-based rehabilitation facility with an adapted fitness centre for client use. This adapted fitness centre is a new initiative to promote physical fitness in youth with a disability. Sixteen youth were enrolled in the adapted fitness centre program at the children’s treatment centre at the time of study recruitment. All sixteen youth were approached to participate in the study, and twelve fit the study criteria for participation and agreed to participate. In the end, ten youth completed the twelve-week study.

The ten youth (5 males and 5 females) had a variety of diagnoses including cerebral palsy, spina bifida, and developmental delay, and their average age was 15.3 years old (SD ± 2.58) (see Table 1). At the time of the study, all participants were participating in individualized exercise programs in the adapted fitness centre and were asked to set three fitness goals. Most participants attended the fitness centre once a week and therefore it took approximately three months to complete the study. This study was approved both by the children treatment centre
research advisory council and the university research ethics board (Appendices A and B). Informed consent to participate was obtained from the youth using a youth assent form and from their primary caregiver using a signed consent form prior to recruitment (Appendices C and D).

In order to support the basic needs of SDT (autonomy, competency and relatedness), participants were able to freely choose the exercises within their program that they wanted to do (i.e. they could do some and not all and could do them in whichever order they chose). They attended the fitness centre whenever they wanted and did as much as they wanted of their programs. The participants were often participating in the fitness centre along side other youth and centre staff. The competency of their goals was measured at the 6 and 12 visit to the centre.

The participant’s ability to achieve fitness goals was measured using Goal Attainment Scaling (GAS). GAS is a reliable and valid measure that was originally used to evaluate intervention outcomes in mental health in the late 1960s and since has been used to evaluate services in education, social services, and health (Cusick, McIntyre, Novak, Lannin, & Lowe, 2006; Malec, 1999; Strecher et al., 1995). Increasingly in pediatrics, GAS is being used to evaluate therapeutic interventions in the fields of special education, occupational therapy and physical therapy (King et al., 1999). This scale is a measure of individualized behaviour change and is becoming increasingly popular in evaluating functional goal achievement of pediatric therapeutic interventions (King et al., 1999). In this scale, change is rated on a scale from -2 to +2 in relation to the achievement of observable measurable outcomes set by the client and the therapist (Appendix F; American Alliance for Health, Physical Education, 1999).
Table 1

*Participant Demographic Information*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Diagnosis</th>
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<td>19</td>
<td>Developmental Delay</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>Prader Willi Syndrome</td>
</tr>
</tbody>
</table>
In the first session, participants discussed their fitness goals with the researcher. Together, they agreed on current baseline abilities and set achievable outcomes for their GAS scale. All goals were set using the FITT principle (variations in frequency, intensity, time, or type). Overload and progression are two basic training principles in exercise prescription. *Overload* refers to the amount of load or resistance, on the body than it is normally accustomed to in order to increase fitness. *Progression* is the way in which an individual should increase the load. It is recommended that individuals gradually increase frequency, intensity, or time, or a combination of all three components in their exercise programs. Within the FITT principle, *frequency* refers to how often a person performs the exercise. *Intensity* is how hard the person exercises and can be measured a number of different ways, revolutions per minute or heart rate for example. *Time* is the length of the physical activity. *Type or specificity* refers to selecting exercises to match the overall fitness goal. For instance, muscular strength gains use resistance training and not flexibility exercises (American Alliance for Health, Physical Education, 1999).

An example of a client’s three GAS goals are listed in Table 2. All participants completed an individualized exercise program which included several different exercises to help them achieve their chosen goals.

**Statistical analysis.** Each of the participants’ three GAS goals were evaluated at three different times (1st, 6th and 12th visit). The resulting scores were analyzed using a repeated measure MANOVA in SPSS. The analysis used the dependent variable GAS score at each time (time 1, time 6, and time 12) and accounted for sphericity using Bonferroni’s correction.
Results

There is a significant multivariate effect over time suggesting that an optimally weighted composite of GAS 1, GAS 2, and GAS 3 shows a significant change over time $F(6,4)=29.552$, $p<0.05$ (partial $\eta^2 = 0.978$). This allows us to test univariates at alpha = .05 for each comparison while still maintaining an experimentwise alpha of 0.05 (Hummel & Stogol, 1971). We interpreted the effects using the Greenhouse-Geisser epsilon adjusted degrees of freedom to account for minor violations of circularity. The univariate results for each goal over time are shown in Table 3. The analysis of the each of the ten participants’ goals at 3 time points showed that participants in this study group achieved their chosen fitness goals over twelve sessions in an adapted fitness centre for youth.
### Table 2

*An Example of a Client’s Three Goals and Relative Goal Attainment Scale Ratings*

<table>
<thead>
<tr>
<th>Goal</th>
<th>Scale</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>Recumbent Cycle 2.5 miles</td>
<td>-2</td>
</tr>
<tr>
<td>Recumbent Cycle 2.5 miles</td>
<td>Cycle 2.3 miles</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td>Cycle 2.4 miles</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>Cycle 2.5 miles</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Cycle 2.6 miles</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Cycle 2.7 miles</td>
<td>2</td>
</tr>
<tr>
<td>No. 2</td>
<td>Bicep curl 30</td>
<td>-2</td>
</tr>
<tr>
<td>Bicep Curl 40 lbs (right and left)</td>
<td>Bicep curl 35</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>Bicep curl 40</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Bicep curl 45</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Bicep curl 50</td>
<td>2</td>
</tr>
<tr>
<td>No. 3</td>
<td>Recumbent Step Climber 5 mins.</td>
<td>-2</td>
</tr>
<tr>
<td>Recumbent Step Climber 5 mins. level 2</td>
<td>Recumbent Step Climber 4 mins.</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td>Recumbent Step Climber 4 1/2 mins.</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>Recumbent Step Climber 5 mins.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Recumbent Step Climber 5 1/2 mins.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Recumbent Step Climber 6 mins.</td>
<td>2</td>
</tr>
<tr>
<td>Measure</td>
<td>Univariate results</td>
<td>Time 2 vs. Time 1</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>GAS 1</td>
<td>$F(1.396, 12.562) = 42.848, p &lt; .05$ partial $\eta^2 = .826$</td>
<td>$F(1,9) = 16.962, p &lt; .05$ partial $\eta^2 = .653$</td>
</tr>
<tr>
<td>GAS 2</td>
<td>$F(1.505, 13.546) = 25.862, p &lt; .05$ partial $\eta^2 = .742$</td>
<td>$F(1,9) = 9.447, p &lt; .05$ partial $\eta^2 = .512$</td>
</tr>
<tr>
<td>GAS 3</td>
<td>$F(1.899, 17.090) = 56.305, p &lt; .05$ partial $\eta^2 = .862$</td>
<td>$F(1,9) = 47.087, p &lt; .05$ partial $\eta^2 = .840^*$</td>
</tr>
</tbody>
</table>

*indicates significance
Discussion

This study provides evidence that youth with a disability are able to set and achieve individual fitness goals. Given that youth with a disability are limited in their choices for individual physical activity opportunities (Yamaki et al., 2011), providing individualized programs for fitness participation is important in order to improve physical activity levels and decrease sedentary activity and obesity. The physical benefits of participation in a fitness program are multiple and potentially more important for this typically sedentary group. Socially, physical activity has also been shown to be a great mediator of physical, school-aged children with physical disabilities participating in physical activity with their same age peers, reported facilitated communication and coorporation. Rimmer, Rowland and Yamaki (2007) report the need for researchers to further focus on exercise interventions that address specific disability groups and conditions. As with any study, this study was limited by certain inherent research difficulties. This study while small in sample size took place in a unique fitness centre for youth with a disability and maximized to the best potential the number of participants. Having the researcher set goals with clients facilitated goal setting with participants but may also have affected the researcher subjectiveness of the goal setting. All possible measures were taken to limit the researcher bias in this study.

The results of this study are consistent with Self-determination Theory and more specifically the Basic Needs Theory of SDT, as the participants achieved their goals in an autonomy supportive environment. The free choice and independence of the fitness centre as well as the social environment of youth with a disability participating in individualized programs together, likely enhanced goal achievement and the overall well-being and motivation of the
participants. SDT studies have shown that people who regularly participate in exercise report more self-determined reasons for exercise involvement (Mullan, Markland, & Sheppard, 1997). Self-determined exercisers report higher rates of physical activity initiation (Kowal & Fortier, 2007), adherence to exercise programs (Fortier & Grenier, 1999), greater interest in participation (Li & Harmer, 1996), and flow (Kowal & Fortier, 2000).

SDT also shows considerable appeal in exploring the satisfaction of basic needs thought to motivate exercise. According to Deci and Ryan (2002), situations in which basic needs of relatedness, autonomy, and competence are fulfilled should sustain behaviour while situations that stifle needs would diminish behaviour. Cross-sectional studies in this area have shown that psychological need fulfillment is associated with more self-determined exercise motives (McDonough & Crocker, 2007; Vlachopoulos & Michailidou, 2006; Wilson, Mack, Muon, & LeBlanc, 2007). Longitudinal studies support the basic needs theory and highlight that the fulfillment of competence, autonomy, and relatedness needs within exercise is dynamic (Edmunds et al., 2007; Wilson, Rodgers, Blanchard, & Gessell, 2003). In order to support this theoretical foundation youth in this study were directly involved in the setting of their fitness goals, they were given independence and a social environment with their peers for participation.

SDT has proven a suitable teaching model for promoting positive health outcomes in physical education for youth (Chatzisarantis et al., 2006; Hagger, Chatzisarantis, Barkoukis, Wang, & Baranowski, 2005; Standage & Gillison, 2007; Standage, Duda, & Ntoumanis, 2003). As Standage and Gillison (2007) report, self determination offers an opportunity to increase the general self-esteem and reported levels of health related quality of life (HRQoL) of students in physical education. This is supportive of previous research proposing that satisfaction of basic
psychological needs of autonomy, relatedness and competence leads to improved overall well-being and psychological health in other groups (Gillison et al., 2006; Ryan, Patrick, Deci, & Williams, 2007; Standage & Gillison, 2007).

This pilot study demonstrates, larger scale intervention studies for exercise and disability are needed in order to help create the foundations for future evidence based practice in health promotion for youth with a disability using goal setting and a self-determination framework for participation. Specifically goal setting supports the basic psychological need of competency when achieving personal fitness goals. We have shown that youth with a disability are willing and able to achieve fitness-related goals without on-going intervention when given an accessible and supportive environment for physical activity participation. It is evident that more research is needed to further understand the exercising needs and motivation of this group in order to best support their willingness to exercise and participate in an active healthy lifestyle.
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CHAPTER IV

Enabling Participation through Individual Exercise Programs: A pilot trial (Study Three)²

Estimates of physical activity for children are at an all time low and this insufficient amount of physical activity for children is one of the contributing factors to the highest recorded rates of obesity in school-aged children (Faigenbaum et al., 2009). To address this growing health concern the World Health Organization (2010), the Canadian Society of Exercise Physiology (2011) and the U.S. Department of Health and Human Services (2008) recommend that youth (12-17 years old) participate in 60 minutes of moderate to vigorous physical activity daily.

Sixty minutes of daily physical activity should include exercise. It has been reported that children who exercise in properly supervised and prescribed exercise programs benefit from the same positive health changes as adults. It is reported that not only is regular physical activity essential for normal growth and development in children and youth but having a physically active lifestyle during the pediatric years may reduce the risk of developing some chronic diseases later in life. As a result, there is growing support by medical, fitness, and sport organizations for youth to exercise (American College of Sports Medicine, 2007; Behm, Faigenbaum, Falk, & Klientrou, 2008; McCambridge & Stricker, 2008).

While this is true for typically developing children, less in known about these outcomes and participation in exercise programs for youth with a physical disability (Rimmer et al., 2007).

² A version of this chapter has been submitted for publication to the Journal of Disability and Rehabilitation
Research indicates that youth with a disability are not achieving the recommended 60 minutes of physical activity a day and are significantly less active and more obese than their same aged peers (Cooper et al., 1999).

Participation in physical activity and sports for children with disabilities can have significant positive health outcomes, including decreased complications of immobility (Durstine et al., 2000). To be most effective, physical activity programs should incorporate properly designed and implemented programs of sports and physical activities targeting cardiovascular endurance, flexibility, balance, agility, muscular strength, accessibility, safety, and enjoyment (Rimmer & Rowland, 2008). Exercise programs for youth with a disability can improve overall strength and cardiovascular endurance and exercise is essential in alleviating and avoiding secondary conditions including lower pain, de-conditioning and fatigue, that are associated with physical inactivity (Arbour-Nicitopoulos & Martin Ginis, 2011). However, translating research outcomes from clinical settings to community based opportunities remains an area of research requiring further investigation (Rimmer et al., 2005). One approach to increasing the physical activity of youth with a disability is to provide an opportunity for youth to exercise in a supportive inclusive fitness environment. In Canada, a recent review of accessible fitness facilities found that most recreation and fitness facilities were limited in their accessibility for people with disabilities (Rimmer, 1999; Rimmer et al., 2010). Similarly in the United States, most fitness facilities are not accessible and are in violation of the Americans with Disabilities Act guidelines for the built environment (Rimmer et al., 2010). Furthermore, youth with a disability are frequently not permitted in private fitness facilities. In private clubs it is generally mandated as adult only facilities or a minimum of 16 years old for membership.
In a comprehensive review of exercise interventions for people with a physical or cognitive disability (1986-2006), Rimmer et al. (2010) found that most exercise interventions targeted individuals who had a stroke (20%), multiple sclerosis (15%), or intellectual disability (13%). The interventions involved a mixture of training modalities including aerobic and strength exercises. Moreover, most adapted exercise programs are facilitated by a physiotherapist in a treatment centre and in many circumstances exercise is used as a therapeutic tool for the group for functional gains (Rimmer, 1999; Rimmer, Chen, McCubbin, Drum, & Peterson, 2010). Typically, program participants are grouped by similar diagnosis; by gross motor function ability; and by similar age. Most research to date has focused on functional physical outcomes and while this may provide useful outcomes for exercise research it is not reflective of lifelong individualized participation in physical activity and exercise (Mechanic & Hansell, 1987). Longmuir and Bar-Or (2000) determined that youth with visual impairment or physical disabilities, specifically cerebral palsy and muscular dystrophy, have significantly lower levels of habitual physical activity, consider themselves less fit relative to their peers, and report more limitations for physical activity participation. Since the physical activity behaviours developed during adolescence have a long-term influence on lifelong physical activity habits, exploring opportunities to be more physically active for youth with a disability could have lifelong positive effects on their health (Daley, 2002). Adolescence is a time for physical and psychological development and increased awareness of self identity and physical body (Mechanic & Hansell, 1987). As such, it represents a pivotal time to introduce lifelong healthy behaviours (Chatzisarantis et al., 2006; Deci & Ryan, 2002; Ryan et al., 1997; Sebire, Standage, & Vansteenkiste, 2009). This time in an individual’s
life, while typically trying to be more independent and self-determined in all areas of their lives, is an ideal stage for intervention to promote physical activity and exercise (Epstein, Rice & Wallace, 1989). The purpose of this pilot study was to explore whether youth participating independently in individualized fitness programs would achieve improve their performance of exercise skills. Self-Determination Theory (Hagger et al., 2007; Wilson et al., 2008) was used as a framework for exploring individual physical fitness participation for youth with a disability.

SDT is proposed as a continuum of motivation ranging from intrinsic motivation (engaged in activities for their own sake) to amotivation (lack of intention). Between the two end points is a gradient of extrinsic motivation including: integrated regulation, identified regulation, introjected regulation, and external regulation. Intrinsic motivation would guarantee persistence and long lasting participation in exercise, as it is highly autonomous and the individual chooses to participate in the activity for its own sake rather than any external reason (Chatzisarantis et al., 2006; Deci & Ryan, 2002; Ryan et al., 1997; Sebire, Standage, & Vansteenkiste, 2009). SDT holds considerable appeal as an approach for understanding the initiation and persistence for individuals to exercise and the using of SDT as a framework for investigating exercise motivation has proven useful in the exercise motivation research conducted to date (Mullan et al., 1997). SDT is essential in the exploration of exercise behaviours and has been shown to be valuable in understanding the initiation and persistence of exercise behaviours. SDT studies have shown that people who regularly participate in exercise report more self-determined reasons for exercise involvement (Edmunds et al., 2006; Standage et al., 2003).
Central to SDT are three basic psychological needs for autonomy, competence, and relatedness; all of which are essential in understanding the initiation and regulation of behaviour (Rimmer, 1999; Rimmer & Rowland, 2008; Rimmer et al., 2007, 2010). SDT proposes that all behaviours are a result of an individual’s choice to satisfy basic psychological needs and people are more likely to be intrinsically motivated towards a behaviour if such needs are being met. According to Deci and Ryan (1985, 2002), autonomy-supportive environments, as opposed to controlling situations, are assumed to facilitate self-determined motivation. Research with youth and leisure time physical activity has demonstrated that SDT positively predicts leisure time exercise participation and that all three needs are relevant to the physical activity context, youth want choice, to feel successful, and seek to be accepted by peers in their physical activity pursuits (Edmunds et al., 2006; Standage et al., 2003) There are multiple positive benefits of exercise participation for individuals with a disability and exercise has potential to promote health and prevent secondary conditions. However, youth with a disability are not participating in physical activity enough to acquire the benefits of a healthy active lifestyle (Rimmer, 1999; Rimmer & Rowland, 2008; Rimmer, Chen, McCubbin, Drum, & Peterson, 2010; Rimmer et al., 2007). This study explored individual physical fitness participation for youth with a disability, following an individualized fitness program in an accessible fitness centre incorporating a SDT framework to support exercise participation for youth with a disability.

**Method**

Ten youth (five males and five females) were recruited for this intervention study from a local children’s treatment centre. This children’s treatment centre is a community-based rehabilitation facility with an adapted fitness centre for client use. This adapted fitness centre is
a new initiative to promote physical fitness in youth with a disability. The centre has fully accessible cardiovascular training equipment including: recumbent step, recumbent hand and cycle ergometer, and a treadmill. Each piece of equipment has removable seating for individuals using a wheelchair. For strength training, participants had access to free weights, resistance tubing, and cable pulleys. For balance and flexibility, participants could stretch using an elevated stretching table or floor mats and train balance using balance cushions, stability balls, and discs.

Sixteen youth were enrolled in the adapted fitness centre program at the children’s treatment centre at the time of study recruitment. All 16 youth were approached to participate in the study and of that, 12 met the study criteria and agreed to participate. The 10 participants completed the study and had a variety of diagnosis and their average age was 15.3 years old (SD ± 2.58) (Table 1).

At the time of the study, all participants were participating in individualized exercise programs in the adapted fitness centre and were asked to set three fitness-related goals. Most participants attended the fitness centre once a week. The length of participation in the study was approximately three months. Prior to recruitment, this study was approved both by the treatment centre research advisory council and the university research ethics board (Appendix A and B). Informed consent to participate in the study was obtained from the youth using a youth assent form and from their primary caregiver using a signed consent form (Appendix C and D). Once the consents were obtained, the participants met with the researcher to set three fitness-related goals (Table 2). Then, the exercise skills were videotaped to establish baseline performance and the participants were videotaped performing their goals. During the next 12
sessions, the participants practiced their three exercise skills in an individualized fitness program created by the exercise therapist. The programs were created based on baseline exercise skill performance and participant goals.

Based on the baseline data measured the clients’ goals were manipulated using the FITT principle of frequency, intensity, or type to reach the intended goal over 12 sessions. During the 12 sessions, participants attended drop in times in the adapted fitness centre to practice their fitness programs at their convenience. Attendance was recorded at each of the sessions. Post-test, study participants were videotaped performing their three goals.

The video tapes were coded and randomized for a rating using the Performance Quality Rating Scale (PQRS; Rimmer, 1999). The PQRS (Appendix G) is a performance-based observation rating scale. Quality of task performance is rated according to a 10-point scale based on the competency of the performance with 1 indicating being unable to perform the task and 10 indicating competent performance of motor skill. Previous studies have indicated the PQRS has an inter-rater reliability of 0.63 – 0.89 (Martini, 1994). All scores were recorded and then subsequently analyzed using SPSS data analysis software. The scoring therapist was an outside researcher (not involved in this research) as well as an occupational therapist with experience using the PQRS rating scale.
Table 1

*Participant Demographic Information*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19</td>
<td>Cerebral Palsy</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>Cerebral Palsy</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
<td>Cerebral Palsy</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>Developmental Delay</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
<td>Cerebral Palsy</td>
</tr>
<tr>
<td>6</td>
<td>14</td>
<td>Spina Bifida</td>
</tr>
<tr>
<td>7</td>
<td>15</td>
<td>Spina Bifida</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>Cerebral Palsy</td>
</tr>
<tr>
<td>9</td>
<td>19</td>
<td>Developmental Delay</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>Prader Willi Syndrome</td>
</tr>
</tbody>
</table>
Table 2.

*An Example of Participant Goals*

<table>
<thead>
<tr>
<th>Goal Description</th>
<th>Baseline</th>
<th>Goal</th>
<th>FITT Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 1 Recumbent Cycle 2.5 miles</td>
<td>2.3 miles</td>
<td>2.5 miles</td>
<td>Increase distance</td>
</tr>
<tr>
<td>Goal 2 Bicep Curl 40 lbs</td>
<td>30 lbs</td>
<td>40 lbs</td>
<td>Increase weights</td>
</tr>
<tr>
<td>Goal 3 Recumbent Step Climber</td>
<td>4 mins.</td>
<td>5 mins</td>
<td>Increase time</td>
</tr>
</tbody>
</table>
Results

In a MANOVA test of significance there is a significant multivariate effect over time suggesting a significant change over time $F(7,3)=3.633$, $p<0.05$ (partial $\eta^2 =0.969$). The univariates were tested at alpha = .05 for each comparison while still maintaining an experimentwise alpha of 0.05 (Hummel & Stogol, 1971). The exercise skills were analyzed using a MANOVA in order to account for individual differences in the three exercise skills. By analyzing the between subject effects to account for individual variation and ensure all participants results were showing the same patterns. The effects were interpreted using the Greenhouse-Geisser epsilon adjusted degrees of freedom to account for minor violations of circularity. Descriptive statistics are shown in Table 3 and the individual univariate results in Table 4.
Table 3

Summary of Descriptive Statistics for Performance Quality Rating Scale results

<table>
<thead>
<tr>
<th>Goal</th>
<th>Time</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>PQRS 1</td>
<td>1</td>
<td>5.80</td>
<td>2.044</td>
<td>10</td>
</tr>
<tr>
<td>PQRS 1</td>
<td>2</td>
<td>7.60</td>
<td>1.647</td>
<td>10</td>
</tr>
<tr>
<td>PQRS 2</td>
<td>1</td>
<td>5.10</td>
<td>1.449</td>
<td>10</td>
</tr>
<tr>
<td>PQRS 2</td>
<td>2</td>
<td>7.20</td>
<td>1.687</td>
<td>10</td>
</tr>
<tr>
<td>PQRS 3</td>
<td>1</td>
<td>5.00</td>
<td>1.886</td>
<td>10</td>
</tr>
<tr>
<td>PQRS 3</td>
<td>2</td>
<td>7.30</td>
<td>2.214</td>
<td>10</td>
</tr>
</tbody>
</table>

Note. PQRS = Performance Quality Rating Scale; PQRS 1 = Goal 1, PQRS 2 = Goal 2, PQRS 3 = Goal 3
Table 4.

*Univariate Results for each Performance Quality Rating Scale Goal*

<table>
<thead>
<tr>
<th>Goal</th>
<th>Univariate Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>PQRS 1</td>
<td>$F(1, 9) = 1.83, p &lt; .05$ partial $\eta^2 = .169$</td>
</tr>
<tr>
<td>PQRS 2</td>
<td>$F(1, 9) = .545, p &lt; .05$ partial $\eta^2 = .057$</td>
</tr>
<tr>
<td>PQRS 3</td>
<td>$F(1, 9) = 10.328, p &lt; .05$ partial $\eta^2 = .534$</td>
</tr>
</tbody>
</table>

*Note. PQRS = Performance Quality Rating Scale; PQRS 1 = Goal 1, PQRS 2 = Goal 2, PQRS 3 = Goal 3*
Discussion

The results of this study highlight the importance of providing inclusive environments for youth to participate in physical activity. We have shown that when given a supportive environment for youth to participate in autonomy supportive environment youth with a disability achieve their fitness related goals. We know that currently, youth with a disability have limited opportunities for participation and when offered, these opportunities are often sports-focused or physical education classes in school (McDougall et al., 2004b). By employing SDT in autonomy supportive environment to support the needs of youth with a disability, physical therapists and occupational therapists should consider opportunities for their clients to be active in non-traditional clinical settings in order to increase adherence to goals and enjoyment of programs.Engaging the client in his or her personal goals and allowing them the opportunity to participate in an independent way may increase therapeutic outcomes. The free choice and independence of the fitness centre as well as the social environment of youth with a disability participating in individualized programs together, likely enhanced goal achievement and the overall well-being and motivation of the participants.

The emerging shift from disease and disability prevention to the prevention of secondary conditions in people with disabilities calls on rehabilitation professionals as an integral component in community health promotion. As a result, this will include fitness centres and fitness professionals as the primary site for health promotion for people with a disability (Rimmer, 1999). As Rimmer (1999) describes, there is a need for strong community based partnerships between rehabilitation centres and fitness centres in order to prevent secondary conditions and promote physical activity for individuals with a disability. He suggest that fitness
centres “with their ambiance and health-oriented focus, have the potential to become a logical extension of the rehabilitation continuum by offering a location in the person’s natural environment to continue the recovery process…” (p.498). Future research, using fitness centres and rehabilitation professionals to encourage participation in physical activity and exercise could help increase the likelihood youth with a disability will avoid secondary health conditions and live and active lifestyle into adulthood.
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CHAPTER V

Exploring exercise motivation in youth with a disability: A profile of five exercisers
(Study Four)

The North American guidelines for physical activity from the Canadian Society of Exercise Physiology (2011) and the U.S. Department of Health and Human Services (2008) both recommend that youth (12-17 years old) participate in 60 minutes of moderate to vigorous physical activity daily. Rimmer and Rowland (2008) state that youth with a disability are not achieving this recommended 60 minutes of physical activity a day and are significantly less active than their same aged peers. As a result, youth with a disability have a higher prevalence of overweight than their non-disabled peers (Rimmer, Rowland, & Yamaki, 2007). Researchers have found that youth with cerebral palsy and muscular dystrophy have significantly lower levels of habitual physical activity, consider themselves less fit relative to their peers, and report more limitations for physical activity participation (Kerr, McDowell, Parkes, Stevenson, & Cosgrove, 2011; Longmuir & Bar-Or, 2000; McCullough, Parkes, Kerr, & McDowell, 2011; McDougall et al., 2004).

Participation in physical activity is a complex interaction between biological, environmental, social, and psychological influences (Biddle & Mutrie, 2001). Examining the motivation to exercise has become an imperative topic in exercise psychology and health promotion research (Biddle & Mutrie, 2001). Self Determination Theory (SDT) is one theoretical approach to exercise motivation that has proven effective as an approach for understanding the initiation and persistence for individuals to exercise (Mullan et al., 1997). SDT proposes that human motivation varies in the extent to which it is autonomous (self-determined) or controlling.
As such, SDT proposes three forms of motivation; intrinsic motivation (highly self-determined), extrinsic motivation, and amotivation (low self-determination). This study explored the motivation to exercise for youth with a disability using the foundational motivation theory of Self-Determination Theory (Hagger & Chatzisarantis, 2008b; Wilson, 2006; Wilson et al., 2008). SDT seeks to explain motivational orientations, contextual influences, and interpersonal perceptions for motivation (Hagger & Chatzisarantis, 2008), and its application as a framework has demonstrated much promise with regards to the exercise motivation research conducted to date (Wilson, Mack & Grattan, 2008). Additionally, SDT has been used in educational contexts for people with a disability (Algozzine et al., 2001; Cobb et al., 2009). SDT is critical in the exploration of exercise behaviours and has been shown to be crucial in understanding the initiation and persistence of exercise behaviours. SDT studies have shown that people who regularly participate in exercise report more self-determined reasons for exercise involvement (Deci & Ryan, 2002). The theory has also proven useful in explaining both the processes underlying exercise motivation (Edmunds et al., 2006; Standage et al., 2003), and areas of special education (Deci & Ryan, 2002), but has yet to be used to explore motivation to exercise for youth with a disability.

Central to SDT are three basic psychological needs for autonomy, competence, and relatedness. These three needs are essential in understanding the initiation and regulation of behavior (Deci & Ryan, 2002). SDT proposes that all behaviours are a result of an individual’s choice to satisfy basic psychological needs and that people are more likely to be intrinsically motivated towards a behavior if such needs are met. Research has shown that SDT positively predicts leisure time exercise participation. All three needs are relevant to the physical activity
context; youth want choice, to feel successful and seek to be accepted by peers in their physical activity pursuits (Edmunds et al., 2006; Standage et al., 2003).

Within SDT, individuals are motivated to exercise either intrinsically or extrinsically along a self-determined continuum. Intrinsically motivated exercisers participate in their exercise for the pleasure and satisfaction of doing so. At the other end of the SDT continuum are four extrinsic regulations for exercise, namely: identified; integrated; external; and introjected regulations. Identified and integrated regulations are more autonomous extrinsic regulations and integrated and external are at the controlling end of the continuum for motivation. An identified regulation is represented in an individual’s belief that the behaviour is of personal significance and value. Whereas, an integrated regulation refers to a behaviour which the individual feels is an important part of his or her personality and consistent with their values. Controlling regulations such as external and introjected are regulations in which the individual seeks to obtain a reward or avoid punishment. External regulations, the rewards/punishment comes from an external source or other person such as a family member or medical professional. With introjected regulation, the individual has internal rewards/punishment such as feelings of pride versus feelings of guilt in regards to their behaviour (Markland & Tobin, 2004).

The purpose of this study was to understand the behavioural regulations for exercise in youth with a disability. Two measures were used: a modified version of the Behavioural Regulation in Exercise Questionnaire (BREQ 2; Wilson, 2006); and the Leisure Time Exercise Questionnaire (LTEQ; Godin, 2011). The BREQ and its subsequent modification (BREQ-2) have become the most widely used measures of the continuum of behavioural regulation in exercise psychology research. The original BREQ was developed to measure external,
introjected, identified and intrinsic forms of regulation of exercise behaviour (Mullan, Markland, & Ingledew, 1997). In its original version, the BREQ did not measure amotivation; however, the revised BREQ-2 version includes a subscale for amotivation (Godin, 2011). A modified version of the BREQ-2 was used in this study (Appendix H) which includes a subscale for integrated regulation (Wilson, 2006), in order to capture all regulations in the SDT continuum. In order to assess exercise participation, we asked participants to complete the LTEQ (Godin, 2011). LTEQ (Appendix I) is a self-report measure to gather information regarding the frequency, intensity, and duration of exercise in a typical week. In previous research, the LTEQ has shown adequate test–retest reliability (Godin & Shephard, 1985; Sallis, Buono, Roby, Micale, & Nelson, 1993; Jacobs, Ainsworth, Hartman, & Leon, 1993), and has shown concurrent validity with other measures of exercise participation (Miller, Freedson, & Kline, 1994; Sallis et al., 1993). The LTEQ has a strong alpha reliability of .87 to .95 and has been validated across many different groups (Godin, 2011). This measure asked participants “Considering a typical 7-day period (a week), how many times on average do you do the following kinds of exercise for more than 15 min during your free time?” Frequencies of exercise are reported for light, moderate, and strenuous exercise, respectively. These two instruments were used to measure the exercise participation and exercise motivation of youth with a disability.

Method

With research ethics approval from the university, five participants were recruited through email and a social networking (Facebook) group to participate in an online questionnaire exploring their motivations to exercise. Participants self-identified using two qualifying questions: do you have a disability? and do you exercise? This ensured the participant sample
reflected youth with a disability who self-identified as currently exercising. A letter of information invited eligible participants to complete the survey (Appendix J), followed by three separate sections of the survey: 1. participant demographic information (age, gender, disability); 2. LTEQ; and 3. BREQ-2. Participant demographic information is seen in Table 1.

In the first section of the survey, participants were asked to report their gender, age, disability, and whether or not they were currently exercising. In the second section, participants were asked to complete the Godin LTEQ in which they reported the frequency and intensity of exercise during a seven day period (Arbour-Nicitopoulos & Martin Ginis, 2011; Longmuir & Bar-Or, 2000; Rimmer et al., 2005). In the final section, participants completed the BREQ with the added integrated regulation subscale (Kang et al., 2007). Using the modified BREQ-2 based in SDT to include identified regulation, we explored the participants’ motivational regulations in exercise (Arbour-Nicitopoulos & Martin Ginis, 2011). The BREQ-2 expands on the BREQ questionnaire developed by Mullan, Markland, and Ingledew (Rimmer et al., 2005) to include a subscale to measure amotivation and identified regulation (Fereday et al., 2009). The most current version of the BREQ-2 was used in this study and included all six subscales of behavioural regulation, intrinsic; identified; introjected; integrated; external; and amotivation in exercise in a 23 item questionnaire.
Table 1

*Participant Demographic Information*

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Primary disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Female</td>
<td>Not identified</td>
</tr>
<tr>
<td>18</td>
<td>Female</td>
<td>Spina Bifida</td>
</tr>
<tr>
<td>15</td>
<td>Male</td>
<td>Spina Bifida</td>
</tr>
<tr>
<td>?</td>
<td>Male</td>
<td>Cerebral Palsy</td>
</tr>
<tr>
<td>19</td>
<td>Male</td>
<td>Not identified</td>
</tr>
<tr>
<td>21</td>
<td>Female</td>
<td>Cerebral Palsy</td>
</tr>
</tbody>
</table>
Results

The results of individual participant responses to the BREQ-2 can be seen in Table 2. Due to the small sample size, descriptive statistics were used to show all participants responses and patterns. All subscale scores were grouped and averaged for each of the six behavioural regulations. Between participants means were calculated and identified integrated regulation as the most dominant regulation for motivation during exercise for this group. Each participant’s subscale scores were rank ordered to identify similar patterns. Three of the five participants followed along the spectrum of SDT from highly internalized and autonomous extrinsic motivation (integrated, identified, introjected, and external). All five participants had very low amotivation scores and it was ranked last in the relative scoring of the subscales for four of the five participants. The results of the LTEQ (see Table 3) show that participants are engaging in moderate to strenuous physical activity on most days of the week.

Discussion

The purpose of this study was to explore the motivation of youth with a disability to exercise using a measure to assess behavioural regulations in exercise. Although the sample size was small, participants showed similar characteristics to other studies of physically active youth. This group of youth who identified themselves as exercisers, had low levels of amotivation. Participants scored highest in integrated regulations with statements like “I participate in exercise because it has become a fundamental part of who I am”. These findings are important given that numerous previous studies have identified the additional barriers to exercise for this group compared to their same-age able-bodied peers (Rimmer et al., 2010). Therefore, the high scores of identified regulations in this study, indicate that this group of exercisers value and self-
identify as an exerciser. Despite the additional barriers this group might experience in exercise participation, they are willing and motivated to exercise.

It is reported that youth with a disability experience additional social and environmental barriers accessing opportunities of physical activity and exercise (Kang et al., 2007). In Canada, a recent review of accessible fitness facilities found that most recreation and fitness facilities were limited in their accessibility for people with disabilities (Arbour-Nicitopoulos & Martin Ginis, 2011). Similarly in the United States, most fitness facilities are not accessible and are in violation of the Americans with Disabilities Act guidelines for the built environment (Olshansky et al., 2005). However, despite these barriers, youth with a disability continue to engage in physical activity through participation in community, national, and international sporting organizations such as the Paralympics and Special Olympics. Having a chronic disease was not perceived as a barrier to participation in organized sport and recreational activities by youth. In fact, the youth were physically active and perceived themselves to be no different from their peers (McCambridge & Stricker, 2008; Ortega et al., 2008; Walker & Townsend, 1999).
Table 2

*Results of the Behavioural Regulation Exercise Questionnaire-2 Summary Chart*

<table>
<thead>
<tr>
<th>Regulation</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amotivation</td>
<td>2.00</td>
<td>1.67</td>
<td>1.00</td>
<td>1.33</td>
<td>1.67</td>
<td>1.53</td>
</tr>
<tr>
<td>External</td>
<td><strong>3.67</strong></td>
<td>1.33</td>
<td>2.33</td>
<td>2.00</td>
<td>2.67</td>
<td>2.40</td>
</tr>
<tr>
<td>Introjected</td>
<td>2.00</td>
<td>3.00</td>
<td>3.67</td>
<td>3.67</td>
<td><strong>4.33</strong></td>
<td>3.33</td>
</tr>
<tr>
<td>Identified</td>
<td>2.33</td>
<td>3.67</td>
<td>4.33</td>
<td>3.67</td>
<td>4.00</td>
<td>3.60</td>
</tr>
<tr>
<td>Integrated</td>
<td>2.75</td>
<td><strong>4.00</strong></td>
<td><strong>5.00</strong></td>
<td><strong>3.75</strong></td>
<td>3.50</td>
<td><strong>3.80</strong></td>
</tr>
<tr>
<td>Intrinsic</td>
<td>3.00</td>
<td>2.25</td>
<td>2.50</td>
<td>2.00</td>
<td>3.50</td>
<td>2.65</td>
</tr>
</tbody>
</table>

*Note.* Bolded items scored highest. Five participants labelled A, B, C, D and E.
Table 3

*Leisure Time Exercise Questionnaire Results*

<table>
<thead>
<tr>
<th>Activity</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strenuous</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>45</td>
<td>18</td>
</tr>
<tr>
<td>Moderate</td>
<td>10</td>
<td>0</td>
<td>15</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>Light</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>21</td>
<td>15</td>
</tr>
<tr>
<td>Total activity</td>
<td>37</td>
<td>27</td>
<td>45</td>
<td>96</td>
<td>48</td>
</tr>
</tbody>
</table>

**Frequency**

- Sometimes
- Often

Total activity score (MET)
In addition to access to service, there is also a growing need for clear guidelines and recommendations for exercise for this group (Rimmer, Chen, McCubbin, Drum, & Peterson, 2010). In order to for youth with a disability to increase physical activity levels at home, in schools, and in the community, it would be beneficial for teachers, caregivers, and rehabilitation professionals to have clear recommendations for exercise for this unique group. We have explored the exercise motivation of this small sample group and recognize the need for a larger scale study to further understand the motivation to exercise for youth with a disability. While the present study provides insightful information regarding the exercise participation of youth with a disability, it is not without limitations. First, a small sample size and the questionnaire format limit the generalizability of these findings. Moreover, because this study was cross-sectional in design, we are not able to infer causation. Lastly, the youth who participated in this study were likely eager and passionate about health and exercise and therefore, may not represent the other youth with a disability. Despite this, the information gathered is valuable in shaping the delivery of health promotion programs for youth with a disability. As a result of this pilot exploration, it is clear that further research in exercise motivation for youth with a disability is needed in order to adequately support the physical activity needs of youth with a disability.
References

Active Healthy Kids Canada. Canada’s Report Card on Physical Activity for Children and Youth. Available online at:

www.activehealthykids.ca/Ophea/ActiveHealthyKids_v2/programs_2006reportcard.cfm.


http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Young+people+in+Canada:+their+health+and+well-being#0


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CHAPTER VI

Discussion

The purpose of this dissertation was to explore the exercise participation of youth with a disability. Currently, there is a health promotion focus for youth because of the increasing rates of sedentary behaviour and obesity (Deci & Ryan, 1985). This is the first generation of youth who may not outlive their parents due to poor lifestyle habits and low levels of physical activity (Olshansky et al., 2005). Given that the physical activity behaviours developed during adolescence have a long-term influence on lifelong physical activity habits (Daley, 2002), exploring opportunities to be more physically active for youth could have lifelong positive effects on their health. In adolescence, youth are typically asserting their independence in all areas of their lives therefore, providing a choice to be more physically active in an inclusive, supportive, and social fitness setting may prove to enhance the therapeutic outcomes and physical activity levels for this group of youth (McCambridge & Stricker, 2008; Ortega et al., 2008; Walker & Townsend, 1999). Additionally, individuals with a disability can be at risk for higher levels of sedentary activity and rates of obesity due to limited physical abilities and opportunities to participate in physical activity (Chen, Kim, Houtrow, & Newacheck, 2010; Liou et al., 2005; Rimmer, 1999; Rimmer, Chen, McCubbin, Drum, & Peterson, 2010a; Rimmer et al., 2007; Yamaki et al., 2011).

This dissertation investigated the use of the Self-Determination Theory (SDT) in the exploration of exercise for youth with a disability (Deci & Ryan, 1985). Following the General Model of Program Planning (GMPP), the first study in this dissertation involved assessment interviews with exercising youth with a disability. In the assessment interviews (Study 1), youth highlighted their desire for physical activity opportunities that promoted their independence,
socializing with peers, and success in reaching fitness goals in a community-based setting. The results of the interviews with exercising youth with a disability fit with the central tenants of the SDT that being: autonomy, relatedness and competence. These three needs are essential in understanding the initiation and regulation of behaviour (Deci & Ryan, 2002). SDT proposes that all behaviours are a result of an individual’s choice to satisfy a basic psychological need and people are more likely to be intrinsically motivated towards behaviours that satisfy such needs. Research has shown that SDT predicts positively leisure time exercise participation. All three basic needs are relevant to the physical activity context, youth want choice, to feel successful and seek to be accepted by peers in their physical activity pursuits (Edmunds et al., 2006; Standage et al., 2003).

The next two studies in this dissertation (study 2 and study 3) using the GMPP model of program planning, reflect the intervention and evaluation phases. Both studies used a 12 session intervention study to measure the achievement of exercise goals in an adapted fitness centre. From the SDT framework, the 12 session exercise intervention design promoted autonomy, independence, and relatedness. Participants were involved in the selection of exercise goals for 12 session visits. Each session was self-directed and recorded for study purposes. During the 12 session intervention, participants achieved their fitness goals measured by Goal Attainment Scaling and improved in the performance of exercise skills as measured by the Performance Quality Rating Scale. All participants saw significant achievement in their fitness goals and their motor skill performance.

The final study explored the motivation to exercise for youth with a disability. In order to continue to promote exercise programs for youth with a disability, it is imperative to understand the behavioural regulations for exercise motivation of this group. Within SDT,
individuals are motivated to exercise either intrinsically or extrinsically along a self-determined continuum. Intrinsically motivated exercisers participate in their exercise for the pleasure and satisfaction of doing so. At the other end of the SDT continuum are four extrinsic regulations for exercise, namely: identified, integrated, external, and introjected regulations (Deci & Ryan, 2002). Using the Behavioural Regulation in Exercise Questionnaire (BREQ 2), youth completed an on-line questionnaire exploring their regulation in exercise. This group of youth, who identified themselves as exercisers, had low levels of amotivation. Participants scored highest in integrated regulations with statements like “I participate in exercise because it has become a fundamental part of who I am”. These findings are important considering the numerous previous studies that have identified the additional barriers to exercise faced by this group compared to their able bodied peers counterparts (Arbour-Nicitopoulos & Martin Ginis, 2011; Longmuir & Bar-Or, 2000; Rimmer et al., 2005).

The Basic Needs Theory of SDT is repeated throughout the results of each section of this entire dissertation. The first study heard from a group of exercising youth who reiterated the three basic needs in their motivation to exercise and be active. They highlighted their preferences for independence, relatedness and skill achievement. This was the foundation for the following two studies in which goal achievement and skill performance were measured. Both studies took place in an autonomy supportive climate in an inclusive fitness centre in order to enhance motivation and support goal achievement and skill performance. The basic needs for autonomy, competency and relatedness were supported in each study and therefore the results of each individual study are related to each other. In an environment supportive of SDT and specifically the basic needs theory, youth with a disability achieve fitness goals, improve exercise skill performance and are generally motivated to exercise. The final study explored the
behavioural regulations for exercisers in the community and reported that youth with a disability have high rates of identified regulations in their motivation to exercise. That is, youth with a disability who exercise, do so because it is of personal value and they see it as part of who they are as an individual. Therefore if there were fewer barriers to participation for this group of youth we could potential encourage more youth with a disability to exercise.

**Inclusive Health Promotion**

The delivery of services to meet the needs of individuals with a disability has undergone a significant evolution in the last 50 years and was recently given new impetus following the Convention on the Rights of Persons with Disabilities (March 30, 2007). Included in this convention was a special session on the rights of the child with a disability where the United Nations General Assembly adopted the following statement:

> Each girl and boy is born free and equal in dignity and rights; therefore, all forms of discrimination affecting children must end.... We will take all measures to ensure the full and equal enjoyment of all human rights and fundamental freedoms, including equal access to health, education and recreational services, by children with disabilities and children with special needs, to ensure the recognition of their dignity, to promote their self reliance and to facilitate their active participation in the community (UNICEF, 2007, p.vi).

The evolution of the rights of the person with a disability and simultaneous shifts in rights of the child has created opportunity for inclusion of all children in schools, homes, and communities worldwide. According to the World Health Organization (WHO), disability is not synonymous with diagnosis and no longer refers to physical representation of certain characteristics as it was in the International Classification of Disease (ICD-10) or the International Classification of
Impairments, Disabilities and Handicaps (ICIDH). Instead in its revised format (the ICF and the ICF-CY), disability is a social model of interaction of person and environment. In this framework, disability is not the individual’s physical capabilities that predict their participation in activity, instead social and environmental the barriers present; in this case diagnosis does not infer function. As such, the assessment of disability refers to an assessment of performance of task in context relevant to the individual. From this ICF perspective, it is possible that someone who is quadriplegic (paralyzed in all four limbs) may not actually fit the definition of disability unless it affects their work, leisure, or daily activities in a meaningful way. This change in view of the disability and how we support individuals with a disability has led to multidisciplinary teams in healthcare and rehabilitation and the use of a common language using the ICF framework for functioning (World Health Organization, 2002). The full participation in life for children and youth with a disability includes opportunities for play, physical activity, exercise, and sport. Gorter (2011) suggested that exercise and sport for individuals with a disability has a place within the ICF framework for health (Ontario Association of Children’s Rehabilitation Services Conference). He recommended that exercise combines the benefits of activity with the promotion of health in body function and structure, while sport marries the benefits of activity and participation (Figure 5). This promotes the need for prescriptive exercise participation for individuals with a disability.

This emerging shift from disease and disability prevention to the prevention of secondary conditions in people with disabilities calls on rehabilitation professionals as an integral component in community health promotion and will include fitness centres and fitness professionals as the primary site for health promotion for people with a disability (Rimmer, 1999). As Rimmer (1999) illustrates in his model of health promotion for people with a
disability, there is a need for strong community-based partnerships between rehabilitation centres and fitness centres in order to prevent secondary conditions and promote physical activity for individuals with a disability. He suggests that fitness centres “with their ambiance and health-oriented focus, have the potential to become a logical extension of the rehabilitation continuum by offering a location in the person’s natural environment to continue the recovery process…” (p.498).

The four studies in this dissertation support the needed shift from rehabilitation focus to inclusive health promotion and physical activity participation. The results of the studies have demonstrated that 1. There are youth with a disability motivated to exercise 2. Self-Determination Theory based practice is effective in order to maximize exercise for youth with a disability 3. Youth with a disability are seeking opportunities to exercise in their communities. Therefore, it is time for rehabilitation specialists and fitness professionals to support the accessibility of fitness and recreation centres in order to promote physical activity and exercise for everyone.
Figure 4. Implications of exercise and physical activity in an ICF Framework.
References

Active Healthy Kids Canada. *Canada’s Report Card on Physical Activity for Children and Youth*. Available online at:

www.activehealthykids.ca/Ophea/ActiveHealthyKids_v2/programs_2006reportcard.cfm.


Appendix A

UWO Research Ethics Approval Notice

(Studies 1, 2, 3)
Office of Research Ethics
The University of Western Ontario
Room 4180 Support Services Building, London, ON, Canada N6A 5C1
Telephone: (519) 661-3036 Fax: (519) 850-2466 Email: ethics@uwo.ca
Website: www.uwo.ca/research/ethics

Use of Human Subjects - Ethics Approval Notice

Principal Investigator: Dr. A. Mandich
Review Number: 15529E
Review Date: October 08, 2008
Review Level: Expedited
Protocol Title: The impact of an exercise program for children with a physical disability
Department and Institution: Occupational Therapy, University of Western Ontario
Sponsor:
Ethics Approval Date: March 24, 2009
Expiry Date: November 30, 2009

Documents Received for information:

This is to notify you that The University of Western Ontario Research Ethics Board for Health Sciences Research Involving Human Subjects (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced study on the approval date noted above. The membership of this REB also complies with the membership requirements for REB’s as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB’s periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request Form.

During the course of the research, no deviations from, or changes to, the protocol or consent form may be initiated without prior written approval from the HSREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g., change of monitor, telephone number). Expedited review of minor change(s) in ongoing studies will be considered. Subjects must receive a copy of the signed information/consent documentation.

Investigators must promptly also report to the HSREB:

a) changes increasing the risk to the participants and/or affecting significantly the conduct of the study;

b) all adverse and unexpected experiences or events that are both serious and unexpected;

c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to this office for approval.

Members of the HSREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the HSREB.

Chair of HSREB: Dr. Joseph Gilbert

Ethics Officer to Contact for Further Information

☐ Janice Sutherland (sutherr@uwo.ca) ☐ Elizabeth Wambolt (ewambolt@uwo.ca) ☐ Grace Kelly (gkelly@uwo.ca) ☐ Denise Grafton (dgraffton@uwo.ca)

This is an official document. Please retain the original in your files.
Appendix B

TVCC Research Ethics Approval Notice

(Studies 1, 2, 3)
Re: Understanding the impact of exercise participation for children with a disability

Dear Dr. Mandich,

On 10 November 2008, I received your letter of response to the Thames Valley Children’s Centre’s Research Advisory Committee’s request for revisions/additional information about the above-named study that was reviewed and conditionally approved on 29 September 2008. I have now reviewed your letter.

You have provided very helpful information pertaining to the assessment procedures used in the Fitness centre and explain that there are currently no definitive protocols for assessment. The attached forms help to clarify the procedures that are in place. You have now also provided clear inclusion and exclusion criteria for study participants.

You have indicated that you will use open-ended recruitment for the qualitative component of your study. You also indicate that, for the quantitative component of your study, you will employ a pretest-posttest design. Regarding power estimates, you state that you expect a large effect size with power set at 0.80 and alpha set at 0.50.

You have clarified that clients who have attended the Fitness centre for over one year will be interviewed as they enter the study and that those clients who complete the 12-week observation will be interviewed at the end of the study. You have now provided additional information about how, and what type of, goals will be set. You have also clarified that an independent assessor who is not blind to the goals will be used to verify the rating of the goals.

You explain that the Letter of Information for the study has been revised to acknowledge the potential for harm and the revised Letter is being reviewed by UWO Ethics.

Based on the additional information you have provided to me, on behalf of the RAC Committee, I grant your study approval. Once the Research Program has received a copy of the UWO Ethics approval form for your study, you may begin to recruit study participants.

In closing, I would like to recommend that you give additional thought to the estimation of study sample size for the quantitative component of your study. It would have been helpful to have some justification...
for why you expect a large effect size and to know the exact effect size expected. It would also have been helpful to have had an exact sample size calculated. Since only those children who complete the 12-week observation will be included in the quantitative data analyses, it is important that enough participants are recruited to meet your power requirements.

If you have any questions, please do not hesitate to contact me. On behalf of the Committee, I would like to extend my best wishes for a successful project once UWO ethics approval has been provided!

Yours sincerely,
Appendix C

Letter of Information

(Studies 1, 2, 3)
The impact of participation in a physical fitness program for youth with a physical disability

Letter of Information

THE PRONOUNS 'YOU' AND 'YOUR' SHOULD BE READ AS REFERRING TO THE PARTICIPANT RATHER THAN THE PARENT/GUARDIAN/NEXT OF KIN WHO IS SIGNING THE CONSENT FORM FOR THE PARTICIPANT

We wish to invite you to participate in this study conducted jointly by Thames Valley Children’s centre TVCC) and The University of Western Ontario (UWO). The study we are conducting explores the experiences of youth participating in an individualized physical fitness program at Thames Valley Children’s centre.

If you choose to participate you will be asked to participate three parts to the study: an interview, fitness goal setting and a video recorded session on the fitness equipment. The interviews will be audio taped and then transcribed into written format by the primary researcher. The fitness centre staff, Kim Simpson or Liz Lusk, will videotape your first, sixth, and twelfth session to the fitness centre. You will be video recorded performing 3 different exercises – one cardio, one strength and one for flexibility or balance. The same exercises will be recorded at your sixth and twelfth visits. All of the sessions will be completed during your regularly scheduled fitness times and should not require any more of your time. We are looking for 15 exercisers to participate in this 12-week study. The video recording will be analyzed for motor skill changes by the research teach using the Performance Quality Rating Scale.

If you agree to participate in this study we will ask you to participate in a semi-structured interview and a video recording of 3 sessions in the fitness centre at Thames valley Children’s Centre. The interview dates and times will be organized at your convenience and held during your first visit to Thames Valley children’s Centre Adapted Fitness Centre. The participation in this study should not require more than 20 minutes of additional time in your first, sixth and twelfth visit to the fitness centre. In your first visit we will ask that you complete the required TVCC goal setting with Fitness Centre staff and that your first sessions using the equipment will be video taped. On your sixth and twelfth visit, the same exercises will be videotaped again as you work out.
Participation in this study is voluntary and parents are encouraged to be present. You may refuse to participate, refuse to answer any questions, or withdraw from the study at any time. All participants in the study will be required to be audio and video taped, if you wish to not be recorded your information will not be included in the research study.

There are no known risks or benefits associated with participation in this study. The participation of children in physical activity and particularly those children with a physical disability is an area of growing research. This new information about supporting children with a physical disability in fitness and exercise will help promote the inclusiveness and accessibility of services in our community. By participating in this study you are assisting the research team in the collection of data in a growing field of interest to the health community and families of other children with physical disabilities.

Your confidentiality will be respected. All study records will be kept in a locked cabinet in a secure office at TVCC and UWO and viewed only by members of the research team. The written reports, audio and video recordings will be kept at the University of Western Ontario for one year from publication date at which time they will be destroyed. Your name will not appear in any written reports; your information collected as a part of this study will be referred to as a study ID number. In addition, your contact information will be required only to arrange the initial appointments and will not be included in any written material produced from the study. If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published without your explicit consent to the disclosure.

This letter is for you to keep. If you have any questions about this study, please contact Dr. Mandich. Representatives of the University of Western Ontario Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

Sincerely,
In addition, if you have questions about the conduct of this study or your rights as a participant, you may contact: Office of Research Ethics, University of Western Ontario, 519-661-3036.
Appendix D

Consent Form (Study 1,2,3)
The impact of participation in a physical fitness program
for youth with a physical disability

I have read the Letter of Information (have had the nature of the study explained to me) and I agree to participate. All questions have been answered to my satisfaction.

Participant Name                       Legal Guardian Name (if not 18 yrs.)

Participant Signature                  Legal Guardian Signature (if not 18 yrs.)

Person Obtaining Consent               Person Obtaining Consent Signature

Date
Appendix E

Interview Guide

(Study 1)
Interview Guide

Impact of Exercise Participation

Research Question:
What are the experiences of children and youth with a disability participating in an exercise program at Thames Valley Children’s Centre Adapted Fitness Centre?

How do you feel? What has changed?

Grand Tour Question 1:
Participants will be asked: “Tell me about being healthy.”

Probe Questions:
• How do you feel?
• What do you think it means to be healthy?
• What are things that you do really well?
• How do you spend your free time?
• Who are your really good friends?
• What would you like to try in the future?
• Has anything changed in your health since you started exercising?

Grand Tour Question 2:
Participants will be asked: “Tell me about your experiences in exercise, fitness and sport.”

Probe Questions:
• Where do you do you exercises?
• What kinds of exercises do you do?
• Who exercises with you?
• What are the changes you notice participating in fitness?
• What would you like to do next?
• Has anything changed since you started exercising?
• What other physical activities do you do?
Appendix F

Goal Attainment Scale

(Study 2)
### Goal Attainment Scale

#### GAS 5 Point Rating Scale

<table>
<thead>
<tr>
<th>Score</th>
<th>Predicted Attainment</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>Much less than expected outcome</td>
</tr>
<tr>
<td>-1</td>
<td>Less than expected outcome</td>
</tr>
<tr>
<td>0</td>
<td>Expected Outcome</td>
</tr>
<tr>
<td>1</td>
<td>Greater than expected outcome</td>
</tr>
<tr>
<td>2</td>
<td>Much greater than expected outcome</td>
</tr>
</tbody>
</table>
Appendix G

Performance Quality Rating Scale

(Study 4)
Performance Quality Rating Scale

ID# ______________

Quality rating:  
1 – cannot perform task at all  
5 - performs parts of the task well  
10 – performs task well

Magnitude of change (-5 to 5):  
-5 – performs 5x worse  
0 - no change  
5 – performs task 5x better

<table>
<thead>
<tr>
<th>Baseline PQRS (time 1)</th>
<th>PQRS rating</th>
<th>Magnitude of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 1</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>Goal 2</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>Goal 3</td>
<td></td>
<td>----</td>
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</tbody>
</table>

Criteria:

<table>
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<th>Mid (time 2)</th>
<th>PQRS rating</th>
<th>Magnitude of change</th>
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</thead>
<tbody>
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<td>Goal 1</td>
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<tr>
<td>Goal 2</td>
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</tr>
<tr>
<td>Goal 3</td>
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<td></td>
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</table>

Criteria:

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</thead>
<tbody>
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<tr>
<td>Goal 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal 3</td>
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</table>

Criteria:
Appendix H

Behavioural Regulations in Exercise Questionnaire

(Study 4)
### Behavioural Regulations in Exercise Questionnaire

<table>
<thead>
<tr>
<th>Statement</th>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel like a failure when I haven’t exercised in a while</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I don’t see the point in exercising</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I get restless if I don’t exercise regularly</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I participate in exercise because it has become a fundamental part of who I am</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I exercise because it is consistent with my values</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I think it is important to make the effort to exercise regularly</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I find my exercise a pleasurable activity</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>It’s important to me to exercise regularly</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I take part in exercise because it is consistent with my life goals</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I consider exercise to be an important part of my identity</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I get pleasure and satisfaction from participating in exercise</td>
<td></td>
<td></td>
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<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I feel under pressure from my friends/family to exercise</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I exercise because it is fun</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I exercise because other people say I should</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I feel ashamed when I miss an exercise session</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I exercise because others will not be pleased with me if I don’t</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I don’t see why I should have to exercise</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I enjoy my exercise sessions</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I think exercising is a waste of time</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I feel guilty when I don’t exercise</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I take part in exercise because my friends/family/spouse say I should</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I can’t see why I should bother to exercise</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>I value the benefits of exercise</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
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</table>
Appendix I

Leisure Time Exercise Questionnaire

(Study 4)
Godin Leisure-Time Exercise Questionnaire

INSTRUCTIONS

In this excerpt from the Godin Leisure-Time Exercise Questionnaire, the individual is asked to complete a self-explanatory, brief four-item query of usual leisure-time exercise habits.

CALCULATIONS

For the first question, weekly frequencies of strenuous, moderate, and light activities are multiplied by nine, five, and three, respectively. Total weekly leisure activity is calculated in arbitrary units by summing the products of the separate components, as shown in the following formula:

\[
\text{Weekly leisure activity score} = (9 \times \text{Strenuous}) + (5 \times \text{Moderate}) + (3 \times \text{Light})
\]

The second question is used to calculate the frequency of weekly leisure-time activities pursued “long enough to work up a sweat” (see questionnaire).

EXAMPLE

Strenuous = 3 times/wk
Moderate = 6 times/wk
Light = 14 times/wk

Total leisure activity score = \( (9 \times 3) + (5 \times 6) + (3 \times 14) = 27 + 30 + 42 = 99 \)
Godin Leisure-Time Exercise Questionnaire

During a typical 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number)

a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY) __________
   (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

b) MODERATE EXERCISE (NOT EXHAUSTING) __________
   (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

c) MILD EXERCISE (MINIMAL EFFORT) __________
   (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)

2. During a typical 7-Day period (a week), in your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?

   OFTEN  SOMETIMES  NEVER/RARELY
   1. □   2. □   3. □
Appendix J

Letter of Information

(Study 4)
Survey Monkey Questionnaire

We wish to invite you to participate in this study conducted by The University of Western Ontario (UWO), exploring exercise motivation of youth with a disability. If you agree to participate, you will be asked to complete an online (or paper) survey. By completing the online survey you indicate your consent to participate in this research study. The survey will take approximately 10 minutes to complete.

It is important for you to know that “Survey Monkey”, a web survey company that is located in the USA, is the host of this online survey. This company is subject to U.S. laws, in particular, the US Patriot Act that allows authorities access to the records of Internet service providers. Survey Monkey’s server records incoming IP addresses – including that of the computer that you use to access the survey. However, no connection is made between your data and your computer’s IP address. If you choose to participate in the survey, you understand that your responses to the survey questions will be stored and accessed in the USA. The Security and privacy policy for Survey Monkey can be found at the following link:

Your participation in this study is voluntary. You may refuse to participate, refuse to answer any questions, or withdraw from the study at any time. There are no known risks or benefits for participating in this study.

We will keep your identity, comments and questionnaire responses confidential and secure. No names will appear on any documents published as a result of this study, all results will be presented in summary form. If you would like to receive a copy of the overall results of the study, please let the investigators know. There are no costs to you for participating in this study.

If you have any questions regarding your rights as a study participant, please contact the Director of the Office of Research Ethics at 6613036. Representatives Health Sciences Research Ethics Board may require access to your study related records or may follow up with you to monitor the conduct of the research of the University of Western Ontario.

If you have any questions about this study, please contact Dr. Mandich or Kim Simpson, investigators on this study.

Sincerely,

Dr.
Director School of Occupational Therapy
The University of Western Ontario

In addition, if you have questions about the conduct of this study or your rights as a participant, you may contact: Office of Research Ethics, University of Western Ontario, 6613036.
Appendix K

UWO Research Ethics Approval

(Study 4)
Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Angela Mandich
Review Number: 17928S
Review Level: Full Board
Approved Local Adult Participants: 0
Approved Local Minor Participants: 10
Protocol Title: Understanding exercise motivation for youth with a disability
Department & Institution: Occupational Therapy, University of Western Ontario
Sponsor:
Ethics Approval Date: June 28, 2011          Expiry Date: April 30, 2012

Documents Reviewed & Approved & Documents Received for Information:

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Comments</th>
<th>Version Date</th>
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<tr>
<td>UWO Protocol</td>
<td></td>
<td></td>
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<td>Letter of Information &amp; Consent</td>
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<tr>
<td>Advertisement</td>
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<tr>
<td>Assent</td>
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This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB’s periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request Form.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the NMREB.

The Chair of the NMREB is Dr. Riley Hinson. The UWO NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 0000041.

[Signature]

Ethics Officer to Contact for Further Information

Janice Sutherland
[janice.sutherland@uwo.ca]

This is an official document. Please retain the original in your files.
Appendix L

Curriculum Vitae
Kimberly B. Simpson

**TITLE**
MSc Health and Rehabilitation Science (UWO 2008)
Doctoral Candidate Health and Rehabilitation Sciences (UWO)
Certified Kinesiologist (CK)

**EDUCATION**

<table>
<thead>
<tr>
<th>Degree</th>
<th>Institution</th>
<th>Department</th>
<th>Year</th>
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<tr>
<td>Hons. BA (Kinesiology)</td>
<td>University of Western Ontario</td>
<td>Health Sciences</td>
<td>2001</td>
</tr>
<tr>
<td>Therapeutic Recreation</td>
<td>Georgian College</td>
<td>Health Studies</td>
<td>2002</td>
</tr>
<tr>
<td>M.Sc.</td>
<td>University of Western Ontario</td>
<td>Health and Rehabilitation Sciences</td>
<td>2008</td>
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<tr>
<td>PhD Candidate</td>
<td>University of Western Ontario</td>
<td>Health and Rehabilitation Sciences</td>
<td>present</td>
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**EMPLOYMENT HISTORY**

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<tr>
<th>Date</th>
<th>Position</th>
<th>Institution</th>
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<tr>
<td>2007 - Present</td>
<td>Kinesiologist</td>
<td>Thames Valley Children’s Centre</td>
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<tr>
<td>2001 – Present</td>
<td>Fitness Instructor</td>
<td>GoodLife Fitness Clubs</td>
</tr>
<tr>
<td>2011 –2011</td>
<td>Lecturer</td>
<td>The University of Western Ontario</td>
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<tr>
<td>2005- 2007</td>
<td>Therapeutic Recreationist</td>
<td>Thames Valley Children’s Centre</td>
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<tr>
<td>2004-2005</td>
<td>Recreation Assistant</td>
<td>Bloorview McMillan Children’s Centre</td>
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<td>2002-2005</td>
<td>Course Instructor</td>
<td>Georgian College</td>
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<tr>
<td>2003-2004</td>
<td>Project Coordinator</td>
<td>Right to Play – West Africa</td>
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<tr>
<td>2002-2003</td>
<td>Child Life Specialist</td>
<td>The Hospital for Sick Children</td>
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TEACHING EXPERIENCE

1. Graduate Seminar Course:

   The University of Western Ontario: Health and Rehabilitation Science Program

   Limited duties – LECTURER: Child and Youth Health Seminar (2011)

2. Undergraduate Courses:

   Georgian College of Applied Arts and Technology: Developmental Service Worker Program, Health Studies

   SESSIONAL INSTRUCTOR - Healthy Active Living (2003 & 2004)

   The University of Western Ontario:
   School of Health Studies (BHSc) Undergraduate Program


   TEACHING ASSISTANT: Health Science 308G: Creative Service Delivery in Rural Communities (2007)


   School of Health Studies (BHSc) and School of Kinesiology Undergraduate Program

   TEACHING ASSISTANT: Health Science 2300 Kin 2222: Systemic Approach to Functional Anatomy

3. Student Supervision

   I have been an internship supervisor for the post-diploma ChildLife Specialist program at McMaster University (2002), the Early Childhood Specialist program at Humber College (2003) and the post-diploma Therapeutic Recreation Program at Georgian College (2005-2007), and a co-supervisor of a practicum placement for a 4th year Health Science Student from the University of Western Ontario (2008).
PUBLICATIONS AND PROFESSIONAL REPORTS


Reports:

Development Documents – Vision, Mission and Objectives of the Thames Valley Children’s Centre Health and Fitness Centre to the Communities in Action Fund, Ronald MacDonald House Charities and Paralympics Ontario (2007)


Right to Play SportHealth Project Partnership Report, Red Cross International (2003)

OTHER SCHOLARLY AND PROFESSIONAL ACTIVITIES

- Ontario Association of Children’s Rehabilitation Services (OACRS) conference – poster presentation (2011 Toronto, Canada)
- International Symposium on Adapted Physical Activity (ISAPA) – oral presentation (2011 Paris, France)
- Healthy Communities Fund grant recipient member Thames Valley Children’s Centre, Ontario Ministry of Health Promotion (2009)
- International conference: Move: rehabilitation, sport and exercise; conference poster presentation (2008 Amsterdam, Netherlands)
- Communities in Action Fund recipient member Thames Valley Children’s Centre (2007) Ontario Ministry of Health Promotion
- Therapy Staff Canadian Paralympics
- Therapy Staff Ontario Paralympics
- World Health Organization Sport-in a Box Project Coordinator

PROFESSIONAL MEMBERSHIPS

Canadian Society of Exercise Physiology (CSEP) current member
Ontario Kinesiology Association (OKA) current member
Therapeutic Recreation Ontario (2001- 2007)

CERTIFICATIONS AND WORKSHOPS

Certified Kinesiologist, Ontario Kinesiology Authority (2007- present)
Fitness Instructor Specialist, Canadian Fitness Professionals (2005- present)
Certified Personal Trainer, Canadian Fitness Professionals (2001-present)
Canadian Fitness Professionals Conference (2002-2010)
Les Mills International Certified Instructor
Reebok Institute Certified Instructor
Schwinn Cycling Certified Instructor
Senior Fitness Instructor course (SFIC)