Linking parental support and parental control to physical activity participation in youth: The mediating role of self-efficacy and enjoyment

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Abstract

Identifying modifiable factors associated with physical activity (PA) is necessary to develop effective behaviour change interventions to promote PA. We examined the associations between parental support, parental control, youth's self-efficacy, enjoyment, and PA participation in- and out-of-school. Data for our cross-sectional study were collected via self-report questionnaires from 602 youth (M_{age}=13.4 years; *SD*=.6) and analyzed using path analysis. We found that parental support and parental control indirectly influenced youth's PA via self-efficacy and enjoyment. Specifically, parental control negatively influenced youth's self-efficacy and enjoyment (β=-.12 to -.15), whereas parental support positively influenced youth's self-efficacy and enjoyment (β=.18 to .31). Also, youth's self-efficacy and enjoyment positively influenced PA performed in- and out-of-school (β=.12 to .26). Our findings suggest parental supportive and controlling behaviours affect youth's self-efficacy and enjoyment, which in turn influence PA participation in different settings. Promoting parental support, while reducing parental control, may effectively increase youth's participation in PA.

Table of Contents

Chapter 1: Introduction

Regular physical activity is essential for healthy physical, psychological, and social development in youth (Eime, Young, Harvey, Charity, & Payne, 2013; Strong et al., 2005). Further, it can help prevent several chronic diseases and promote quality of life in this population (Janssen & Leblanc, 2010). While guidelines have been developed to promote physical activity in youth (Canadian Society for Exercise Physiology, 2011), participation rates are very low (Colley et al., 2011; ParticipACTION, 2015). Therefore, efforts to promote participation in physical activity in youth are needed.

The investigation into modifiable factors associated with physical activity for youth can inform the development of effective interventions aimed at increasing participation in physical activity. A variety of theoretical frameworks and models have been developed to help researchers advance this line of research. Examples include the social cognitive theory (Bandura, 1986) and the theory of planned behaviour (Ajzen, 1991). Many of these frameworks and models suggest that interpersonal factors, such as social support, can influence the likelihood that youth will participate in physical activity (e.g., Taylor, Baranowski, & Sallis, 1994; Timperio et al., 2013; Trost et al., 2003; Welk, 1999). In support of these propositions, parental support has been associated with participation in physical activity for youth in empirical studies (Beets, Cardinal, & Alderman, 2010; Gustafson & Rhodes, 2006). However, most of this research has focused on the direct associations between parental support and youth's participation in physical activity. As a result, the potential mechanisms underpinning the effect of parental support on physical activity remain largely unknown. It is valuable to identify these mechanisms to strengthen the conceptual basis for these links. Self-efficacy and enjoyment, which are two of the most prominent determinants of youth's participation in physical activity (see Sallis, Prochaska, & Taylor, 2000 for review), are potential mechanisms underlying the relationship between parental support and youth's participation in physical activity (Brustad, 1993; Timperio et al., 2013). To this effect, it may be that parental support influences youth's

self-efficacy and enjoyment, and in turn self-efficacy and enjoyment influence youth's participation in physical activity.

It is also important to determine if both tangible and intangible types of parental support are associated with youth's participation in physical activity, and if both are associated with physical activity performed in different settings, namely in- and out-of-school. However, few researchers have analyzed the unique associations between different types of parental support and physical activity performed in- and out-of-school. Rather, most have used global measures for parental support as well as for physical activity. Finally, almost no attention has been given to the 'darker side' of parental influences (i.e., parental control) despite the notion that directing and regulating behaviours and activities can have a negative influence on youth's behaviour, including physical activity (Grolnick & Pomerantz, 2009; Wilson, Spink, & Whittaker, 2007).

Purpose of this Study

To address the limitations of past research, the overall purpose of this study was to gain a better understanding of the associations between parental support, parental control, self-efficacy, enjoyment, and participation in physical activity in youth. The specific objectives were to test two competing models: (a) an indirect effects model whereby parental support (i.e., tangible, intangible) and parental control were indirectly associated with youth's participation in physical activity performed in- and out-of-school via youth's self-efficacy and enjoyment; and (b) a full effects model which adds direct associations from parental support and parental control to youth's participation in physical activity.

Chapter 2: Review of the Literature

Physical Activity and Youth

Researchers have shown that physical activity can promote physical, psychological, and social health (Eime et al., 2013; Janssen & Leblanc, 2010; Strong et al., 2005), and thus has benefits for youth and society. Common proximal physical benefits of physical activity include enhanced muscular endurance and strength, improved flexibility, increased physical fitness, and weight control (Hills, Andersen, & Byrne, 2011; Janssen & Leblanc, 2010). In addition to these benefits, regular physical activity can have long-term benefits including a reduced risk of premature death or developing numerous chronic diseases such as cardiovascular diseases, diabetes, certain cancers, hypertension, and osteoporosis later in life (Andersen, Riddoch, Kriemler, & Hills, 2011; Boreham & Riddoch, 2001). There are also psychological benefits, such that youth who are physically active have better quality of life, decreased risk of depression, lower levels of anxiety, heightened self-esteem, improved self-concept, improved sleep, and are better able to cope with stresses of daily life compared to their less active peers (Eime et al., 2013; Strong et al., 2005). Furthermore, researchers have demonstrated that physical activity has social benefits as it can provide opportunities for socialization with peers, foster supportive relationships, improve social functioning, and reinforce a sense of belonging and connectedness (Bailey, 2005; Boreham & Riddoch, 2001; Eime et al., 2013; Lubans, Plotnikoff, & Lubans, 2012). For these reasons, promoting participation in physical activity for youth is an important public health priority.

In light of the benefits of physical activity, the Canadian Society for Exercise Physiology (CSEP, 2011) has formulated physical activity guidelines for youth between 5 and 17 years of age. They state that youth should accumulate at least 60 minutes of moderate-to-vigorous aerobic physical activity 7 days per week, and vigorous physical activity on 3 or more days per week. In addition to these guidelines for aerobic activity, it is stated that youth should participate

in muscle strengthening activities on 3 non-consecutive days per week. It should be noted, however, that this is the suggested minimal level of physical activity needed to obtain health benefits for youth, and it has been shown that engaging in a greater amount, intensity, and/or duration of physical activity can lead to greater improvements in many health parameters (Janssen & Leblanc, 2010; Strong et al., 2005).

Despite the numerous benefits associated with physical activity for youth, few are sufficiently active (Colley et al., 2011; Troiano et al., 2008). Based on objectively measured physical activity data, 9% of youth 6 to 17 years old living in Canada are currently meeting the aforementioned physical activity guidelines (ParticipACTION, 2015). These low rates of participation are a cause for concern given that there are marked decreases in participation seen in the transition from childhood to adolescence, and again from adolescence to adulthood (Kjonniksen, Torsheim, & Wold, 2008; Wall, Carlson, Stein, Lee, & Fulton, 2011). These findings accentuate the importance of conducting research with youth to understand the factors related to their participation in physical activity to inform the design of early interventions when physical activity patterns are established.

Determinants of Physical Activity: A Theoretical Perspective

Theory-based research is important because it can help researchers extend their current understanding of health behaviours and can offer explanations of how different factors can influence these behaviours (Dewar et al., 2013). Accordingly, several psychosocial theories and models have been developed to guide the investigation of such factors, including the social cognitive theory (Bandura, 1986) and the theory of planned behaviour (Ajzen, 1991). Many of these acknowledge the important role of interpersonal factors, which are defined as sources of influence provided by interactions with significant others (Lubans, Foster, & Biddle, 2008). For example, Davison, Cutting, and Birch (2003) proposed a model where activity-related parenting strategies, such as providing transportation and demonstrating physical activity participation, influence youth's participation in physical activity. Similarly, Trost et al. (2003) suggested a

model that links parental support and youth's participation in physical activity. These authors also proposed that intrapersonal variables, namely parental enjoyment and youth's self-efficacy, mediate the association between parental support and youth's participation in physical activity. Timperio et al. (2013) proposed a model similar to that of Trost et al. (2003), which stipulates parental support fosters youth's positive feelings (i.e., enjoyment) and increases their perceived ability to perform physical activity (i.e., self-efficacy). In turn, youth's self-efficacy and enjoyment are proposed to be associated with higher levels of participation in physical activity in youth. The main distinction between these two latter models is that Trost et al. (2003) investigated *parental* enjoyment of physical activity, rather than *youth's* personal enjoyment of physical activity as in the model used by Timperio et al. (2013). Considering that personal perceptions of enjoyment are key determinants of physical activity behaviour (see Sallis et al., 2000 for review), Timperio et al.'s (2013) model will be used as a foundation to guide the current investigation.

Timperio et al.'s (2013) model focuses on the positive aspects of parental support, which assumes that parental support is an inherently positive influence. Further, much of the prior research on parental support and youth's participation in physical activity has assessed only this positive dimension (Beets, Vogel, Forlaw, Pitetti, & Cardinal, 2006; Duncan, Duncan, & Strycker, 2005; Springer, Kelder, & Hoelscher, 2006; Trost et al., 2003). However, some researchers have indicated that parental behaviours can affect physical activity negatively as well, by exerting control and pressure (Lewis & Butterfield, 2005; Simons-Morton & Hartos, 2002; Wilson et al., 2007). Indeed, the potential for parents to negatively influence youth's participation in physical activity has become increasingly apparent in recent years, looking at research across health domains (e.g., smoking behaviour, nutrition, general health behaviours; Hennessy, Hughes, Goldberg, Hyatt, & Economos, 2010; O'Connor et al., 2014; Wright, Wilson, Griffin, & Evans, 2010). Thus, we cannot assume that parents will have a positive influence on youth's participation in physical activity all of the time. For this reason, the current study integrates parental control into Timperio et al.'s (2013) model since expanding existing

theoretical models may be beneficial to extend previous research (Rhodes & Nigg, 2011), and may further help explain youth's participation in physical activity (Pugliese & Okun, 2014; Wilson & Spink, 2011).

Parental Support: Sources

Social support has been operationalized at the macro-level (i.e., the cumulative impact of one's social network; Richmond & Ross, 2008) and micro-level (i.e., an individual's perception of support received by specific individuals or groups such as peers, siblings, teachers, coaches, and parents; Neumark-Sztainer, Story, Hannan, Tharp, & Rex, 2003; Sallis, Taylor, Dowda, Freedson, & Pate, 2002). The latter operationalization may help provide a better understanding of the role of parental support on youth's participation in physical activity for two reasons. First, there are differences in the abilities of these individuals to impact behaviour change in youth (Beets et al., 2006; Duncan et al., 2005). The impact of support provided often depends on the amount of time spent with the source of support, and the emotional closeness of the relationship. In other words, the more important youth find the source to be, the more likely support will be effective in changing behaviour (Spence & Lee, 2003). Second, the relative importance of different sources of support changes throughout the lifespan based on individual needs (Lox, Martin Ginis, & Petruzzello, 2010). As youth age, peers become a stronger source of support due to the fact that youth become less dependent on parents (Beets et al., 2006; Sallis et al., 2002). For these reasons, it is valuable to differentiate between specific sources of support (e.g., parents, peers, teachers, siblings) to better understand how social ties within families and larger social networks can influence youth's participation in physical activity.

While the different sources of support warrant more attention (Beets et al., 2010; Duncan et al., 2005; Eather, Morgan, & Lubans, 2013), assessing parental support is particularly important when working with youth based on developmental perspectives which posit that parents exert a powerful influence over youth's health behaviours and life choices (Gustafson & Rhodes, 2006; Harter, 1999; Sallis et al., 2000; Trost et al., 2003). Further, researchers have

noted parents as one of the strongest social influences for youth's participation in physical activity (Brustad, 1993; Sallis et al., 2000). Parental support can have a strong influence on youth's behaviour because they live in close contact for the first several years of their lives, and parents are a key source for establishing health behaviour norms within the family unit (Gustafson & Rhodes, 2006). This socialization process is especially relevant since early positive exposure to a variety of physical activities can instil more positive attitudes, and could influence uptake and maintenance of activity among family members (Bois, Sarrazin, Brustad, Trouilloud, & Cury, 2005; Pugliese & Tinsley, 2007). Another reason why parents can have a strong influence on youth's participation in physical activity is because youth are largely dependent on their parents, thus direct facilitation from parents is often needed for youth to be capable of engaging in many physical activities (Morgan et al., 2003; Sallis et al., 1992; Trost et al., 2003). Given these propositions, investigating parental support should be a priority for researchers hoping to understand how to change health behaviours of youth.

Parental Support: Types

Although the concept of parental support has been popular for many years in the field of physical activity psychology, researchers have been slow to reach consensus on how to define and assess this type of support. In general, it is a type of influence broadly defined as the behaviours and resources that one individual provides another to assist them in achieving their desired outcomes (Duncan et al., 2005). In the context of physical activity, for example, these behaviours could be providing advice, material aid, companionship, emotional nurturance, or information (Mendonça, Cheng, Mélo, & de Farias Júnior, 2014). Many researchers have created a global score that reflects these different types of support, whereby higher scores reflect more support in general (Dowda, Dishman, Pfeiffer, & Pate, 2007; Mendonça et al., 2014; Neumark-Sztainer et al., 2003; Trost et al., 2003; Welk, Wood, & Morss, 2003). However, this global conceptualization makes it difficult to determine the unique influence of different types of support provided for participation in physical activity. For this reason, others have

created subscale scores to reflect the distinct types of support (Chogahara, 1999; Sallis et al., 2002). However, the groupings of the different types have varied widely across studies from modelling and encouragement (Brustad, 1993), to financial, logistic, emotional, and reinforcement (Timperio et al., 2013), and informational, emotional, appraisal, and instrumental (Trost & Loprinzi, 2011). These inconsistencies have made it difficult to compare results across studies.

To help provide consistency within the literature this study will use recommendations by Beets et al. (2010) who published an article defining the different types of parental support. The authors stipulated that there are two broad categories of parental support: *tangible* and *intangible*. Tangible support involves explicit behaviours performed by parents that directly assist youth in their participation in physical activity, and it has been referred to as one of the most effective behaviours parents can engage in to support youth's participation in physical activity (Sallis et al., 1992; Trost et al., 2003). According to Beets et al. (2010), two types of support that fall into this category: *instrumental* (i.e., providing transportation, purchasing equipment, paying of fees for activities) and *conditional/companionship* (i.e., participating together in an activity, watching/supervising youth while they are being physically active; Beets et al., 2010).

Intangible support, on the other hand, involves parental verbal and non-verbal behaviours which serve to foster youth's motivation, rather than direct facilitation of physical activity behaviour (Prochaska, Rodgers, & Sallis, 2002). Intangible support is comprised of three types of support: *motivational*, *informational*, and *modelling* (Beets et al., 2010; Pugliese & Tinsley, 2007). Motivational support involves giving encouragement to be physically active and giving praise when youth are active. Informational support involves discussing the benefits of physical activity with youth and teaching them how to be active (Duncan et al., 2005; Prochaska et al., 2002), and modelling involves parents' participation themselves in physical activity (Fredricks & Eccles, 2005). Using the categorization established by Beets et al. (2010) can help

to provide consistency across studies, and thus help replicate findings. Furthermore, in looking at tangible and intangible types of parental support as separate constructs, researchers will be able to determine the relative importance of each.

Linking Parental Support and Physical Activity

A large body of empirical research has investigated the direct effects of parental support on youth's participation in physical activity (Beets et al., 2010; Mendonça et al., 2014). Some research has shown greater parental support is directly and positively associated with youth's participation in physical activity (Davison et al., 2003; Silva, Lott, Mota, & Welk, 2014; Timperio et al., 2013; Trost et al., 2003). Moreover, there are different types of support, which can directly influence youth's physical activity behaviour (Gustafson & Rhodes, 2006; Sallis et al., 2000; Timperio et al., 2013; Trost et al., 2003). For instance, Beets et al. (2006) found that tangible forms of parental support act to facilitate youth's participation in physical activity. Similarly, Heitzler, Martin, Duke, and Huhman (2006) found that tangible support (i.e., parental co-participation, supervision, watching youth participate in physical activity) had a direct influence on participation in physical activity for youth.

In terms of intangible forms of support Timperio et al. (2013) showed that parental encouragement directly impacted youth's participation in physical activity, and similar findings were reported by Springer et al. (2006). Some studies have also shown that other forms of intangible support, such as parental modelling of physical activity behaviour, can influence youth's participation in physical activity (Griffith et al., 2007; Prochaska et al., 2002; Pugliese & Tinsley, 2007; Timperio et al., 2013), though others have reported non-significant associations between these variables. For instance, Trost et al. (2003) as well as Fredricks and Eccles (2005) both found that intangible support was not directly associated with youth's participation in physical activity. Other researchers have found no direct associations between parental support and youth's participation in physical activity (Hamilton & White, 2008; Timperio et al., 2008; Wu, Pender, & Noureddine, 2003). Therefore, it is important to differentiate between various types of

parental support. Further, looking only at the direct associations may create an incomplete picture of the influence of parental support on youth's participation in physical activity. It may be that underlying mechanisms are influenced by parental support and these mechanisms in turn are associated with youth's participation in physical activity. As a result, it is important to investigate both the direct and indirect associations of parental support on youth's participation in physical activity.

Mechanisms linking parental support and physical activity. Although the majority of research has focused on the direct links between parental support and youth's participation in physical activity, several researchers have suggested that parental support may also indirectly influence youth's participation in physical activity (Cheng, Mendonca, & Junior, 2014; Dowda et al., 2011; Shields et al., 2008; Stucky-Ropp & DiLorenzo, 1993; Timperio et al., 2013; Trost et al., 2003). Specifically, the theoretical framework used to guide the current research (Timperio et al., 2013), other psychosocial models (e.g., Heitzler et al., 2010; Sabiston & Crocker, 2008; Trost et al., 2003; Welk et al., 2003), and theories such as the social cognitive theory (Bandura, 1986) and the theory of planned behaviour (Ajzen, 1991) identify youth's self-efficacy and enjoyment as important factors which influence the relationship between parental support and youth's participation in physical activity. This would suggest that parental support is positively associated with self-efficacy and enjoyment, which are subsequently positively associated with youth's participation in physical activity.

There are a number of studies in the literature that would support this proposition. In regards to enjoyment, Timperio et al. (2013) found that it mediated the relationship between family support and youth's participation in physical activity. Similarly, Dowda et al. (2011) demonstrated that higher levels of parental support were associated with increased levels of enjoyment, and subsequently higher levels of physical activity in youth. In regards to self-efficacy, researchers have provided evidence that the association between parental support and youth's participation in physical activity is influenced by youth's self-efficacy (Brustad, 1993;

Lewis, Marcus, Pate, & Dunn, 2002; Trost, Pate, Ward, Saunders, & Riner, 1999; Welk et al., 2003). For example, in Timperio et al.'s (2013) study, self-efficacy was shown to be the strongest influence among the cognitive variables tested between family support and youth's physical activity behaviour. Similarly, Trost et al. (2003) found that tangible and intangible support from parents influenced youth's self-efficacy, and in turn, their participation in physical activity. Collectively, the findings presented above support the notion that enjoyment and self-efficacy may be important factors to consider in the relationship between parental support and youth's participation in physical activity.

Parental Control and Physical Activity

Due to several aspects of the relationship between parents and youth (e.g., gate-keeper role, rule setting, socialization), it has been suggested that there is a need to further explore the impact of parental control on physical activity participation in youth (Lewis, Butterfield, Darbes, & Johnston-Brooks, 2004). While there exist numerous conceptualizations of social control, for the purpose of the present study, parental control is defined as a highly directive strategy employed by parents to influence or change their child's behaviour (Lewis & Butterfield, 2005). Further, it reflects parents' attempts at forcing their child to meet specific demands (Grolnick & Pomerantz, 2009). Both 'nagging' and 'ordering' are examples of two widely used control tactics (Wilson & Spink, 2010). These tactics are more likely to result in youth performing a behaviour out of feelings of guilt or pressure (Pugliese & Okun, 2014). Thus, unlike parental support, parental control is believed to have an adverse influence on health behaviours (Wilson et al., 2007).

Parents' investment in and commitment towards youth make them a likely source to utilize control tactics in a physical activity context (Tinsley, 2003). Parental control is often used as a strategy to influence another person's behaviour when they are behaving in ways that seen as 'deviant' (Lewis & Butterfield, 2005). As the majority of parents understand the importance of physical activity for youth (Cameron, Craig, & Paolin, 2005), physical inactivity may be viewed as a 'deviant behaviour'. Accordingly, parents may use controlling tactics which pressure youth

in an attempt to increase participation in physical activity when youth are not physically active (Wilson et al., 2007). Further, parents are responsible for the health and well-being of their offspring and may exert control in order to enhance behaviours that will be beneficial, such as physical activity (Spink, Strachan, & Odnokon, 2008). Despite these perspectives, the vast majority of the existing research continues to focus on the positive aspects of parental influences. Clearly, there is more to parental influences than presence or absence of parental support. Thus, complete accounts of the associations between parental influence and youth's physical activity should assess youth's perceptions of whether they feel their parents try to control their participation in physical activity.

Drawing on general health literature, the use of social control has been associated with reduced adherence to cardiac rehabilitation (Franks et al., 2006), lower consumption of fruits and vegetables (Grolnick & Pomerantz, 2009), increased smoking behaviour or lower smoking reductions (Lewis & Butterfield, 2005; Westmaas, Wild, & Ferrence, 2002), and negatively linked to general positive health behaviours (Tucker & Anders, 2001). There is also initial evidence that parental control may negatively influence participation in physical activity (Pugliese & Okun, 2014; Wilson & Spink, 2011). For example, Wilson et al. (2007) found an inverse correlation between parental control tactics and youth's participation in physical activity. Similarly, Pugliese and Okun (2014) found use of parental control was a strong predictor of reactance, in which youth may ignore the influence, participate in less physical activity, or hide inactivity in order to restore a sense of personal control. These results offer initial evidence of the potential adverse effect that parental control may have on youth's participation in physical activity. However, there has been little work exploring these associations within the physical activity context to build a strong body of evidence. Additional studies are required before definitive conclusions can be made.

Mechanisms linking parental control and physical activity. In addition to potential negative associations with youth's participation in physical activity, parental control may also

adversely influence youth's self-efficacy and enjoyment. According to Roemmich, Lambiase, McCarthy, Feda, and Kozlowski (2012), highly directive behaviours from parents may lower youth's perceptions of autonomy, which may negatively influence youth's beliefs in their ability to participate in physical activity as well as lower the enjoyment they derive from their participation. These propositions are further corroborated by previous research showing that higher levels of autonomy were positively associated with self-efficacy (Vierling, Standage, & Treasure, 2007) and enjoyment (Cox, Smith, & Williams, 2008). Since self-efficacy and enjoyment have been found to influence participation in physical activity, lowering youth's perceptions of these variables could potentially lessen the likelihood of youth's participation in physical activity. However, there are few studies that have tested the indirect effects of parental control on youth's participation in physical activity via youth's perception of enjoyment and self-efficacy. Including both positive and negative dimensions of parental influences into direct and indirect models is, therefore, the next logical step in examining the role of parental influences on youth participation in physical activity.

Physical Activity Performed In- and Out-of-School

To date, most studies have focused on general physical activity by assessing overall participation in physical activity (Van der Horst, Paw, Twisk, & Van Mechelen, 2007) or differentiating by the intensity of physical activity (e.g., Edwardson & Gorely, 2010). However, youth's physical activity may take place in a variety of settings (e.g., school, home, neighbourhood, gym, outdoor field). These settings are important to consider because both offer numerous opportunities for participation in physical activity, and have important implications for the health of youth (Eime et al., 2013). In addition, schools may offer youth different opportunities in terms of the sports and physical activities offered, compared to those available out-of-school (i.e., in the community or at home; Dagkas & Stathi, 2007). Based on previous research showing that activities performed in these various setting may have specific correlates (Andersen, Hughes, & Fuemmeler, 2009; Strauss, Rodzilsky, Burack, & Colin, 2001), it is

possible that parental support, parental control, self-efficacy, and enjoyment differentially influence youth's participation in physical activity performed in different settings. Therefore, it is necessary to differentiate physical activities based on the location where they are performed.

This study seeks to provide further contextual information by differentiating between physical activity performed in- and out-of-school, as the types of parental support provided by parents will likely vary depending on the characteristics of activities youth are engaged in (Vilhjalmsson & Kristjansdottir, 2003). Participation in organised physical activity out-of-school may require more tangible forms of parental support whereby parents are required to drive youth to and from games and practice, as well as to enrol and pay for participation. Other forms of tangible support such as supervision and co-participation may be more relevant for participation out-of-school (Edwardson & Gorely, 2010). Although participation in out-of-school activities may require more tangible forms of parental support, intangible types of support such as emotional and motivational support may be more important to encourage youth to participate in physical activity in-school. However, it may also be that youth are more reliant on peers and teammates to provide intangible support (Beets et al., 2006) when it comes to in-school physical activity and organized activities out-of-school. Further, it has been suggested that the reach of parental influence may not extend during school hours as youth typically have more proximal influences during this time (Spence & Lee, 2003). Taken together, findings suggest tangible and intangible forms of parental support have unique associations with participation in physical activity performed in different settings; though it is not clear at this time which type of support is more important for physical activity in which setting. Therefore, research examining the associations between parental support, parental control, self-efficacy, enjoyment and youth's participation in physical activities should differentiate between participation in- and out-of-school to more precisely pinpoint unique predictors of youth's physical activity to inform tailored behaviour change interventions.

Current Study

Given that participation rates in youth are low (Colley et al., 2011), there is a need to examine modifiable factors that could influence youth's participation in physical activity. This would inform effective behaviour change interventions, as well as extend theory-based research aimed at promoting participation in physical activity. Based on a review (Sallis et al., 2000) which shows that parental support, self-efficacy, and enjoyment are among the most consistent modifiable correlates of participation in physical activity for youth, and building on Timperio et al. (2013) conceptual model, the general purpose of this study was to gain a better understanding of the associations between parental support, parental control, self-efficacy, enjoyment, and participation in physical activity in youth. The specific objectives were to test and compare two competing models. To this end, we examined the direct influence of parental support (i.e., tangible and intangible) and parental control on youth's participation in physical activity performed both in- and out-of-school, as well as the indirect influence of these variables via self-efficacy and enjoyment on youth's participation in physical activity.

Hypotheses

In line with theoretical propositions (Heitzler et al., 2010; Sabiston & Crocker, 2008; Welk et al., 2003) and empirical research (e.g., Sallis et al., 2000; Timperio et al., 2013; Trost et al., 2003), we put forward the following hypotheses (see Figure 1 for a visual representation of the hypothesized associations between study variables):

a) Parental tangible and intangible support would have a *direct* and *positive* association with youth's self-efficacy, enjoyment, and participation out-of-school of *moderate* magnitude, and a *direct* and *positive* association with participation in-school of *weak* magnitude
b) Parental control would have a *direct* and *negative* association with youth's self-efficacy, enjoyment, and participation out-of-school of *moderate* magnitude, and a *direct* and *negative* association with participation in-school of *weak* magnitude

c) Parental support (i.e., tangible and intangible) would have an *indirect* and *positive,* association with youth's participation out-of-school of *moderate* magnitude, and an *indirect* and *positive* association with participation in-school of *weak* magnitude via youth's self-efficacy and enjoyment
d) Parental control would have an *indirect* and *negative* association with youth's participation out-of-school of *moderate* magnitude, and an *indirect* and *negative* association with participation in-school of *weak* magnitude via youth's self-efficacy and enjoyment
e) Youth's perceptions of self-efficacy and enjoyment would have *direct* and *positive* associations with participation in- and out-of-school of *moderate* magnitude

Chapter 3: Methods

Overview of the MATCH Study

Data for this cross-sectional study were collected within the context of a larger, ongoing, prospective cohort study entitled: *Monitoring Activities of Teenagers to Comprehend their Habits* (MATCH). A detailed description of the MATCH study design and methods can be found elsewhere (see Bélanger et al., 2013). Briefly, the primary purpose of the MATCH study is to investigate trends in physical activity participation of youth living in New Brunswick, and identify factors that can predict their physical activity over time. The initial sample consisted of 802 students in grades 5 and 6 who were recruited from 17 schools in New Brunswick from September 2011 to January 2012. Participants were recruited from a mix of French- and English-speaking schools that vary in socioeconomic status (i.e., high, moderate, low) and geographic location (i.e., rural, urban, suburban). Data are collected from students who provided assent and parental consent (see Appendix A) through self-report questionnaires administered every 4 months during the school year until they graduate in grade 12. The baseline questionnaire package took 45-60 minutes to complete, while the follow-up questionnaire packages take 20-30 minutes to complete. The MATCH study protocol was approved by the Centre Hospitalier de l'Université de Sherbrooke Ethics Committee (Appendix B). Permission to conduct the analysis for this study and the addition of questionnaires to collect data to address the current research questions was approved by the University of Ottawa Ethics Board (Appendix C).

Relevant Participant and Methods Information for the Current Study

Data for the current study were collected in the spring of 2014 from 602 participants who were aged 12 to 15 years (M_{age}=13.4, *SD*=.6). Measures of parental support, parental control, and self-efficacy were added to the MATCH questionnaire package. Measures of physical activity, enjoyment, and sociodemographics were already included in the MATCH questionnaire package and were used for this study. A copy of the sociodemographic questions asked to

parents during a phone interview and youth can be found in Appendices E and F, respectively, and a copy of the questionnaires assessing the variables of interest in this study can be found in Appendices G (English) and H (French).

Measures

Participant information. A sociodemographic questionnaire completed by participants was used to determine participants' age and sex. Additional data on parental income and education level were provided by parents. Income was categorized into three categories (i.e., < $30,000; $30,000-$80,000; ≥ $80,000) and parents' educational status was dichotomized (i.e., did not attend university; attended university). These variables were used to describe the sample.

Physical Activity. The MATCH study uses a self-report 4-month physical activity recall measure, adapted from the Weekly Activity Checklist (Sallis et al., 1993). For MATCH, it was adapted to reflect age appropriate activities commonly performed by youth in New Brunswick. Specifically, all items were included from the checklist developed by Sallis et al. (1993), as well as the items included in Kowalski, Crocker, and Kowalski (1997). Further, an additional 14 activities were added to the original checklist (Craig, Cameron, Russell, & Beaulieu, 2001) to more accurately reflect preferences of youth in the region. This method was chosen to reduce the cost of measurement and participant burden, and thus improve retention over time. Another reason for using this type of measure is that it can provide contextual information (Hardy, Barnett, Espinel, & Okely, 2013). In the MATCH study, it was therefore used to assess frequency of participation in a variety of different activities, as well as assess the primary location where activities were performed. To this end, participants were asked to report how often they participated in each of 36 different physical activities in the past 4 months. The response options were: *never*, *once per month or less*, *2-3 times per month*, *once per week*, *2-3 times per week*, *4-5 times per week*, and *almost everyday*. To gather contextual information on where these activities took place, participants were also asked to indicate the location where

they most often participated in each activity. The response options were: *school*, *home or neighbourhood*, *'indoor arena, gym, etc.,' outdoor field*, and *other.* Scores on the original scale have shown adequate internal (α > .72) and test-retest reliability (intra-class correlation (ICC) > .74; Janz, Lutuchy, Wenthe, & Levy, 2008; Sallis et al., 1993; Sirard & Pate, 2001). Moreover, this scale has been used and validated in several studies with youth (e.g., Fung et al., 2012; MacKelvie, Khan, Petit, Janssen, & McKay, 2003; Petit et al., 2002). To calculate youth's physical activity score, the response options for frequency of each given activity were assigned a score from 0 (*never*) through to 6 (*almost every day*). We then added these values for all activities performed in-school, and the frequency of all activities performed out-of-school (i.e., those performed at home or in the neighbourhood, in an indoor arena, gym, etc., in an outdoor field, other), and divided this total by the number of activities to provide an average participation score for both in- and out-of-school.

Parental Support. This study assessed perceptions of parental support using the Parent Support Scale (Prochaska et al., 2002). It is a 5-item questionnaire designed to assess five types of support for physical activity (i.e., instrumental, conditional, companionship, motivational, informational). Participants were asked to indicate how often their mother and father each provided the types of support described. Given that parental role modelling has been linked to physical activity (Pugliese & Tinsley, 2007; Timperio et al., 2013), participants were also asked to report how often each parent does physical activity or sports herself/himself. This item has been used in previous research (Jago, Fox, Page, Brockman, & Thompson, 2009). Each of the 12 items were scored on a 5-point Likert scale ranging from 1 (*never*) to 5 (*every day*). Due to collinearity, maternal and paternal scores were combined for like items. Items were then categorized into tangible support and intangible support. To calculate the tangible support score we took the average of the instrumental, conditional, and companionship items. To calculate the intangible support score we averaged the responses for the motivational,

informational, and modelling items. This resulted in two scores (i.e., parental-tangible, parental-intangible).

There is evidence from past research to suggest that scores on this scale have internal reliability (α ≥ .85 Beets, Pitetti, & Forlaw, 2007). Evidence for score reliability was also demonstrated in the current sample for tangible (α = .78) and intangible support (α = .76). Additionally, test-retest reliability of scores on this measure have been shown to be high (intra-class correlation (ICC)= .88; Prochaska et al., 2002). Furthermore, this scale has been used frequently in studies exploring associations between parental support and youth's physical activity as seen in a recent review (see Sleddens et al., 2012).

Social Control. Two items used in previous research assessing youth's perceptions controlling parental behaviours (Wilson & Spink, 2011; Wilson, Spink, & Priebe, 2010) were used to assess parental control for physical activity. Participants were asked to describe how often each of their parents engaged in the described behaviours. Each question was scored on a 5-point Likert scale ranging from 1 (*never*) to 5 (*very often*). Scores on both items for mothers and fathers were combined to reflect total parental control, where higher scores represented higher levels of perceived parental control. The reliability of scores on this measure in past research has been found to be close to traditional cut-off values of .70 (i.e., α =.67; Wilson & Spink, 2010). Score reliability in this sample was acceptable (α = .85).

Self-Efficacy. Motl et al.'s (2000) Self-Efficacy Scale was used to assess youth's perceptions of self-efficacy for physical activity. Participants were asked to report how difficult it is for them to be physically active in eight different situations. Each item was scored on a 5-point Likert scale ranging from 1 (*very easy*) to 5 (*very difficult*). After reverse scoring items, a mean score was calculated, whereby higher scores indicate a higher level of perceived ability to engage in physical activity. Validity and reliability evidence for this measure have been reported (Barr-Anderson et al., 2007; Dishman, Saunders, Motl, Dowda, & Pate, 2009; Patnode et al., 2010). Specifically, test-retest (ICC = .80; Motl, Dishman, Saunders, Dowda, & Pate, 2007), and

internal reliability (α > .78; Barr-Anderson et al., 2007; Dishman et al., 2009; Dowda et al., 2007) have been reported. Score reliability for the current sample was acceptable (α = .90). Further, this questionnaire has been used with youth in previous research (e.g., Dishman et al., 2004; Patnode et al., 2010; Ryan & Dzewaltowski, 2002).

Enjoyment. The 7-item enjoyment subscale from the Motives for Physical Activities Measure-Revised (MPAM-R; Ryan, Frederick, Lepes, Noel, & Sheldon, 1997) was used to assess youth's enjoyment of physical activity. Participants were presented with a list of reasons why individuals typically engage in physical activities (e.g., "because I like to do this activity"). After being prompted to keep in mind the activities and sports they engage in, participants were asked to indicate how true each reason for participation is for them. Each item is rated on a 7-point Likert scale ranging from 1 (*not true at all for me*) to 7 (*very true for me*). The mean score was calculated for the subscale, whereby higher scores indicate higher levels of enjoyment. The reliability and validity of the enjoyment subscale scores have been demonstrated (i.e., α > .88; Ryan et al., 1997; Wilson, Rodgers, & Fraser, 2002; Withall, Jago, & Fox, 2011). Previous researchers have used this questionnaire when investigating physical activity of youth (e.g., Battistelli, Montani, Bertinato, Uras, & Guicciardi, 2012; Schneider & Kwan, 2013). Score reliability for this sample was acceptable (α = .88).

Translation Procedures

Considering participants were recruited from both English- and French-speaking schools for the MATCH study, all measures for the current study were translated into French if validated translations were not already available. This was the case for the measures assessing self-efficacy, parental support, and parental control. In translating the measures from English to French, the methodology outlined by Sperber (2004) was used. First, the main researcher's supervisor who is fluent in both English and French translated the measures into French. During this step, the emphasis was on conceptual (rather than literal translations), and on clear and concise formulation appropriate for the reading level of participants. Second, three bilingual

individuals edited the translated version for consistency with the English version. Third, two bilingual graduate students without access to the original version back-translated the measures into English. Fourth, the main researcher and two other individuals involved with the project compared the initial English version to the back-translated version and brought minor modifications to it to reconcile any differences among them.

Data Analysis

Preliminary analysis. Initial data analyses were performed using the Statistical Package for Social Sciences (SPSS) version 22 (IBM, 2013). First, descriptive statistics were computed for each variable. At this time, data were explored for missing values using frequency distributions and univariate outliers using z-scores (values > 3.00 indicate a possible outlier; Tabachnick & Fidell, 2007). Mahalonobis distance was used to detect multivariate outliers (i.e., values > 25 indicate possible multivariate outlier; Barnett & Lewis, 1978). In addition, data were screened to test for violations of the assumptions of linearity, normality (i.e., inspected skewness and kurtosis values where values > 2 indicate non-normality), homoscedasticity, and multicollinearity (i.e., pairwise correlations > .80 indicate potential multicollinearity, variance inflation factors with values > 10 and tolerance and condition indices with values < .01 indicate multicollinearity; Tabachnick & Fidell, 2007). Internal consistency reliability coefficients (Cronbach's alpha; Cronbach, 1951) were inspected for all measures to determine if they met minimum recommended values of .70 (Nunnally, 1978).

All data met the assumptions necessary for multivariate analysis, except for eight univariate and three multivariate outliers, and therefore, these outliers were removed. Since total missing data for all variables was less than 5% and Little's MCAR test indicated that the data were missing completely at random, estimation maximization was used to replace missing values (Dempster, Laird, & Rubin, 1977).

Main Analysis. Path analysis using robust maximum likelihood estimation was used to test the hypothesized associations between parental support and parental control, youth's self-

efficacy, enjoyment, and participation in physical activity. The two hypothesized models were tested: (1) an indirect effects model where parental support (i.e., tangible and intangible) and parental control were directly related to youth's self-efficacy and enjoyment, which in turn were directly related to youth's participation in physical activity performed in- and out-of-school, and (2) a full effects model where paths directly linked parental support and parental control to youth's participation in physical activity performed in- and out-of-school were tested in addition to the associations tested in the indirect effects model. These analyses were performed in LISERL 8.1 (Jöreskog & Sörbom, 2004) where the composite scores from each measures were used. Path analysis was chosen for a number of reasons, one of which is that it is superior to regression analysis when testing multiple dependent variables (Fairchild & MacKinnon, 2009). Further, it allows for the testing of models that include multiple mediators, both direct and indirect effects, and this method also allows for comparison between two models (Streiner, 2005).

Following the recommendations of Hu and Bentler (1999), the fit of both path models was assessed using multiple goodness-of-fit indices. Specifically, we used the following indices: Comparative Fit Index (CFI; values ≥ .95 indicate good model fit), the Root Mean Square Error of Approximation (RMSEA; values ≤ .06 indicate good model fit), and the Standardized Root Mean Square Residual (SRMR; values ≤ .08 indicate good model fit). To compare both models, AIC values were calculated for both models and the model with lower AIC was to be retained (Kline, 2010). Further, given that chi-square (χ^2) values are sensitive to sample size, these values were reported but not used to indicate model fit. Last, the strengths of the direct and indirect associations between study variables were inspected.

Chapter 4: Article

This chapter presents the submitted manuscript that emanated from the results of this Master's thesis. It has been submitted to *Psychology of Sport and Exercise* which has an impact factor of 1.89. We feel this article fits well within the scope of this international peer-reviewed journal. Note that the original submission was blinded to allow for an unbiased peer reviewed; however, we have presented the un-blinded version here. Also, note that we have formatted the article according to *Psychology of Sport and Exercise* instructions for authors.

Authors' Contributions

Erin K. Wing (BHK): Was responsible, under the direct supervision of Dr. Jennifer Brunet, for the conceptualization of this project, writing the proposal, compiled questionnaires, involved in collecting data with the MATCH study, performed data analysis, and was the primary author for this thesis and associated manuscript.

Jennifer Brunet (PhD): Was involved in every stage of the conceptualization and preparation of this thesis, provided close supervision, critical feedback, and revisions of multiple drafts of both the article and thesis document.

Mathieu Bélanger (PhD): As principle investigator of the MATCH study, Dr. Bélanger contributed largely in facilitating a platform through which the necessary data could be collected. Additionally, Dr. Bélanger provided feedback on the manuscript associated with this Master's thesis.

Parental influences and youth's participation in physical activity in- and out-of-school: The mediating role of self-efficacy and enjoyment

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Abstract

Despite the benefits of physical activity (PA), participation rates in youth remain low. Identifying modifiable factors associated with youth's participation in PA can provide information to inform behavior change interventions. We examined how parents can promote or thwart youth's participation in PA practiced in- and out-of-school, directly and indirectly via self-efficacy and enjoyment. Data collected in Spring 2014 from 602 youth (M_{age}=13.4 years; *SD*=.6) living in New Brunswick, Canada who were participating in the *Monitoring Activities of Teenagers to Comprehend their Habits* (MATCH) study were analyzed using path analysis. We found that a model in which parental support and control indirectly influenced youth's participation in PA via self-efficacy and enjoyment provided superior fit to the data [χ^2=32.63; *df*=8; RMSEA=.07, 90%CI=.05,.10; CFI=.97; SRMR=.04], compared to a model in which perceived parental support and control directly and indirectly influenced youth's participation in PA [χ^2= 22.87; *df*=2; RMSEA=.13, 90%CI=.09,.18; CFI=.97; SRMR=.03]. In our retained model, parental control negatively influenced youth's self-efficacy and enjoyment (β=-.12 to -.15), whereas parental support positively influenced youth's self-efficacy and enjoyment (β=.18 to .31). In turn, youth's self-efficacy and enjoyment positively influenced their participation in PA in- and out-of-school (β=.12 to .26). Our findings suggest parents can enhance or impede youth's self-efficacy and enjoyment, which in turn influence their participation in PA practiced in- and out-of-school. Interventions promoting parental support and reducing parental control may help to address the physical inactivity epidemic in youth by fostering two of the most salient determinants of PA in this population – self-efficacy and enjoyment.

Keywords: Enjoyment, self-efficacy, youth, physical activity, parental influences

Parental influences and youth's participation in physical activity in- and out-of-school: The mediating role of self-efficacy and enjoyment

Participation in regular physical activity promotes overall health and development in youth (Eime, Young, Harvey, Charity, & Payne, 2013; Janssen & Leblanc, 2010), and decreases the risk of chronic disease later in life (Andersen, Riddoch, Kriemler, & Hills, 2011). Despite this, participation rates in this population are low (Colley et al., 2011; Hallal et al., 2012). In Canada, only 9% of boys and girls aged 6 to 17 years meet recommended levels (ParticipACTION, 2015). Thus, research into modifiable factors associated with youth's participation in physical activity is necessary to inform the development of effective behavior change interventions.

Several psychosocial models have been developed to guide the investigation of such factors, including the social cognitive theory (Bandura, 1986) and the theory of planned behavior (Ajzen, 1991). Although different terms are used, *self-efficacy* that one can exercise control over one's actions to perform an activity and the *enjoyment* of an activity are two key constructs represented in these and many other models developed to explain individual's behavior. Empirical evidence shows that self-efficacy and enjoyment are two of the most salient determinants of physical activity which are consistently and positively associated with participation in physical activity in youth (see Sallis, Prochaska, & Taylor, 2000 for review). Consequently, it is important to identify factors that can be targeted in interventions to enhance youth's self-efficacy and enjoyment in order to increase youth's participation in physical activity.

Based on developmental perspectives (Harter, 1999) and empirical studies (Silva, Lott, Mota, & Welk, 2014; Timperio et al., 2013), parents can influence youth's self-efficacy and enjoyment. For example, parents may foster youth's self-efficacy by explicitly providing youth opportunities to be active (i.e., a process known as providing tangible support) or by giving verbal and non-verbal feedback to promote youth's belief that they are capable of

performing a given activity (i.e., a process known as providing intangible support). Furthermore, parents may promote youth's enjoyment by helping ensure youth have positive experiences in physical activity and by encouraging them to positively interpret their experiences (Fredericks & Eccels, 2004). However, the notion that parents may influence youth's participation in physical activity indirectly via self-efficacy and enjoyment has largely been ignored as most studies focused on parental support have examined the direct links between parental support and youth's participation in physical activity (Beets, Cardinal, & Alderman, 2010). Examining the indirect associations between parental support and youth's participation in physical activity via self-efficacy and enjoyment may help to clarify previous equivocal findings concerning the association between parental support and youth's participation in physical activity (Beets et al., 2010).

Studies examining the association between parental support and youth's participation in physical activity have also neglected to consider parental control. In line with developmental perspectives (Harter, 1999) and given converging evidence across various health disciplines that parental control can negatively influence youth's health behaviors such as nutrition, smoking, and participation in physical activity (Grolnick & Pomerantz, 2009; Lewis & Butterfield, 2005; Wilson & Spink, 2011), it is important to examine the ramifications of parental control on youth's self-efficacy, enjoyment, and participation in physical activity. There is preliminary evidence that parental control may negatively influence youth's participation in physical activity (Wilson & Spink, 2011). Since there have been few studies looking at these associations and even fewer investigating the underlying mechanisms, replication of these initial findings is needed to confirm these propositions as well as identify the possible mechanisms through which parental control may influence participation.

Last, past studies have mostly operationalized physical activity as a global construct (Van der Horst, Paw, Twisk, & Van Mechelen, 2007) or focused on specific intensities of physical activity (e.g., Edwardson & Gorely, 2010). Currently unknown is whether parental

support, parental control, self-efficacy, and enjoyment differentially influence youth's participation in physical activity practiced in different settings. Of particular interest is whether these factors influence participation in physical activity practiced both in- and out-of-school settings, which each have important roles to play in promoting health in youth (Eime et al., 2013). Given that schools may offer youth different opportunities to try new sports and physical activities than those available out-of-school (i.e., in the community or at home; Dagkas & Stathi, 2007), there is a need to include measures of participation in physical activity practiced in- and out-of-school.

Addressing these limitations in the literature will provide a better understanding of the associations between parental support, parental control, self-efficacy, enjoyment, and participation in physical activity practiced in- and out-of-school among youth. Therefore, we aimed to examine these complex associations among youth aged 12 to 15 years, an age when youth are establishing physical activity behaviors (Kjonniksen, Torsheim, & Wold, 2008). Specifically, we examined the direct influence of parental support (i.e., tangible and intangible) and parental control on youth's participation in physical activity practiced both in- and out-of-school, as well as the indirect influence of these variables, via self-efficacy and enjoyment, on youth's participation in physical activity in these settings.

Methods

Participants and Procedures

Data for this cross-sectional analysis were collected through self-report questionnaires, within the context of a larger, ongoing, prospective cohort study *Monitoring Activities of Teenagers to Comprehend their Habits* (MATCH). A detailed description of the MATCH study can be found elsewhere (see Bélanger et al., 2013). Briefly, participants were recruited in 2011 from grade 5 and 6 classes across New Brunswick. Schools were chosen to represent a mix of language (French, English), socioeconomic status (high, moderate, low), and geographic location (rural, urban, suburban). Data are collected every 4 months until participants graduate

from grade 12, resulting in a total of 24 survey cycles. For the current study, data from 602 youth who responded in Spring 2014 were analyzed (i.e., cycle 9), as this was the first time parental support, parental control, and self-efficacy were assessed. The MATCH study protocol was approved by the Centre Hospitalier de l'Université de Sherbrooke Ethics Committee, and further approval was obtained by the University of Ottawa Ethics Board to perform the current analysis. Informed parental consent and youth assent were obtained prior to data collection.

Measures

Sociodemographic information. Participants reported their age and sex, and parents reported their income (< $30,000; $30,000-$80,000; ≥ $80,000) and education (did not attend university; attended university) during a phone interview.

Physical activity. A 4-month physical activity recall was used to collect data on youth's participation in physical activity. Youth reported the frequency in which they participated in different physical activities outside of physical education class. Response options were *never*, *once per month or less*, *2-3 times per month, once per week*, *2-3 times per week*, *4-5 times per week*, and *almost everyday*. Contextual information regarding where the activities took place were also obtained by asking participants to indicate the location where they performed each activity most often. Response options were *at school*, *at home or in the neighbourhood*, *in an indoor arena*, *gym, etc.*, *in an outdoor field*, and *other*. This questionnaire was based on existing physical activity checklists (Kowalski, Crocker, & Kowalski, 1997; Sallis et al., 1993). However, we added 14 activities to reflect age appropriate preferences of youth in the region (Craig, Cameron, Russell, & Beaulieu, 2001), resulting in a total of 36 activities. Scores on the checklists on which the current checklist was based have shown adequate internal ($\alpha > .72$) and test-retest reliability (intra-class correlation (ICC) > .74; Janz, Lutuchy, Wenthe, & Levy, 2008; Sallis et al., 1993). Moreover, these types of checklists have been used and validated in studies with youth (e.g., Janz et al., 2008; Sallis et al., 1993). To calculate youth's physical activity scores, we summed the frequency of participation for all activities practiced in-school, and

summed the frequency of all activities practiced out-of-school (i.e., those performed at home or in the neighbourhood, in an indoor arena, gym, etc., in an outdoor field, and other).

Parental support. The Parent Support Scale (Prochaska, Rodgers, & Sallis, 2002) was used to assess youth's perceptions of parental support for physical activity. It is a 5-item questionnaire which has been used frequently in studies exploring associations between parental support and youth's participation in physical activity (Sleddens et al., 2012). It assesses five types of support: instrumental, conditional, companionship, motivational, and informational. An additional question used in previous research (Jago, Fox, Page, Brockman, & Thompson, 2009) to assess assessing parental role modeling was added since this variable has been linked to youth's physical activity and studied within the context of parental support in previous studies (Timperio et al., 2013). Participants indicated how often their mother and father each provided the six types of support. All 12 items were scored on a 5-point Likert scale ranging from 1 (*never*) to 5 (*every day*). After combining like items for mothers and fathers because of collinearity, we created a tangible support score by averaging scores for instrumental, conditional, and companionship items. Motivational, informational, and modeling were averaged and categorized to create the intangible support score. Adequate Chronbach's alpha values (α = .85-.91; Beets, Pitetti, & Forlaw, 2007) and test-retest reliability (ICC = .88; Prochaska et al., 2002) have been reported for the original scale scores. Score reliability in this study was acceptable for intangible (α = .76) and tangible support (α = .78).

Parental control. Two items employed in previous research (Wilson & Spink, 2011) were used to assess youth's perceptions of parental controlling behaviors for physical activity. Participants indicated how often they perceived their mother and their father as 'ordering' or 'nagging' them to engage in physical activity using a 5-point Likert scale ranging from 1 (*never*) to 5 (*very often*). We averaged all four scores to obtain a mean score. Score reliability in this study was acceptable (α = .85).

Self-efficacy. Motl et al.'s (2000) Self-Efficacy Scale was used to assess youth's self-efficacy beliefs specific to physical activity. Participants reported how difficult it was for them to be physically active in eight different situations. Each item was scored on a 5-point Likert scale ranging from 1 (*very easy*) to 5 (*very difficult*). After reverse scoring all items, we calculated a mean score. Higher scores reflect a higher level of perceived ability to engage in physical activity. Evidence for internal consistency for scores on this measure have been shown in past research with youth ($\alpha \geq .81$; Barr-Anderson et al., 2007; Patnode et al., 2010). Score reliability in this study was acceptable ($\alpha = .90$).

Enjoyment. The 7-item enjoyment subscale from the Motives for Physical Activities Measure-Revised (MPAM-R; Ryan, Frederick, Lepes, Noel, & Sheldon, 1997) was used to assess youth's enjoyment of physical activity. After reading a list of reasons why individuals typically engage in physical activity, participants indicated how true each reason was for them. Each item was rated on a 7-point Likert scale ranging from 1 (*not true at all for me*) to 7 (*very true for me*). We averaged all scores to obtain a mean score. Evidence of internal score reliability ($\alpha > .88$) and validity of the enjoyment subscale of the MPAM-R have been previously demonstrated (Wilson, Rodgers, & Fraser, 2002; Withall, Jago, & Fox, 2011). Score reliability in this study was acceptable ($\alpha = .88$).

Data Analysis

Initially, data were screened for missing values, outliers and violations of the assumptions for multivariate analyses, and Chronbach's alpha values (Cronbach, 1951) were computed for each multi-item measure in SPSS version 22. Next, descriptive statistics were computed for all study variables.

Path analysis using robust maximum likelihood estimation was used to test the associations between parental support, parental control, self-efficacy, enjoyment, and participation in physical activity practiced in- and out-of-school. We tested and compared two models. In Model 1, parental support (i.e., tangible and intangible) and parental control were

directly related to youth's self-efficacy and enjoyment, which in turn directly related to their participation in physical activity practiced in- and out-of-school. In Model 2, paths directly relating parental support and parental control to youth's participation in physical activity practiced in- and out-of-school were added in addition to the associations tested in Model 1. These analyses were performed in LISREL 8.1.

We assessed overall model fit using recommended goodness-of-fit indices (Hu & Bentler, 1999): Comparative Fit Index (CFI; values ≥ .95 indicate good model fit), the Root Mean Square Error of Approximation (RMSEA; values ≤ .06 indicate good model fit), and the Standardized Root Mean Square Residual (SRMR; values ≤ .08 indicate good model fit). Also, Akaike Information Criterion (AIC) values were obtained for both models and used for model selection. Specifically, the model with the smallest AIC value was selected because smaller values reflect a better model fit (Kline, 2010).

Results

Descriptive Statistics

The final sample consisted of 602 youth (55.8% girls; $M_{age=}$13.4 years, *SD*=.6). Based on data available from 192 parents, 42.4% of mothers and 34.4% of fathers attended university, and 44% of families had an annual income greater than $80,000. Missing data were minimal (less than 5% for all data used) and Little's MCAR test showed these data were missing at random. Estimation maximization was used to replace these missing values (Dempster, Laird, & Rubin, 1977). Also, all data met the assumptions necessary for multivariate analysis, except for eight univariate and three multivariate outliers. These outliers were removed. Score ranges, mean scores, standard deviations, and bivariate correlations among manifest variables are presented in Table 1.

Model Fit

All three fit indices indicated that the data provided a good fit for Model 1 [χ^2=32.63; *df*=8; RMSEA=.07, 90%CI=.05,.10; CFI=.97; SRMR=.04], whereas only two out of the three fit

indices indicated good fit of the data for Model 2 [χ^2=22.87; *df*=2; RMSEA=.13, 90%CI=.09,.18; CFI=.97; SRMR=.03]. Also, Model 1 had a slightly lower AIC value (72.63) than Model 2 (74.87). Consequently, Model 1, which only includes indirect paths from parental support and parental control to youth's participation in physical activity via self-efficacy and enjoyment, was retained and the standardized estimated parameters for this model are reported in Table 2.

As shown in Table 2, parental control was negatively associated with enjoyment (β=-.12) and self-efficacy (β=-.15). In contrast, tangible support was positively associated with enjoyment (β=.31) and self-efficacy (β=.27), and intangible support was positively associated with enjoyment (β=.18). In turn, enjoyment was positively associated with participation in physical activity practiced in- and out-of-school (β=.12 to .26), and self-efficacy was positively associated with participation in physical activity practiced in-school (β=.14).

Discussion

Physical activity is associated with numerous physical, psychological, and social health outcomes (Eime et al., 2013; Janssen & Leblanc, 2010), making it a cornerstone in the effort to enhance the health of youth. Promoting regular participation in physical activity has been a high priority for the World Health Organization (WHO, 2013) and other national health organizations (Public Health Agency of Canada, 2011) given the small proportion of youth meeting recommended levels of physical activity around the world (Colley et al., 2011; Hallal et al., 2012). In light of these realities, we focused our efforts on studying modifiable factors that can be targeted in physical activity behavior change interventions. Specifically, we examined the direct influence of parental support (i.e., tangible and intangible) and parental control on youth's participation in physical activity practiced in- and out-of-school, as well as the indirect influence of these variables on youth's participation in physical activity via self-efficacy and enjoyment. Overall, our findings suggest that youth's self-efficacy and enjoyment are positively associated with their participation in physical activity, although differences were observed depending on the setting where physical activity was practiced (i.e., in- or out-of-school). Our findings also

suggest that parents can indirectly influence youth's participation in physical activity via their influence on youth's self-efficacy and enjoyment.

In agreement with past research (Peterson, Lawman, Wilson, Fairchild, & Van Horn, 2013; Timperio et al., 2013), tangible parental support, which refers to parents explicitly facilitating physical activity, was positively associated with youth's self-efficacy and enjoyment. However, intangible parental support, which refers to parents verbal and non-verbal behaviors toward physical activity participation, was only associated with enjoyment. This may be because the latter does not remove important barriers to participation in physical activity (Trost et al., 2003), and thus does not enhance youth's perceptions of their ability to engage in the behavior. It may also be because some forms of intangible support can be perceived as overbearing (Wright, Wilson, Griffin, & Evans, 2010), much like parental control. Indeed, we found that parental control was negatively associated with youth's self-efficacy and enjoyment. These findings are consistent with past research demonstrating that overly directive parental behaviors restrict youth's autonomy, which is associated with lower self-efficacy and enjoyment, as well as less participation in physical activity (Simons-Morton & Hartos, 2002). These findings suggest it may be promising to inform parents of the benefits of providing tangible support and the negative effects controlling behaviors may have on youth's self-efficacy and enjoyment of physical activity – two key determinants of physical activity behavior (Sallis et al., 2000).

Previous studies examining the association between parental support and youth's participation in physical activity have reported equivocal findings (Beets et al., 2010). Some researchers have found parental support to be positively associated with youth's participation in physical activity (e.g., Timperio et al., 2013), whereas others have found no direct association (e.g., Hamilton & White, 2008). Such equivocal findings may relate in part to the fact that most studies explored the direct associations between these variables. Our findings regarding the non-significant direct associations, but significant indirect associations, provide evidence suggestive that parental support is indirectly associated with youth's participation in physical

activity via self-efficacy and enjoyment. Accordingly, these findings demonstrate the importance of including self-efficacy and enjoyment when investigating the associations between parental support, parental control, and youth's participation in physical activity.

Another noteworthy finding is that the cognitive variables were not associated with both contextual measures of physical activity (i.e., in-school, out-of-school). While it is clear that self-efficacy and enjoyment are related to youth's participation in physical activity in general (Sallis et al., 2000), few studies have investigated whether these factors are related to physical activity practiced in- and out-of-school. In our study, we show that enjoyment is important for participation in physical activity practiced both in- and out-of-school, but that self-efficacy may only be important for participation in physical activity practiced in-school. These unique associations highlight the value of considering the context in which youth practice physical activity. Doing so will enable researchers to more precisely identify unique predictors of youth's participation in physical activity to inform targeted interventions seeking to increase different types of participation – as both have important roles to play in promoting health in youth (Eime et al., 2013).

The limitations of this study should be considered when interpreting the findings. First, the cross-sectional design precludes the ability to draw conclusions about causality. Conclusions regarding directionality should also be interpreted with caution due to the cross-sectional nature of this study. It is possible that youth who engage in higher levels of physical activity elicit more support from their parents and/or that this participation fosters self-efficacy and enjoyment. However, the hypothesized associations tested herein were based on theoretical perspectives (e.g., the social cognitive theory, the theory of planned behavior). Second, findings may not be generalizable to youth of younger or older ages. Third, data were collected by self-report. Although necessary to gather contextual information and youth's perceptions, this method may have introduced potential biases.

Conclusion

Parents have an important role in impacting youth's self-efficacy and enjoyment of physical activity. Taken together, we suggest researchers and program administrators take into account both the positive and negative influence of parents, differentiate between specific types of parental support (i.e., tangible and intangible), and consider the context in which the physical activity is practiced. Last, we suggest that parents provide support for youth to be active while limiting controlling behaviors, in order to promote youth's perceptions of their self-efficacy and enjoyment of physical activity, in turn facilitating participation in physical activity.

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Conflict of Interest statement

The authors declare that there are no conflicts of interest.

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Table 1

Score Ranges, Means (M), Standard Deviations (SD), and Correlations among Manifest Variables

Variable	Range	M	SD	Correlations						
				SE	ENJ	INPA	OUTPA	PC	IPS	TPS
SE	1-5	3.75	.94	1.00	–	–	–	–	–	–
ENJ	1-7	5.26	1.33	.12	1.00	–	–	–	–	–
INPA	0-6	1.60	2.00	.15	.14	1.00	–	–	–	–
OUTPA	0-7	3.29	1.46	.10	.27	.05	1.00	–	–	–
PC	1-5	1.92	1.06	-.10	-.02	.02	-.01	1.00	–	–
IPS	1-5	3.42	1.07	.17	.39	.07	.11	.23	1.00	–
TPS	1-5	3.27	1.07	.24	.42	.09	.13	.19	.75	1.00

**Note.* SE = Self-efficacy; ENJ = Enjoyment; INPA = In-school physical activity; OUTPA = Out-of-school physical activity; PC = Parental control; IPS = Intangible parental support; TPS = Tangible parental support. Data were collected in Spring, 2014 in New Brunswick, Canada.

Table 2

Associations between Parental Control, Parental Support, Self-Efficacy, Enjoyment, and Physical Activity Practiced In- and Out-of-School of Model 1

Variable	***B***	***SE B***	**β**	***T*-value**
PC → SE	-.13	.04	-.15	-3.65
PC → ENJ	-.15	.05	-.12	-3.18
IPS → SE	-.01	.05	-.01	-.10
IPS → ENJ	.22	.07	.18	3.16
TPS → SE	.24	.05	.27	4.58
TPS → ENJ	.39	.07	.31	5.62
SE → INPA	.29	.09	.14	3.39
SE → OUTPA	.11	.06	.07	1.79
ENJ → INPA	.19	.06	.12	3.09
ENJ → OUTPA	.29	.04	.26	6.63

**Note.* SE = Self-efficacy; ENJ = Enjoyment; INPA = In-school physical activity; OUTPA = Out-of-school physical activity; PC = Parental control; IPS = Intangible parental support; TPS = Tangible parental support *B* = unstandardized beta; *SE B* = standard error; β = standardized beta. *T*-values ≥ 1.96 indicate statistical significance. Data were collected in Spring, 2014 in New Brunswick, Canada.

Chapter 5: General Discussion

Youth is a critical period for promoting participation in physical activity since it functions to maintain optimal growth and development (Flynn et al., 2006; Strong et al., 2005), and establishes physically active lifestyle habits and attitudes that may follow into adulthood (Kjonniksen et al., 2008; Wall et al., 2011). Unfortunately, national health surveys (e.g., Colley et al., 2011) have shown that the majority of Canadian youth fail to participate in sufficient amounts of physical activity to reap the associated health benefits. Therefore, there is a critical need for research into the factors that can be modified to promote participation in physical activity for youth. Self-efficacy and enjoyment are two of the most salient determinants of youth's physical activity behaviour (Sallis et al., 2000), and for that reason are promising variables to target in behaviour change interventions. Further, parental support is an interpersonal factor that can influence the likelihood that youth will participate in physical activity, as well as influence youth's self-efficacy and enjoyment of physical activity (Silva, Lott, Mota, & Welk, 2014; Timperio et al., 2013). Alternatively, parental control may have the opposite effect and decrease the likelihood youth will participate in physical activity, and thwart their self-efficacy and enjoyment (Simons-Morton & Hartos, 2002). These influences may be particularly relevant for youth since parents are highly responsible for establishing youth's social environment (Gustafson & Rhodes, 2006). As such, we tested two models where we examined the direct influence of parental support (i.e., tangible and intangible) and parental control on youth's participation in physical activity performed both in- and out-of-school, as well as the indirect influence of these variables via self-efficacy and enjoyment on youth's participation in physical activity. In our study, youth's perceptions of parental support were positively related to their self-efficacy and enjoyment of physical activity, whereas their perceptions of parental control were negatively related to their self-efficacy and enjoyment of physical activity. In turn, enjoyment was positively associated with youth's participation in physical activity performed in- and out-of school, and self-efficacy was positively associated with youth's participation in-school. As such, promoting supportive

and reducing controlling behaviours from parents may be effective strategies to increase youth's participation in physical activity.

Associations between Self-Efficacy, Enjoyment, and Youth's Participation in Physical Activity

Self-efficacy that one can exercise control over one's actions to perform an activity and the enjoyment of an activity are two constructs that have been consistently linked with youth's participation in physical activity (see Sallis et al., 2000 for review). In general, our findings confirm the importance of these factors and past empirical research (Beets, Cardinal, & Alderman, 2010; Gustafson & Rhodes, 2006), as self-efficacy and enjoyment were positively associated with youth's participation in physical activity. They also offer support to social cognitive perspectives (Bandura, 1986), which propose that social influences can impact individual cognitions, which in turn influence behaviour. In this study, we also extend this knowledge and specify the location in which physical activity is performed. Indeed, few studies have investigated whether youth's self-efficacy and enjoyment are related to participation in physical activity performed in different settings, namely in- and out-of-school. It is important to determine if youth's self-efficacy and enjoyment influence participation in physical activity performed in- and out-of-school because this will allow researchers to develop more specifically targeted interventions. Our findings showed that youth's self-efficacy and enjoyment have different associations with physical activity performed in two different settings. Specifically, we found that enjoyment was related to participation in physical activity performed both in- and out-of-school, but that self-efficacy was only related to participation in physical activity performed in-school. There are several explanations for why youth's self-efficacy was not associated with their physical activity performed out-of-school. It could be that even though youth may be efficacious in their ability to participate in physical activity, they may have lacked opportunities to be active or have experienced barriers that prevented them from being active. In support of this contention, Lareau (2011) noted that some youth have constraints which restrict their

opportunities for participation in physical activity performed out-of-school, including competing demands on their time such as other extracurricular activities, hobbies, volunteering, and homework. Moreover, there may be additional barriers to physical activity performed out-of-school compared to in-school that are harder for youth to overcome, such as the variety, costs, and proximities of activities offered close to the youth's home (Bouffard et al., 2006). Furthermore, there may be other important personal facilitators such as youth's knowledge, attitudes, and motivation (Bandura, 1986) that might be more salient for participation in physical activity performed out-of-school. As such, more research is needed to test these potential explanations.

Nevertheless, the unique associations we observed from youth's self-efficacy and enjoyment to participation in- and out-of-school in youth highlight the value of considering the setting in which youth perform physical activity. As physical activity performed both in- and out-of-school have important roles to play in promoting health in youth (Eime et al., 2013), continued research looking at these two settings have important implications. Doing so will enable researchers to more precisely identify unique predictors of youth's participation in physical activity to inform targeted interventions seeking to increase different types of participation in physical activity.

Associations between Parental Support, Parental Control, and Youth's Participation in Physical Activity

Youth's perceptions of parental support were generally positively associated with youth's self-efficacy and enjoyment of physical activity. Specifically, we found that tangible parental support, which involves parental behaviours that directly facilitate participation in physical activity for youth, was positively associated with self-efficacy and enjoyment. This finding is in agreement with past research (Brunet et al., 2014; Peterson, Lawman, Wilson, Fairchild, & Van Horn, 2013; Timperio et al., 2013). This might be because through tangible supports such as when parents provide transportation, pay fees for sports, and supervise during physical activity,

parents are able to provide opportunities for youth to be active, and by participating in activities with youth they can help ensure positive experiences. These increased opportunities and positive experiences may increase youth's beliefs in their ability to perform activity (i.e., self-efficacy) and may also help to ensure youth enjoy physical activity, both of which are important to increase or maintain participation in physical activity for youth (DiLorenzo, Study-Ropp, Vander Wal, & Gotham, 1998). Overall our findings suggest it may be especially beneficial for parents to endorse tangible forms of support in order to enhance youth's self-efficacy and enjoyment which are related to participation in physical activity.

On the other hand, intangible parental support, which refers to parents' verbal and non-verbal behaviours in relation to physical activity, was positively associated with enjoyment, but not self-efficacy. This finding is in line with previous research demonstrating parents' role as socializers can promote positive exposure to physical activity to instil positive attitudes and increase youth's enjoyment of physical activity through positive reinforcement, helping understand the benefits of physical activity, and demonstrating their own physical activity (Bois et al., 2005; Pugliese & Tinsley, 2007). These intangible supportive behaviours (i.e., encouragement, providing information, parental role modelling) may not be as effective to promote self-efficacy for youth compared to tangible supports. This may be because the intangible forms of support do not remove important barriers to participation in physical activity (Trost et al., 2003), and thus does not enhance youth's perceptions of their ability to participate in physical activity. It may also be because some forms of intangible support can be perceived by youth as overbearing (Wright et al., 2010), much like parental control.

Indeed, we found that parental control was negatively associated with youth's self-efficacy and enjoyment. This is consistent with past findings that demonstrated controlling behaviours perceived by youth as overly directive actually restrict their perceptions of autonomy (Simons-Morton & Hartos, 2002), negatively affecting their self-efficacy and enjoyment. For instance, a reduced perception of autonomy and personal choice can attenuate youth's self-

efficacy and enjoyment because they feel pressured to engage in activities they may not feel sufficiently capable of, or enjoy doing (Lewis et al., 2002; Roemmich et al., 2012). According to Erikson (1968), gaining autonomy for youth is a developmental need that serves to enhance youth's identity, and high levels of control can hinder the development of autonomy and may create conditions where future participation in physical activity is less likely. Moving forward, based on the findings of this study as well as wider literature interventions should seek to increase autonomy supportive environments and include strategies to inform parents of the potential negative, albeit likely well-intentioned, influence they may have for participation in physical activity for youth. For instance, interventions could encourage open communication between parents and youth in an attempt to limit youth's perceptions of parental control, and help them interpret their parent's behaviours as supportive rather than controlling. Further, from a self-determination perspective (Deci & Ryan, 1985) it is important for parents to include youth in decisions made with regard to their participation in physical activity to encourage autonomy supportive environments, which may foster youth's self-efficacy and enjoyment, are known to increase the likelihood of participation in physical activity (Roemmich et al., 2012).

There were no significant direct relationships observed between parental support or parental control and youth's participation in physical activity. However, these findings offer evidence to suggest that the relationship between parental support and parental control, and youth's physical activity may be indirect. This suggestion is in line with a number of studies that also found indirect relationships between parental support and youth's participation in physical activity (Silva et al., 2014; Timperio et al., 2013). Further, these findings help provide some clarity to inconsistencies in past research. Previous studies examining the association between parental support and youth's participation in physical activity have reported equivocal findings (Beets et al., 2010; Gustafson & Rhodes, 2006; Mendonça et al., 2014). Some researchers have found parental support to be positively associated with youth's participation in physical activity (Davison et al., 2003; Springer et al., 2006; Timperio et al., 2013), whereas others have

found no direct association (Hamilton & White, 2008; Timperio et al., 2013; Wu et al., 2003). Such equivocal findings may relate to most studies having explored only direct associations between these variables. Our findings regarding a non-significant direct association, yet significant indirect associations provide evidence suggestive that parental support indirectly influences youth's participation in physical activity through self-efficacy and enjoyment. Accordingly, these findings demonstrate the importance of including self-efficacy and enjoyment when investigating the associations between parental support, parental control, and youth's participation in physical activity.

Last, in line with our hypotheses, the indirect associations observed between parental influences and youth's participation were of moderate magnitude for out-of-school physical activity participation and of weak magnitude for in-school physical activity participation. Although preliminary, this latter finding contrasts past research which found parental influence did not extend to youth during school (Spence & Lee, 2003). While youth may have more proximal influences on their self-efficacy and enjoyment while at school, findings from this study would suggest that while the association with parental support and parental control is of a weak magnitude, these influences do extend to youth in-school. These findings suggest it is useful to distinguish between different settings youth participate in physical activity. As well, they highlight the important role parents play in establishing youth's health behaviours across various contexts.

Limitations and Future Research Directions

While this study has many strengths and can offer a number practical implications for those interested in the associations between parental support and/or parental control, and youth's participation in physical activity, it is important to consider the findings of this study within the context of its limitations. First, the cross-sectional design precludes the ability to draw conclusions about causality. Conclusions regarding directionality should also be interpreted with caution due to the cross-sectional nature of the analysis. It is possible that youth who participate

in higher levels of physical activity elicit more support from their parents, and it could be this participation that increases their self-efficacy and enjoyment. These findings highlight the importance of conducting longitudinal studies to confirm the directionality of these associations and potential reciprocal effects between parental support, parental control, youth's self-efficacy and enjoyment, and participation in physical activity. Using these designs will also allow researchers to explore potential changes in the associations between parental support and parental control and youth's participation in physical activity over time. Further, developing and testing interventions, which include a wider assessment of parental influence (i.e., specific types, valance) and consider the context of physical activity, will enable the refinement of programs to create effective physical activity promotion methods.

A second limitation of our study is the generalizability of our findings. Since this sample was collected from youth within a small age range and geographical location, this sample may not be representative of youth living in other locations, of different cultures, or ages. Third, information on study variables were provided by self-report measures, although necessary to gather contextual information, this method may have introduced potential biases.

Last, data regarding participants' height and weight were not collected and consequently were not included in the analysis. In the future, it may be beneficial to account for physiological and developmental factors such as body mass index and puberty status of youth which may act as confounding variables. These physiological factors may alter the associations observed between parental influences and participation in physical activity for youth (Brunet et al., 2014; Davison, Werder, Trost, Baker, & Birch, 2007). Further, we did not conduct sex-specific analyses as there was no theoretical rationale to suspect that different associations would emerge for boys and girls. In lieu, we tested a model controlling for sex. This did not significantly influence the pattern of results. Nevertheless, as there have been differences observed in past research highlighting differences between determinants of physical activity participation

between boys and girls (Sallis et al., 2000; Wright et al., 2014), we suggest further considerations of sex may be important for continued investigation.

Contributions to the Literature

This study makes a number of contributions to the current literature investigating modifiable factors associated with youth's participation in physical activity. First, we help to clarify past equivocal findings where some researchers have found direct relationships between parental support and youth's physical activity, and others have found no direct relationship (Beets et al., 2010). Rather, we propose that this relationship is indirect, and that parental support and parental control may impact youth's participation in physical activity through their self-efficacy and enjoyment. We provide evidence for this proposition by testing the hypothesized associations within a single statistical model to determine which modifiable factors were significantly associated with youth's participation in physical activity. In doing so, we were also able to directly compare two plausible models – an indirect effects model in which parental support and parental control were indirectly associated with youth's participation in physical activity via self-efficacy and enjoyment, and a full effects model which also includes direct associations between parental support and parental control and youth's participation in physical activity. We can more confidently suggest that the associations between parental support and parental control with youth's participation in physical activity may be indirect for two main reasons. First, by showing non-significant direct paths from parental support and parental control to youth's participation in physical activity within the full effects model. Second, when comparing these two models we found the indirect effects model, which suggests parental support and parental control are associated with youth's physical activity only through youth's self-efficacy and enjoyment, was a better fit for our data. Thus demonstrating the important role parents can play to foster positive perceptions of self-efficacy and enjoyment of physical activity to promote participation in physical activity for youth.

Further, we differentiate between two types of parental support (i.e., tangible, intangible). Considering that both types of parental support were not associated with youth's self-efficacy and enjoyment, we suggest it is necessary to delineate between different types of support when investigating the influence parents have on youth's participation in physical activity. As parental support (i.e., tangible, intangible) and parental control were generally associated with self-efficacy and enjoyment positively and negatively respectively, it is therefore, also important to further delineate between these positive and negative influences parents have on youth's cognitions. Moreover, most researchers have used global measures of physical activity which may not allow for the identification of unique associations of parental support and parental control with youth's cognitions and their participation in physical activity. Thus, we considered the setting in which youth perform physical activity in order to more precisely identify unique correlates of participation in physical activity for youth in- and out-of-school.

Practical Recommendations

Based on the present findings, extent literature (Roemmich et al., 2012; Vierling et al., 2007) and existing theoretical frameworks like self-determination theory (Deci & Ryan, 1985), there are a number of specific strategies that program administrators could encourage parents to use to foster their child's self-efficacy and enjoyment for physical activity. First and foremost, have parents create an autonomy support environment by allowing youth to make decisions regarding their physical activity. Alternatively, parents can provide a list of choices from which youth may choose from. Parents should help to foster a sense of responsibility for youth to learn to how to incorporate physical activity into their lives. Creating an open two-way dialogue in which parents use language that emphasize personal choice, ask open ended questions, and employ active listening techniques to ensure youth feel that their opinions matter. Once this dialogue has been established parents have an opportunity to educate youth as to why physical activity is important and can also have a chance to engage youth to problem solve potential strategies to overcome barriers impeding their participation in physical activity. Along these lines

parents should also provide praise to proactive attempts by youth to be active rather than mere compliance with parental demands. Parents should also avoid strategies which may be perceived as coercive such as performance derived rewards or comparisons to other youth. A final strategy may be for parents to participate in activities together or teach youth a new skill or activity to enhance youth's perceptions of competence and enjoyment.

In addition to the aforementioned strategies, in an effort to cumulate these suggested strategies and translate our research findings into real world applications we put forth recommendations which echo the sentiments of a recent position statement released by ParticipACTION (2015). This position statement advocates for increased opportunities for youth to engage in self-directed active outdoor play that may take place in any setting (e.g., home, school, childcare, community, nature). Play allows youth to engage in activities for the purposes of enjoyment and fun while obtaining the physical, psychological, and social benefits of physical activity. Further, this method of physical activity promotion, which is well aligned with the tenants of self-determination theory by fostering an autonomy supportive environment allowing youth to choose the activities they engage in. This strategy is likely to foster both self-efficacy and enjoyment that can be implemented both in- and out-of-school in a cost effective manner.

Conclusion

Based on the current study, both parental support and parental control seem to play important role in promoting or thwarting participation in physical activity of youth. While parents may not directly impact behaviour based on our findings, their influence has important indirect implications in that parents can effect youth's self-efficacy and enjoyment of physical activity, which in turn are important factors for participation in physical activity for youth. Taken together, we suggest researchers and program administrators consider both the positive and negative influence of parents, differentiate between specific types of parental support (i.e., tangible and intangible), and take into account the setting in which the physical activity is performed. Last, we

suggest that parents provide support for youth to be active, while limiting controlling behaviours, in order to promote an autonomy supportive environment and foster youth's perceptions of self-efficacy and enjoyment of physical activity, and in turn facilitate participation in physical activity. We put forward these recommendations to inform the continued development of effective behaviour change interventions seeking to increase the number of youth who are able to obtain the numerous physical, psychological, and social benefits by being physically active.

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Figure 1: Hypothesized Model

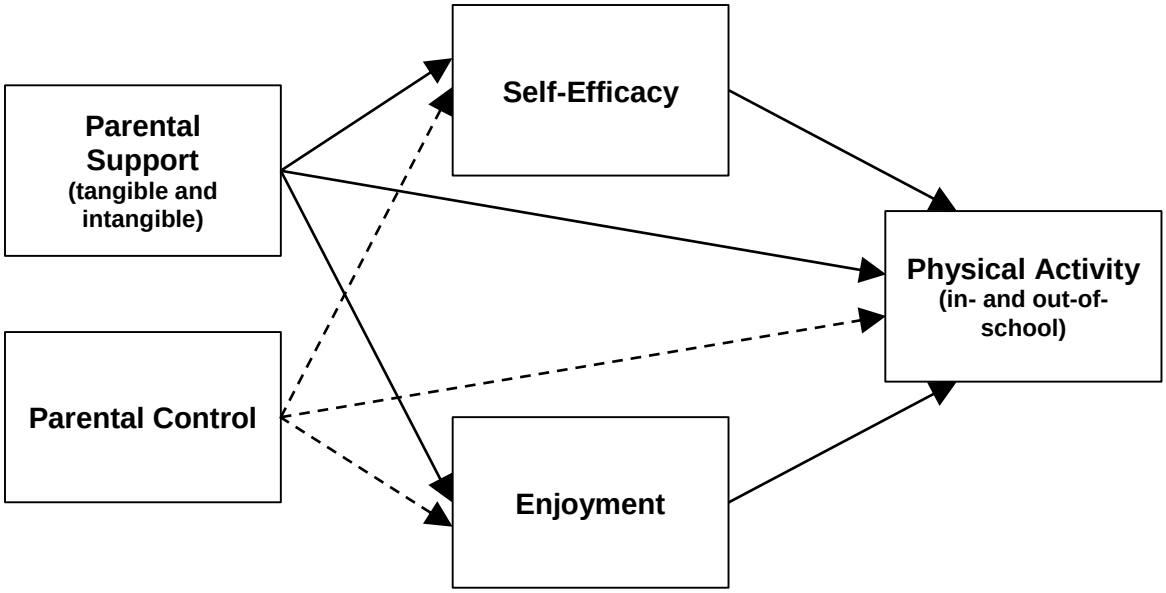

Figure 1. Hypothesized Associations between Parental Support, Parental Control, Self-Efficacy, and Physical activity in the Full Effects Model
Note:* **— indicates a positive association; --- indicates a negative association

Appendix A: Consent and Ascent Form

CENTRE DE FORMATION MÉDICALE DU NOUVEAU-BRUNSWICK

PROJET MATCH PROJECT

Dear Parent/Guardian,

Your child's class has been selected to take part in the MATCH (Measuring Youth Activities to Comprehend their Habits) research project. This project will allow us to better understand the reasons that bring youth to participate or not in different types of physical activity. This will lead to the development of interventions that will aim to improve the health of children.

The study is aimed at students in grade 5 and 6 of 15 schools in New Brunswick. This project has two components, here are the details:

- PART 1 : Questionnaire. We will ask your child to fill a questionnaire lasting about 30 minutes three times a year throughout their academic progress (possibly until grade 12).
    - The questionnaires will be administrated in the fall, winter and spring of each year during school hours.
    - We need answers from as many students as possible (regardless of their level of physical activity).
    - The questions raised in the study inquire about the types of physical activity performed, opinions, experiences and feelings of students towards physical activity. This questionnaire has only multiple choice questions.
- PART 2 : Individual interviews. It is possible that we ask permission to interview your child regarding the reasons behind the continuation or discontinuation of physical activity.
    - This interview should take about 30-45 minutes and will take place during school hours with the permission of the teacher.
    - Interviews will be repeated every year for the duration of the study.
    - You will receive a call if your child is selected to participate in the interview. You will also be asked to participate in a telephone interview lasting about 10 minutes.

Both your school district and school principal fully support this project and have agreed that your child's class can participate. However your child's participation is completely voluntary and it is entirely up to you. Time spent on this research meets the youth's school curriculum and, therefore, will not cause any delay for those who decide to participate. Your child will not be liable to any penalty if he doesn't participate and you may decide to withdraw him or her from the study at any time. In the case of a refusal to consent to participate, your child may still remain in class but will be busy with other school activities under the supervision of the teacher.

Your child's answers will be strictly confidential. Be assured that no publication or scientific communication will contain information that can identify him or her.

This project will lead to important information to better intervene with youth. There is no risk associated with participation in this project. We obtained approval from the *Comité d'éthique de la recherche en santé chez l'humain* of the *Centre Hospitalier Universitaire de Sherbrooke* (CHUS) to pursue this study. If you want to contact a member of that comity, you can call the following number (819) 346-1110, ext. 12856.

Thank you for taking the time to learn about this project. If you have any questions about this study, you can contact Isabelle Caissie, at (506) 863-2266 or match.study@gmail.com.

Sincerely,

Mathieu Bélanger, PhD
Principal Investigator

Isabelle Caissie, MSc.
Research Coordinator

Version : November 1, 2011

CÉR chez l'humain du CHUS
APPROUVÉ novembre 2011 80

Appendix B: Ethics approval – University of Sherbrooke

CHUS
Centre hospitalier universitaire de Sherbrooke

COMITÉ D'ÉTHIQUE DE LA RECHERCHE EN SANTÉ CHEZ L'HUMAIN

Le 12 mai 2011

Pr Mathieu Bélanger
Centre de formation médicale du Nouveau-Brunswick

OBJET: Projet # **11-025**
Mesurer les Activités des jeunes pour Comprendre leurs Habitudes: Le Projet MATCH.

Pr Bélanger ,

Le Comité d'éthique de la recherche en santé chez l'humain du Centre Hospitalier Universitaire de Sherbrooke a évalué le protocole de recherche ainsi que les documents afférents à l'étude citée en objet de la lettre. La présente est pour vous informer que le CÉR a approuvé votre projet. À cet effet, veuillez trouver ci-joint le formulaire d'approbation.

Le cas échéant, veuillez également trouver ci-joint le formulaire de consentement approuvé par le CÉR et portant son sceau d'approbation. Vous devez utiliser des photocopies de ce formulaire pour obtenir le consentement des sujets.

Espérant le tout à votre convenance, je vous prie d'agréer mes sentiments distingués.

Marcelle Monette Ph. D.
Présidente du comité

Téléphone: 819 346-1110, poste 12856
Télécopieur: 819 820-6498
Courrier électronique: ethique.chus@ssss.gouv.qc.ca
Site WEB: www.crc.chus.qc.ca

HÔPITAL FLEURIMONT
3001, 12è Avenue Nord
Bureau Z5-3014
Sherbrooke (Québec) J1H 5N4

APPROBATION ET ATTESTATION

Comité d'éthique de la recherche en santé chez l'humain du Centre hospitalier universitaire de Sherbrooke

MEMBRES DU COMITÉ :

APRIL Marie-Josée, Ph.D. rep. en éthique, FMSS, v.-présidente
BERNIER, Louise, juriste, extérieur
BOUFFARD, Nicole, représentante scientifique, v.-présidente
BRISSON, Sophie, avocate, extérieur
BRODEUR, Louise, représentante du public
CHAÂLALA, Chiraz, MD, neurochirurgienne, CHUS
CISSÉ, Aboubacar, professeur, FMSS
CLICHE, Jocelyne, représentante du public / droit
CLOUTIER, Sylvie, pharmacienne, CHUS
CLOUTIER, Yvan, représentant en éthique, extérieur
CÔTÉ, Anne-Marie, MD, néphrologue, CHUS
CYR, Claude, MD, pédiatre, CHUS
DESPATIS, Marc-Antoine, MD, chirurgie vasculaire, CHUS
GAGNÉ, Ginette, représentante du publie
GRÉGOIRE, Nathalie, avocate, extérieur
JETTÉ, Sylvie, Ph.D., infirmière, FMSS
LEBLOND, Julie, pharmacienne, CHUS
MÉNARD, Julie, Ph. D. représentante scientifique, CRC
MONETTE, Marcelle, Ph.D. rep. en éthique / scientifique, Présidente
POIRIER, Marie-Sol, M.Sc (c), représentante en éthique / scientifique
ROBERGE, Jean-Pierre, représentant du public
ROUSSEAU, Marie-Pierre, pharmacienne, CHUS
SAVARD, Anne-Marie, avocate, extérieur

En raison de son implication dans le projet de recherche, la personne suivante, membre du comité d'éthique, n'a pas participé à son évaluation ou à son approbation : S/O

Approbation demandée par: Pr Mathieu Bélanger

Pour le projet # 11-025

Mesurer les Activités des jeunes pour Comprendre leurs Habitudes: Le Projet MATCH.

Approbation donnée en réunion plénière du comité le 05 avril 2011 pour 12 mois.

☒ Protocole complet : MATCH sur demande de fonds

☐ Formulaire de consentement principal 3 mars 2011 version 2 février 2011 fr. et ang. à modifier

☐ Autre formulaire de consentement :

☐ Questionnaire(s) : pour les élèves, pour les parents, pour les écoles; v. franç. et angl. (à modifier)

☐ Amendement # : . Date amendement :

☐ Autre : version française et anglaise de: bulletins d'information; instruction à lire devant la classe, lettre au directeur d'école; résumé du projet (à modifier)

Brochure /Monographie reçue pour évaluation:

En ce qui concerne l'essai clinique visé, à titre de représentant du Comité d'éthique de la recherche, je certifie que:
1. La composition de ce comité d'éthique satisfait aux exigences pertinentes prévues dans le titre 5 de la partie C du Règlement sur les aliments et drogues.
2. Le comité d'éthique de la recherche exerce ses activités de manière conforme aux bonnes pratiques cliniques, et
3. Ce comité d'éthique a examiné et approuvé le formulaire de consentement et le protocole d'essai clinique qui sera mené par le chercheur susmentionné, au lieu d'essai indiqué. L'approbation et les opinions du présent comité ont été consignées par écrit.

12 mai 2011

Signé par: **Marcelle Monette Ph. D.** **Présidente du comité** **Date de la signature**

Appendix C: Ethics Approval – University of Ottawa

Numéro de dossier: H10-14-22 **Date (mm/jj/aaaa):** 11/20/2014

Université d'Ottawa University of Ottawa
Bureau d'éthique et d'intégrité de la recherche Office of Research Ethics and Integrity

Certificat d'approbation éthique

CÉR Sciences et science de la santé

Chercheur principal / Superviseur / Co-chercheur(s) / Étudiant(s)

Prénom	Nom de famille	Affiliation	Rôle
Mathieu	Bélanger	Autres / Autres	Chercheur principal
Jacinthe	Beauchamp	Autres / Autres	Co-chercheur
Jennifer	Brunet	Sciences de la santé / Activité physique	Co-chercheur
Jennifer	O'Loughlin	Autres / Autres	Co-chercheur
Jean-François	Richard	Autres / Autres	Co-chercheur
Catherine	Sabiston	Autres / Autres	Co-chercheur
Erin Katherine	Wing	Sciences de la santé / Activité physique	Étudiant-chercheur

Numéro du dossier: H10-14-22

Type du projet: Thèse de maîtrise

Titre: Effect of parental social support and social control on the physical activity participation of youth

Date d'approbation (mm/jj/aaaa)	Date d'expiration (mm/jj/aaaa)	Approbation
11/20/2014	11/19/2014	Ia

(Ia: Approbation complète, Ib: Autorisation préliminaire de libération de fonds de recherche)

Conditions Spéciales / Commentaires:
N/A

550, rue Cumberland 550 Cumberland Street
Ottawa (Ontario) K1N 6N5 Canada Ottawa, Ontario K1N 6N5 Canada
(613) 562-5387 • Téléc./Fax (613) 562-5338
http://www.recherche.uottawa.ca/deontologie/ http://www.research.uottawa.ca/ethics/index.html

Numéro de dossier: H10-14-22 **Date (mm/jj/aaaa):** 11/20/2014

Université d'Ottawa University of Ottawa
Bureau d'éthique et d'intégrité de la recherche Office of Research Ethics and Integrity

La présente confirme que le Comité d'éthique de la recherche (CER) de l'Université d'Ottawa identifié ci-dessus, opérant conformément à l'Énoncé de politique des Trois conseils et toutes autres lois et tous règlements applicables de l'Ontario, a examiné et approuvé la demande d'approbation éthique du projet de recherche ci-nommé. L'approbation est valide pour la durée indiquée plus haut et est sujette aux conditions énumérées dans la section intitulée "Conditions Spéciales / Commentaires".

Lors de l'étude, le protocole ne peut être modifié sans approbation préalable écrite du CER sauf si le sujet doit être retiré en raison d'un danger immédiat ou s'il s'agit d'un changement ayant trait à des éléments administratifs ou logistiques de l'étude comme par exemple un changement de numéro de téléphone. Les chercheurs doivent aviser le CER dans les plus brefs délais de tout changement pouvant augmenter le niveau de risque aux participants ou affecter considérablement le déroulement du projet. Ils devront aussi rapporter tout évènement imprévu et / ou dommageable et devront soumettre toutes les nouvelles informations pouvant nuire à la conduite du projet et/ou à la sécurité des participants. Toutes modifications apportées au projet, aux lettres d'information / formulaires de consentement ainsi qu'aux documents de recrutement doivent être soumises pour approbation à ce Service en utilisant le document intitulé "Modification au projet de recherche" au: http://www.recherche.uottawa.ca/deontologie/formulaires.html.

Veuillez soumettre un rapport annuel au responsable de l'éthique de la recherche, quatre semaines avant la date d'échéance indiquée afin de fermer le dossier ou demander un renouvellement de l'approbation éthique. Le document nécessaire est disponible en ligne au:
http://www.recherche.uottawa.ca/deontologie/formulaires.html.

Pour toutes questions, vous pouvez communiquer avec le bureau d'éthique en composant le poste 5387 ou en nous contactant par courriel à: ethique@uOttawa.ca.

Germain Zongo
Responsable de l'éthique de la recherche
Pour Dr. Daniel Lagarec, président du CÉR en Sciences de la santé et Sciences

550, rue Cumberland 550 Cumberland Street
Ottawa (Ontario) K1N 6N5 Canada Ottawa, Ontario K1N 6N5 Canada
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http://www.recherche.uottawa.ca/deontologie/ http://www.research.uottawa.ca/ethics/index.html

Appendix D: Demographic Information Collected from Parents

Questionnaire for parents

PROJET MATCH PROJECT

Hello, can I talk to a parent or guardian of [name of child]?

My name is _____. I'm calling regarding the MATCH project. It's a study on physical activity to which your child's [name of child] school is participating. We went to your child school and have administrated questionnaires to students in his/her class. We would now like to ask you few questions to help us with this study.

You do not need to answer all the questions and there will be no consequences if you decide not to do it. You can also decide to answer certain questions but not others. In all, the questionnaire should take about 10 minutes.

The information collected and the questionnaires will be **strictly confidential**.

Do you agree to respond to the questionnaire?

Thank you for your collaboration!

Today's date: / /**2012**
day month year

1. What is the highest level of education of the parents (father)?

- ☐ No certificate, Diploma or Degree
- ☐ High School Certificate or equivalent
- ☐ Apprenticeship or trades Certificate/Diploma
- ☐ College or other non-university Certificate or Diploma
- ☐ University Certificate or Diploma below Bachelor's Degree
- ☐ Bachelor's Degree
- ☐ Master's or Doctorate Degree
- ☐ Other:

2. What is the highest level of education of the parents (mother)?

- ☐ No certificate, Diploma or Degree
- ☐ High School Certificate or equivalent
- ☐ Apprenticeship or trades Certificate/Diploma
- ☐ College or other non-university Certificate or Diploma
- ☐ University Certificate or Diploma below Bachelor's Degree
- ☐ Bachelor's Degree
- ☐ Master's or Doctorate Degree
- ☐ Other:

3. What is your best estimate of the total income, before taxes and deductions, of all household members from all sources in the past 12 months?

- ☐ Less than $5,000
- ☐ More than $5,000 but less than $10,000
- ☐ More than $10,000 but less than $15,000
- ☐ More than $15,000 but less than $20,000
- ☐ More than $20,000 but less than $30,000
- ☐ More than $30,000 but less than $40,000
- ☐ More than $40,000 but less than $50,000
- ☐ More than $50,000 but less than $60,000
- ☐ More than $60,000 but less than $80,000
- ☐ More than $80,000
- ☐ Don't know

PROJET MATCH PROJECT

Bonjour, puis-je parler à un parent ou tuteur de [nom de l'enfant]?

Mon nom est _____. Je vous appelle concernant le projet MATCH. C'est une étude sur l'activité physique à laquelle l'école de votre enfant [nom de l'enfant] participe. Nous avons été à l'école de votre enfant et avons administré des questionnaires aux élèves de sa classe. Nous aimerions maintenant vous poser quelques questions pour nous aider avec cette étude.

Vous n'avez pas besoin de répondre à toutes les questions et il n'y aura pas de conséquence si vous ne le faites pas. Vous pouvez aussi décider de répondre à certaines questions et pas à d'autres. En tout, le questionnaire devrait prendre environ 10 minutes.

L'information collectée ainsi que les questionnaires seront **strictement confidentiels**.

Est-ce que vous acceptez de répondre au questionnaire?

Merci de votre collaboration!

Date d'aujourd'hui: / /**2012**
jour mois année

1. Quel est le niveau d'éducation le plus élevé des parents (père)?

☐ Aucun diplôme ou certificat d'études secondaires
☐ Diplôme d'étude secondaire ou l'équivalent
☐ Diplôme ou certificat de métier ou d'apprenti
☐ Diplôme ou certificat non universitaire (collège communautaire ou CEGEP
☐ Certificat ou diplôme universitaire inférieur au baccalauréat
☐ Baccalauréat
☐ Maîtrise ou doctorat
☐ Autre:

2. Quel est le niveau d'éducation le plus élevé des parents (mère)?

☐ Aucun diplôme ou certificat d'études secondaires
☐ Diplôme d'étude secondaire ou l'équivalent
☐ Diplôme ou certificat de métier ou d'apprenti
☐ Diplôme ou certificat non universitaire (collège communautaire ou CEGEP)
☐ Certificat ou diplôme universitaire inférieur au baccalauréat
☐ Baccalauréat
☐ Maîtrise ou doctorat
☐ Autre:

3. Quelle est votre meilleure estimation du revenu total, avant impôts et déductions, de tous les membres du ménage provenant de toutes sources au cours des 12 derniers mois?

☐ Inférieur à $5,000
☐ Plus de $5,000, mais inférieur à $10,000
☐ Plus de $10,000, mais inférieur à $15,000
☐ More than $15,000 but less than $20,000
☐ Plus de $15,000, mais inférieur à $20,000
☐ Plus de $30,000, mais inférieur à $40,000
☐ Plus de $40,000, mais inférieur à $50,000
☐ Plus de $50,000, mais inférieur à $60,000
☐ Plus de $60,000, mais inférieur à $80,000
☐ Plus de $80,000
☐ Ne sait pas

Appendix E: Demographic Information Collected from Youth

1. Are you a girl or a boy?

O A girl
O A boy

2. What is your date of birth?

Day				Month		Year	
O	1	O	17	O	January	O	1998
O	2	O	18	O	February	O	1999
O	3	O	19	O	March	O	2000
O	4	O	20	O	April	O	2001
O	5	O	21	O	May	O	2002
O	6	O	22	O	June		
O	7	O	23	O	July		
O	8	O	24	O	August		
O	9	O	25	O	September		
O	10	O	26	O	October		
O	11	O	27	O	November		
O	12	O	28	O	December		
O	13	O	29				
O	14	O	30				
O	15	O	31				
O	16						

1. Es-tu une fille ou un garçon?

O une fille
O un garçon

2. Quelle est ta date de naissance?

jour				mois		année	
O	1	O	17	O	Janvier	O	1998
O	2	O	18	O	Février	O	1999
O	3	O	19	O	Mars	O	2000
O	4	O	20	O	Avril	O	2001
O	5	O	21	O	Mai	O	2002
O	6	O	22	O	Juin		
O	7	O	23	O	Juillet		
O	8	O	24	O	Août		
O	9	O	25	O	Septembre		
O	10	O	26	O	Octobre		
O	11	O	27	O	Novembre		
O	12	O	28	O	Décembre		
O	13	O	29				
O	14	O	30				
O	15	O	31				
O	16						

Appendix F: English Questionnaires
Physical Activity

The following table contains 2 questions. If you answer "Never" to the first question DO NOT answer the second question. We want to know about the activities that you have done outside of your gym class in the past 4 months.

	a) Think about the activities that you have done outside of your gym class in the past 4 months. How often did you take part in the following activities?							**b) Where did you most often do this activity?**				
	Never	Once per month or less	2-3 times per month	Once per week	2-3 times per week	4-5 times per week	Almost every day	School	Home or neighbourhood	Indoor arena, gym, pool, etc.	Outdoor field	Other (daycare, etc.)
Street hockey, Floor hockey	1	2	3	4	5	6	7	1	2	3	4	5
Ice hockey	1	2	3	4	5	6	7	1	2	3	4	5
Ringuette	1	2	3	4	5	6	7	1	2	3	4	5
Ice skating (not for hockey or ringuette)	1	2	3	4	5	6	7	1	2	3	4	5
In-line skating	1	2	3	4	5	6	7	1	2	3	4	5
Skateboarding	1	2	3	4	5	6	7	1	2	3	4	5
Bicycling	1	2	3	4	5	6	7	1	2	3	4	5
Walking for exercise	1	2	3	4	5	6	7	1	2	3	4	5
Track and field	1	2	3	4	5	6	7	1	2	3	4	5
Jogging or running	1	2	3	4	5	6	7	1	2	3	4	5
Golfing	1	2	3	4	5	6	7	1	2	3	4	5
Swimming	1	2	3	4	5	6	7	1	2	3	4	5
Gymnastics	1	2	3	4	5	6	7	1	2	3	4	5

	a) Think about the activities that you have done outside of your gym class in the past 4 months. How often did you take part in the following activities?							**b) Where did you most often do this activity?**				
	Never	Once per month or less	2-3 times per month	Once per week	2-3 times per week	4-5 times per week	Almost every day	School	Home or neighbourhood	Indoor arena, gym, pool, etc.	Outdoor field	Other (daycare, etc.)
Aerobics, Yoga, Exercise class	1	2	3	4	5	6	7	1	2	3	4	5
Home exercises (push-ups, sit-ups)	1	2	3	4	5	6	7	1	2	3	4	5
Baseball or Softball	1	2	3	4	5	6	7	1	2	3	4	5
Weight training	1	2	3	4	5	6	7	1	2	3	4	5
Basketball	1	2	3	4	5	6	7	1	2	3	4	5
Football	1	2	3	4	5	6	7	1	2	3	4	5
Soccer	1	2	3	4	5	6	7	1	2	3	4	5
Volleyball	1	2	3	4	5	6	7	1	2	3	4	5
Badminton	1	2	3	4	5	6	7	1	2	3	4	5
Tennis	1	2	3	4	5	6	7	1	2	3	4	5
Kayak / Canoe	1	2	3	4	5	6	7	1	2	3	4	5
Dance	1	2	3	4	5	6	7	1	2	3	4	5
Trampoline	1	2	3	4	5	6	7	1	2	3	4	5
Skipping rope	1	2	3	4	5	6	7	1	2	3	4	5
Hand ball or Mini handball	1	2	3	4	5	6	7	1	2	3	4	5
Ball-playing (dodge ball, kickball, catch)	1	2	3	4	5	6	7	1	2	3	4	5
Games (chase, tag, hide and seek)	1	2	3	4	5	6	7	1	2	3	4	5
Downhill skiing or snowboarding	1	2	3	4	5	6	7	1	2	3	4	5

	a) Think about the activities that you have done outside of your gym class in the past 4 months. How often did you take part in the following activities?							**b) Where did you most often do this activity?**				
	Never	Once per month or less	2-3 times per month	Once per week	2-3 times per week	4-5 times per week	Almost every day	School	Home or neighbourhood	Indoor arena, gym, pool, etc.	Outdoor field	Other (daycare, etc.)
Boxing, wrestling	1	2	3	4	5	6	7	1	2	3	4	5
Karate, Judo, Tai Chi, Taekwondo	1	2	3	4	5	6	7	1	2	3	4	5
Cross-country skiing	1	2	3	4	5	6	7	1	2	3	4	5
Indoor chores (vacuuming, cleaning)	1	2	3	4	5	6	7	1	2	3	4	5
Outdoor chores (mowing, gardening)	1	2	3	4	5	6	7	1	2	3	4	5
Other (please specify)	1	2	3	4	5	6	7	1	2	3	4	5

Parental Support

For each of the following questions, describe how often your **mother** and **father** have provided the support described. Circle your answer, from 1 being “never” to 5 being “every day”.

	Never				Every Day
1. Encouraged you to do physical activities or play sports					
A. Mother	1	2	3	4	5
B. Father	1	2	3	4	5
2. Done a physical activity or played sports with you					
A. Mother	1	2	3	4	5
B. Father	1	2	3	4	5
3. Provided transportation to a place where you can do physical activity or play sports					
A. Mother	1	2	3	4	5
B. Father	1	2	3	4	5
4. Watched you participate in physical activities or sports					
A. Mother	1	2	3	4	5
B. Father	1	2	3	4	5
5. Told you that physical activity is good for your health					
A. Mother	1	2	3	4	5
B. Father	1	2	3	4	5
6. Do physical activity or sports himself/herself					
A. Mother	1	2	3	4	5
B. Father	1	2	3	4	5

Parental Control

For each of the following questions describe how often your **mother** and **father** have provided the following strategies to increase your physical activity or sport participation. Circle your answer, from 1 being “never” to 5 being “very often”.

	Never				Very Often
1. Nagged you to be physically active or play sports					
A. Mother	1	2	3	4	5
B. Father	1	2	3	4	5
2. Ordered you to be physically active or play sports					
A. Mother	1	2	3	4	5
B. Father	1	2	3	4	5

Self-Efficacy

How difficult is it for you to be physically active in the following situations. Circle your answer, from 1 being “very easy” to 5 being “very difficult”.

		Very Easy				Very Difficult
1.	I can be physically active during my free time on most days	1	2	3	4	5
2.	I can ask my parents or other adults to do physically active things with me	1	2	3	4	5
3.	I can be physically active during my free time on most days even if I could watch TV or play video games instead	1	2	3	4	5
4.	I can be physically active during my free time on most days even if it is very hot or cold outside	1	2	3	4	5
5.	I can ask my best friend to be physically active with me during my free time on most days	1	2	3	4	5
6.	I can be physically active during my free time on most days even if I have to stay at home	1	2	3	4	5
7.	I have the coordination I need to be physically active during my free time on most days	1	2	3	4	5
8.	I can be physically active during my free time on most days no matter how busy my day is	1	2	3	4	5

Enjoyment

The following is a list of reasons why people engage in physical activities, sports and exercise. Keeping in mind physical activities/sports you normally do, and respond to each question from a scale from 1 to 7, according to how true that response is for you.

	Not all true for me						Very true for me
1. Because it's fun.	1	2	3	4	5	6	7
2. Because I think it's interesting.	1	2	3	4	5	6	7
3. Because I enjoy this activity.	1	2	3	4	5	6	7
4. Because I find this activity stimulating.	1	2	3	4	5	6	7
5. Because I like the excitement of participation.	1	2	3	4	5	6	7
6. Because I like to do this activity.	1	2	3	4	5	6	7
7. Because it makes me happy.	1	2	3	4	5	6	7

Appendix G: French Questionnaires

Activité Physique

Le tableau suivant contient 2 questions. Si tu réponds « Jamais » à la question a) NE RÉPONDS pas au b). On veut connaître les activités que tu as faites à l'extérieur de ton cours de gym dans les 4 derniers mois.

	a) Pense aux activité que tu as fait à l'extérieur de ton cours de gym dans les 4 derniers mois. Combien de fois as-tu participé aux activités suivantes?							**b) Où as-tu fait cette activité le plus souvent?**				
	Jamais	Une fois par mois ou moins	2-3 fois par mois	Une fois par semaine	2-3 fois par semaine	4-5 fois par semaine	Presque tous les jours	École	Maison ou quartier	Aréna, gymnase, piscine, etc.	Terrain plein air (dehors)	Autre (garderie, etc.)
Hockey de rue, hockey intérieur	1	2	3	4	5	6	7	1	2	3	4	5
Hockey sur glace	1	2	3	4	5	6	7	1	2	3	4	5
Ringuette	1	2	3	4	5	6	7	1	2	3	4	5
Patinage sur glace (pas hockey ou ringuette)	1	2	3	4	5	6	7	1	2	3	4	5
Patins à roues alignées	1	2	3	4	5	6	7	1	2	3	4	5
Planche à roulette ou Trotinette (Scooter)	1	2	3	4	5	6	7	1	2	3	4	5
Bicyclette	1	2	3	4	5	6	7	1	2	3	4	5
Marcher pour de l'exercice	1	2	3	4	5	6	7	1	2	3	4	5
Athlétisme (lancer, saut en hauteur)	1	2	3	4	5	6	7	1	2	3	4	5
Jogging ou Course	1	2	3	4	5	6	7	1	2	3	4	5
Golf	1	2	3	4	5	6	7	1	2	3	4	5
Natation	1	2	3	4	5	6	7	1	2	3	4	5
Gymnastics	1	2	3	4	5	6	7	1	2	3	4	5

	a) Pense aux activité que tu as fait à l'extérieur de ton cours de gym dans les 4 derniers mois. Combien de fois as-tu participé aux activités suivantes?							**b) Où as-tu fait cette activité le plus souvent?**				
	Jamais	Une fois par mois ou moins	2-3 fois par mois	Une fois par semaine	2-3 fois par semaine	4-5 fois par semaine	Presque tous les jours	École	Maison ou quartier	Aréna, gymnase, piscine, etc.	Terrain plein air (dehors)	Autre (garderie, etc.)
Aerobics, Yoga, classe d'exercices	1	2	3	4	5	6	7	1	2	3	4	5
Exercices maison (redressement assis)	1	2	3	4	5	6	7	1	2	3	4	5
Baseball ou Balle-molle/Softball	1	2	3	4	5	6	7	1	2	3	4	5
Poids et haltères (musculation)	1	2	3	4	5	6	7	1	2	3	4	5
Ballon panier/Basketball	1	2	3	4	5	6	7	1	2	3	4	5
Football	1	2	3	4	5	6	7	1	2	3	4	5
Soccer	1	2	3	4	5	6	7	1	2	3	4	5
Ballon-volant/Volleyball	1	2	3	4	5	6	7	1	2	3	4	5
Badminton	1	2	3	4	5	6	7	1	2	3	4	5
Tennis	1	2	3	4	5	6	7	1	2	3	4	5
Aviron / Canoë	1	2	3	4	5	6	7	1	2	3	4	5
Danse	1	2	3	4	5	6	7	1	2	3	4	5
Trampoline	1	2	3	4	5	6	7	1	2	3	4	5
Corde à sauter	1	2	3	4	5	6	7	1	2	3	4	5
Handball ou Mini handball	1	2	3	4	5	6	7	1	2	3	4	5
Ballon (ballon chasseur, kickball, catch)	1	2	3	4	5	6	7	1	2	3	4	5
Jeux (chasse, tag, cache-cache)	1	2	3	4	5	6	7	1	2	3	4	5
Ski alpin ou planche à neige	1	2	3	4	5	6	7	1	2	3	4	5
Boxe, lute	1	2	3	4	5	6	7	1	2	3	4	5
Karaté, Judo, Tai Chi, Taekwondo	1	2	3	4	5	6	7	1	2	3	4	5

	a) Pense aux activité que tu as fait à l'extérieur de ton cours de gym dans les 4 derniers mois. Combien de fois as-tu participé aux activités suivantes?							**b) Où as-tu fait cette activité le plus souvent?**				
	Jamais	Une fois par mois ou moins	2-3 fois par mois	Une fois par semaine	2-3 fois par semaine	4-5 fois par semaine	Presque tous les jours	École	Maison ou quartier	Aréna, gymnase, piscine, etc.	Terrain plein air (dehors)	Autre (garderie, etc.)
Ski de fond	1	2	3	4	5	6	7	1	2	3	4	5
Travaux intérieurs (aspirateur, nettoyer)	1	2	3	4	5	6	7	1	2	3	4	5
Travaux extérieurs (tondre, jardiner)	1	2	3	4	5	6	7	1	2	3	4	5
Autres (spécifier svp)	1	2	3	4	5	6	7	1	2	3	4	5

Support Sociale

Pour chacune des questions suivantes, décrivez à quelle fréquence votre **mère** et votre **père** ont fourni le support suivant. Encerclez votre réponse, 1 étant «jamais» et 5 étant «tous les jours».

	Jamais				Tous les jours
3. T'a encouragé à être actif(ve) ou à pratiquer des sports					
A. Mère	1	2	3	4	5
B. Père	1	2	3	4	5
4. A fait de l'activité physique ou pratiqué des sports avec toi					
A. Mère	1	2	3	4	5
B. Père	1	2	3	4	5
5. T'a apporté à un endroit où tu peux faire de l'activité physique ou pratiquer des sports					
A. Mère	1	2	3	4	5
B. Père	1	2	3	4	5
6. T'a regardé faire de l'activité physique ou pratiquer des sports					
A. Mère	1	2	3	4	5
B. Père	1	2	3	4	5
7. T'a dit que la pratique de l'activité physique ou des sports est bonne pour ta santé					
A. Mère	1	2	3	4	5
B. Père	1	2	3	4	5
8. Fait elle/lui-même de l'activité physique ou pratique des sports					
A. Mère	1	2	3	4	5
B. Père	1	2	3	4	5

Pression Sociale

Pour chacune des questions suivantes, inscrivez combien de fois votre **mère** et votre **père** ont fourni les stratégies suivantes pour augmenter votre activité physique ou votre participation sportive. Encerclez votre réponse, 1 étant «jamais» à 5 «très souvent».

	Jamais				Très souvent
1. T'a agacé pour faire du sport ou de l'activité physique					
A. Mère	1	2	3	4	5
B. Père	1	2	3	4	5
2. T'a ordonné à faire du sport ou de l'activité physique.					
A. Mère	1	2	3	4	5
B. Père	1	2	3	4	5

Sentiment d'Efficacité Personelle

Jusqu'à quel point est-il difficile pour vous d'être physiquement actif dans les situations suivantes? Encerclez votre réponse, 1 étant «très facile» et 5 étant «très difficile».

		Très facile				Très difficile
1.	Je peux être physiquement actif(ve) pendant mes temps libres la plupart des jours	1	2	3	4	5
2.	Je peux demander à mes parents ou d'autres adultes de faire des activités physiques avec moi	*1*	2	3	4	5
3.	Je peux être physiquement actif(ve) pendant mes temps libres la plupart des jours, même si je pourrais plutôt regarder la télévision ou jouer à des jeux vidéo	1	2	3	4	5
4.	Je peux être actif(ve) physiquement pendant mes temps libres la plupart des jours, même s'il fait très chaud ou froid à l'extérieur	1	2	3	4	5
5.	Je peux demander à mon/ma meilleur(e) ami(e) d'être physiquement actif(ve) avec moi pendant mes temps libres la plupart des jours	1	2	3	4	5
6.	Je peux être physiquement actif(ve) pendant mes temps libres la plupart des jours, même si je dois rester à la maison	1	2	3	4	5
7.	J'ai la coordination dont j'ai besoin pour être physiquement actif(ve) pendant mes temps libres la plupart des jours	1	2	3	4	5
8.	Je peux être physiquement actif(ve) pendant mes temps libres la plupart des jours peu importe à quel point ma journée est occupée	1	2	3	4	5

Plaisir

Ce qui suit est une liste de raisons pour lesquelles les individus font de l'activité physique, des sports et de l'exercice. Pense aux activités physiques/sports que tu fais habituellement et réponds aux questions suivantes, selon une échelle de 1 à 7, en indiquant dans quelle mesure les énoncés suivants sont vrais pour toi.

	Pas du tout vrai pour moi						Tout à fait vrai pour moi
1. Parce que c'est amusant.	1	2	3	4	5	6	7
2. Parce que j'aime faire cette activité.	1	2	3	4	5	6	7
3. Parce que ça me rend heureuse ou heureux.	1	2	3	4	5	6	7
4. Parce que je pense que c'est intéressant.	1	2	3	4	5	6	7
5. Parce que j'aime cette activité.	1	2	3	4	5	6	7
6. Parce que je trouve cette activité stimulante.	1	2	3	4	5	6	7
7. Parce que j'aime l'excitation de participer à cette activité.	1	2	3	4	5	6	7