INVESTIGATING MESSAGE BELIEVABILITY AS A DETERMINANT OF PARENTS’ INTENTIONS TO SUPPORT THEIR CHILDREN IN MEETING PHYSICAL ACTIVITY AND SCREEN TIME GUIDELINES

by

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Abstract

The majority of children are not meeting the Canadian Physical Activity Guidelines (PAG) or the Screen Time Guidelines (STG). Parents play a role in changing the health behaviours of their children by engaging in supportive behaviours (e.g. transporting them to sports; placing limits on TV viewing). These behaviours, and their determinants, may differ for moms versus dads and for physical activity versus screen time. According to the social issue advertising believability model (SIABM), whether parents support their children in achieving these guidelines may depend on how believable they find guideline promotion advertisements (message believability [MB]). Whether parents find a message believable may depend upon their perceived behavioural control for engaging in the supportive behaviours. The purpose of this study was to examine a) MB as a determinant of parents’ intentions to support their children in meeting the PAG and STG, and b) perceived behavioural control as a determinant of whether parents consider PAG and STG advertisements believable. A secondary objective was to examine differences in parents’ evaluations of the PAG and STG advertisements. Data were collected online using Survey Monkey Audience; 500 Canadian parents with at least one child aged 5-11 (75.6% moms; 24.4% dads) were included in the sample. A structural equation model testing the SIABM relationships demonstrated good model fit for both advertisements in the whole sample, and moms, and dads separately (CFIs ≥.96; RMSEAs ≤.06). Contrary to hypothesis MB did not predict intentions, and perceived behavioural control did not predict MB (p>.05). Parents had more positive evaluations of the PAG advertisement versus the STG advertisement; nonetheless, parents had stronger intentions to support screen time reduction versus physical activity participation (p<.05). When considering moms and dads separately, moms had stronger attitudes towards physical activity participation and screen time reduction, and believed both advertisements more than dads. Moms had greater intentions to support screen time reductions versus physical activity participation. More research is needed to examine the relationship
between perceived behavioural control, MB, and intentions. Future advertisements should emphasize how parents can support screen time reduction beyond the scope of promoting supportive behaviours for physical activity participation.
Co-Authorship

This thesis presents the original work of Jocelyn Jarvis in collaboration with her supervisor, Dr. Amy Latimer-Cheung. Jocelyn Jarvis was responsible for developing the research question, conducting background research, designing the study, collecting data, leading the statistical analysis, interpreting the results, and writing the thesis. Dr. Latimer-Cheung assisted with development of the research question, the design of the study, the interpretation of the results and the written findings of the thesis. Dr. Tanya Berry and Dr. Valerie Carson provided guidance on the development of the research question, the design of the study, and the interpretation of the results. Dr. Latimer-Cheung and Dr. Ryan Rhodes provided guidance on the statistical analysis.
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Chapter 1

Introduction

1.1 Overview

The majority of Canadian children are not meeting the Physical Activity Guidelines (PAG) which recommend 60 minutes of moderate to vigorous physical activity each day to achieve health benefits (Colley et al., 2011). Similarly, the majority of Canadian children are not meeting the Sedentary Behaviour Guidelines (Colley et al., 2011). One key component of the Sedentary Behaviour Guidelines that children are not meeting are the Screen Time Guidelines (STG), which recommend limiting recreational screen time to less than two hours each day to achieve health benefits (Colley et al., 2011, Tremblay et al., 2011a). Parents can play an important role in changing the health behaviours of their children by engaging in supportive behaviours (e.g., encouraging children, providing sporting equipment, setting rules around television; Biddle & Goudas, 1996; Gustafson & Rhodes, 2006; Trost et al., 2003; Welk, Wood, & Morss, 2003). These supportive behaviours, and their determinants, may differ for moms versus dads (Gustafson & Rhodes, 2006; Yao & Rhodes, 2013) and for physical activity versus screen time. One strategy that can be used to promote health behaviours such as physical activity participation or screen time reduction to a specific subgroup (i.e., parents) is to create a targeted mass media advertisement promoting the behaviour of interest (Kreuter & Wray, 2003). Effective mass media advertisements persuading parents to support their children’s physical activity participation and screen time reduction are needed.

When creating these persuasive advertisements, whether parents believe the advertisements (i.e., message believability) should be considered (Petty & Cacioppo, 1986). According to the social issue advertising believability model (O’Cass & Griffin, 2006), greater
message believability is associated with greater attention being paid to advertisements, social issue involvement, attitudes towards the issue, and intentions to engage in the behaviours being promoted by the advertisements. In the context of the PAG and STG, message believability may also be determined by parents’ perceived behavioural control for the supportive behaviours necessary to enable their children’s physical activity participation versus screen time reduction. Thus, in the current study perceived behavioural control was added to the model to help further understand the complexity of message believability in developing parents’ intentions to engage in supportive behaviours enabling child physical activity participation and screen time reduction.

1.2 Primary Objective and Hypotheses

1.2.1 Objective.

The purpose of this study was to test the social issue advertising believability model in a sample of 500 parents to determine a) if believability of PAG and STG advertisements predicts parents’ intentions to engage in behaviour to support their children’s physical activity participation and screen time reduction and b) if perceived behavioural control is predictive of message believability. A secondary objective was to determine whether message believability differed for the PAG advertisement versus the STG advertisement. In addition, I examined whether all other model variables (i.e., attention, social issue involvement, attitudes towards the issue, attitudes towards parental support, perceived behavioural control, and intentions) differed for the PAG advertisement versus the STG advertisement. These objectives were assessed in the whole sample overall as well as separately for moms and dads. The separate analyses were conducted to determine if results varied when providing advertisements to moms versus dads.

1.2.2 Hypotheses.

H1: Message believability would predict parents’ intentions to engage in supportive behaviours for child physical activity participation and screen time reduction.
**H2:** Parents’ perceived behavioural control for engaging in supportive behaviours for physical activity participation and screen time reduction would predict how believable they find the PAG and STG advertisements respectively.

**H3:** All social issue advertising believability model variables would be greater for the PAG advertisement compared to the STG advertisement.

### 1.3 References


Chapter 2

Literature Review

2.1 Child Physical Activity and Sedentary Behaviour

2.1.1 Prevalence and guidelines.

Physical activity has been defined as, “a form of leisure-time physical activity that is usually performed repeatedly over an extended period of time with a specific external objective such as the improvement of fitness, physical performance, or health.” (Bouchard, Blair, & Haskell, 2012, p. 12). Sedentary behaviour has been defined as, “activities that do not increase energy expenditure substantially above the resting level and includes activities such as sleeping, sitting, lying down, and watching television, and other forms of screen-based entertainment.” (Pate, O’Neill, & Lobelo, 2008, p. 174). Changes in the prevalence of physical activity and sedentary behaviours are altering the population health of Canadian children (Tremblay & Willms, 2003). Declining levels of child physical activity and increasing sedentary behaviour is contributing to mental and physical health problems in children (Bauman, Finegood & Matsudo, 2009; Halfon, Larson & Slusser, 2013; Rey-López, Vincente-Rodríguez, Biosca, & Moreno, 2008; Tremblay & Willms, 2003). Increased physical activity participation and reduced sedentary behaviour have been suggested to protect children from these health risks by helping to control weight gain and body composition (Must & Tybor, 2005; Tremblay & Willms, 2003).

Current Canadian Physical Activity Guidelines (PAG) suggest children should engage in 60 minutes of moderate to vigorous physical activity each day to achieve desirable health benefits (Tremblay et al., 2011b). Unfortunately, only a small proportion of children are meeting these PAG (Colley et al., 2011). In addition to the PAG, Canada has released Sedentary Behaviour Guidelines for children in an attempt to promote a reduction in sedentary time. These guidelines advocate that to achieve health benefits recreational screen time should be limited to less than two
hours per day while trying to minimize motorized transport, sitting time, and time spent indoors (Tremblay et al., 2011a). Canadian children spend an average of 8.6 hours of their waking hours in sedentary behaviours, far surpassing the recommended guidelines (Colley et al., 2011). There is a need to promote physical activity and reduce sedentary behaviour to improve the health of Canadian children.

2.1.2 Recreational screen time.

Screen time is a specific type of sedentary behaviour which is a measure of combined TV viewing, video game playing, cell phone, and computer use (Mark & Janssen, 2008; Rey-López et al., 2008; Sigman, 2012; Tremblay et al., 2011c). As such, the term child Screen Time Guidelines (STG) used in this thesis refers to the specific component of the Sedentary Behaviour Guidelines that recommends limiting recreational screen time to less than two hours each day (Colley et al., 2011). A systematic review by Tremblay and colleagues (2011c) revealed that television viewing for greater than two hours a day is associated with negative physical, physiological, and psychosocial health outcomes in youth independent of physical activity behaviour. Furthermore, Mark and Janssen (2008) suggest that screen time may be more ‘sedentary’ than other sedentary behaviours. This idea is supported by a study by Klesges, Shelton, and Klesges (1993) that demonstrated that child energy expenditure was actually lower when watching television than at rest. These ideas are echoed in a recent review on screen time and its distinct aspects from other sedentary pursuits (Sigman, 2012). Disappointingly, results of the 2001/2002 World Health Organization Health Behaviour in School-Aged Children survey discovered that only 18% of girls and 14% of boys in grades 6-10 were meeting the STG (Mark, Boyce, & Janssen, 2006). As such, there is an independent need to focus on reducing screen time beyond general sedentary behaviour in children.

2.1.3 Physical activity and screen time as distinct.
Physical activity and screen time are frequently considered contradicting behaviours and often are negatively correlated (Tammelin, Ekelund, Remes, & Näyhä, 2007). However, these behaviours have also been found to be unrelated suggesting the need to further understand these behaviours and their individual complexities and determinants (Andersen, Crespo, Bartlett, Cheskin, & Pratt, 1998; Biddle, Gorely, Marshall, Murdey, & Cameron, 2003; Mark & Janssen, 2008; Rey-López et al., 2008). It is possible to meet the PAG and still engage in enormous amounts of recreational screen time and surpass the STG (Salmon, Tremblay, Marshall, & Hume, 2011). Of concern, an analysis of an adolescent sample from the National Health and Nutrition Examination Surveys from 1999-2004 concluded that physical activity participation had negligible impact on the relationship between screen time and metabolic syndrome (Mark & Janssen, 2008). As such, there is a need to focus on reducing recreational screen time independent of promoting physical activity in youth. The current project focuses on creating effective advertisements independently promoting physical activity participation and screen time reduction to help Canadian children meet PAG and STG to improve their health outcomes.

2.2 Parents

2.2.1 Parents as behaviour change agents.

Parents and family play a key role in changing the health behaviours of their children (Epstein, Valoski, Wing, & McCurley, 1990; Golan & Crow, 2004; Golan, Kaufman, & Shahar, 2006; Golan & Weizman, 2001; Lindsay, Sussner, Kim, & Gortmaker, 2006). In fact, interventions seeking to reduce childhood obesity through behaviour modification were found to be more effective when parent support groups and educational sessions involved parents and children together (Golan et al., 2006), or parents exclusively (Golan & Crow, 2004; Golan, Fainaru, & Weizman, 1998) versus children alone. Because promotion of child health to combat obesity is a national priority (Public Health Agency of Canada, 2011), research surrounding the specific role of parents as behaviour change agents for their children has expanded. Uncovering
how parents can be persuaded to support their children in beneficial health behaviour changes is necessary and will be addressed in the current study.

### 2.2.2 Parental support for physical activity.

Parental support has been studied extensively in the context of child physical activity behaviour. Although inconsistently defined in the literature, parental support behaviours are behaviours parents perform that facilitate or enable child health behaviours, such as physical activity, that children may not partake in otherwise (Biddle & Goudas, 1996; Trost et al., 2003). Parental support has been positively related to child physical activity both directly, through supportive behaviours, and indirectly, though psychosocial variables such as self-efficacy (Biddle & Goudas, 1996; Trost et al., 2003; Welk et al., 2003). A review by Gustafson and Rhodes (2006) revealed that the three most significant types of parental support are parental encouragement, involvement, and facilitation (i.e., providing transportation to sport or activities, access, or equipment). Modeling is another important factor as children with active parents are much more likely to be active than children with inactive parents (Moore et al., 1991). Research should continue to investigate how to effectively promote these support behaviours to parents as a strategy to increase child physical activity (Jarvis et al., 2014; Yao & Rhodes, 2013).

### 2.2.3 Interventions targeting parents to increase child physical activity.

Interventions have begun targeting parental support behaviours in efforts to increase child physical activity participation. It is difficult to assess parent-targeted interventions because often interventions are comprehensive school or community-based programs including a parent component with few interventions targeting parents exclusively (Lindsay et al., 2006). A systematic review of interventions that engaged parents to support child physical activity indicated that study designs and outcome measures are so variable that it is difficult to draw solid conclusions about effective interventions (O’Connor, Jago, & Baranowski, 2009). Although lacking in uniform evidence, interventions with educational or training programs for parents
delivered through family visits or by phone appeared promising (O’Connor et al., 2009). They suggested that the evidence base needs to be built with more interventions targeting parents to engage in supportive behaviours enabling child physical activity participation to support this association in the literature (O’Connor et al., 2009). With the need to further explore these relationships, the current investigation seeks to understand the development of parents’ intentions to engage in these supportive behaviours to increase child physical activity participation.

### 2.2.4 Parental support for reducing child recreational screen time.

Exploring strategies for parental support that may reduce child recreational screen time are necessary. For example, it has been found that parents can reduce the time children spend watching TV by not allowing them to have a television in their bedroom, limiting the number of TVs around the house, and creating rules around screen time (Carlson et al., 2010; Lindsay et al., 2006; Weicha, Sobol, Peterson, & Gortmaker, 2001). Additionally, children who have limits on TV time watch less TV than children with no limits suggesting that these restrictions may be beneficial in reducing screen time (Weicha et al., 2001). This evidence is alarming considering that only about one half of older children have restrictions on how much TV they are allowed to watch (Roberts, Foehr, Rideout, & Brodie, 1999; Weicha et al., 2001). Other types of screen time limits that appear beneficial include limiting the number of meals children are allowed to eat in front of the TV which may reduce TV watching (Saelens et al., 2002; Salmon, Timperio, Telford, Carver, & Crawford, 2005). Overall, the most effective support behaviours for reducing screen time are thought to center around parents setting and enforcing consistent rules and limits for screen time (Carlson et al., 2010).

Modeling of screen time behaviour may also play an important role in supporting children to reduce their screen time. A cross-sectional study of Australian children emphasized the importance of modeling for child screen time behaviour (Salmon et al., 2005). This study demonstrated that the amount of TV parents watched was directly related to the amount of TV
watched by their child (Salmon et al., 2005). Children with parents who reported greater than 30 minutes a day of computer of e-game use had children who were classified into the lowest quartile for physical activity participation as measured by accelerometer (Salmon et al., 2005). This association of parent and child screen time behaviours was also seen in a study of young children ages 5 to 6 (Jago et al., 2014). Findings in both studies varied between boys and girls, and moms and dads, suggesting that the relationships between screen time behaviours and parents may be complex (Jago et al., 2014; Salmon et al., 2005). These studies emphasized several ways parents may influence and engage in supportive behaviours for screen time reduction. The current investigation seeks to understand how to develop parents’ intentions to engage in these supportive behaviours for screen time reduction among children (i.e., parental support).

2.2.5 Interventions targeting parents to reduce child screen time behaviours.

A review by Salmon and colleagues (2011) summarizes interventions designed to reduce child sedentary behaviour, many of which focused predominately on screen time. Interestingly, interventions to reduce sedentary time appeared to be more effective than strategies to increase health behaviours such as physical activity (Kamath et al., 2008; Salmon et al., 2011). Some strategies of home-based and school-based interventions appeared to target parents through intervention; however, none appeared to directly target parents as the primary agents of change (Salmon et al., 2011). Considering the crucial role of parents in children’s health behaviour change, interventions seeking to reduce child screen time should begin targeting parents. Taking this approach may help alter supportive behaviours as well as parent screen time behaviours that act as correlates for child screen time.

2.2.6 Moms and dads and child health behaviour change.

When promoting supportive behaviours we must consider potential differences between moms and dads. A review of parental support for child physical activity by Gustafson and Rhodes (2006) indicated overall inconsistent findings in the literature concerning gender differences for
parents. The majority of studies demonstrated gender-specific differences for the child in that boys receive more support than girls from both parents to increase physical activity participation (Gustafson & Rhodes, 2006). Although there were inconsistent findings throughout, observations tended to differ depending on whether the study focused on the gender of the child, the gender of the parents, or the maternal or paternal relationships (Gustafson & Rhodes, 2006; Yao & Rhodes, 2013). As such, examining parents as a single population as well as moms and dads separately may further clarify some of these differences when promoting supportive behaviours to parents. Gustafson and Rhodes (2006) recommend that future studies examine differences in parental support due to gender of the parent and the child, which is why this study will consider differences in support for moms and dads and will check for gender of the child as a covariate in analyses. To our knowledge, differences between moms and dads for support of screen time reduction has not been investigated, although, a single study has examined screen time associations in moms and dads independently (Jago et al., 2014). The current study will investigate parents in general, as well as in moms and dads separately, in order to determine if there are important differences that should be considered when creating advertisements promoting supportive behaviours to all parents or to moms and dads specifically.

2.3 Health Messaging

2.3.1 Mass media messaging.

Social marketing refers to designing and publicizing programs that support socially beneficial behaviour change (Grier & Bryant, 2005). One component of these social marketing campaigns is mass media messaging (Finlay & Faulkner, 2005; Grier & Bryant, 2005). It has been suggested that independent mass media advertisements minimally impact behaviour change (Cavill & Bauman, 2004; Wallack, 1981); however, their dissemination may serve to increase awareness of the link between health and the selected health behaviour in the minds of consumers (Finlay & Faulkner, 2005). As a result, these campaigns may be important in developing attitudes
towards the behaviour of interest in order to persuade consumers to subsequently develop intentions to comply with the advertisement promoting behaviour change (Cavill & Bauman, 2004). Although behaviour change is likely not the primary goal of an independent social marketing advertisement (Wallack, 1981), these advertisements can make a larger impact on behaviour change when they are used as part of an integrated social marketing campaign (Grier & Bryant, 2005) or applied with other messaging and behaviour change strategies. A review by Noar (2006) concluded that when a mass media campaign is well-executed and designed carefully it can be effective at influencing proximal outcomes (i.e., knowledge, attitudes, and beliefs) as well as distal outcomes including health behaviour. Due to the large reach of mass media campaigns, these shifts in behaviour can have important implications for public health when messages are designed appropriately (Noar, 2006). As such, it is imperative that we discover how messages work in order to develop effective mass media advertisements promoting supportive behaviours to parents in order to produce population wide effects.

In mass media campaigns, messages are the words or phrases that convey meaning whereas advertisements are the actual promotion of a message itself (Grier & Bryant, 2005). In the context of the current study, messages promoting supportive behaviours for child physical activity participation and screen time reduction were displayed in print advertisements mirroring the Canadian Society of Exercise Physiology fact sheets (CSEP, 2011a; CSEP, 2011b). As such, PAG and STG messages were evaluated in the context of PAG and STG advertisements and were therefore referred to as advertisements throughout the study.

2.3.2 Message targeting.

One strategy suggested to increase the likelihood that mass media advertisements will be effective is to create targeted messages. Targeting messages involves creating a message for a specific subgroup of the population that is assumed to share certain characteristics (Kreuter & Wray, 2003). The principle of targeting is centered around the idea that messages can be made
more relevant to individuals in the targeted group thereby increasing the likelihood that they will attend to them (Kreuter & Wray, 2003; Noar, 2006). Targeting campaigns at a group such as parents allows advertisements to be made relevant to specific attributes of that group which may increase the relevance and effectiveness of the advertisement for influencing behavioural outcomes (Hawkins, Kreuter, Resnicow, Fishbein & Dijkstra, 2008; Kreuter & Wray, 2003; Noar, 2006). Targeting is an important strategy to apply when designing mass media campaigns in order to increase the likelihood of health behaviour change (Noar, 2006). Using principles of targeting when creating advertisements promoting supportive behaviours to parents in general, or moms and dads specifically, may better persuade parents to develop intentions to engage in supportive behaviours.

### 2.3.3 Mass media campaigns targeting parents for child physical activity.

National physical activity promotion agencies in Canada and the United States have successfully targeted parents with social marketing campaigns promoting support for child physical activity. ParticipACTION Canada’s *Think Again* campaign emphasized the discrepancy between what parents perceive to be an adequate amount of physical activity for their children and what the PAG recommend (Berry et al., 2012; Gainforth et al., submitted; Jarvis et al., 2014). An evaluation of this campaign suggests that parents who were aware of the campaign had greater knowledge of PAG, outcome expectations of their children being active, and intentions to support their children in meeting the PAG (Gainforth et al., submitted). They also reported engaging in more supportive behaviours than parents who were unaware of the campaign (Gainforth et al., submitted). Similarly, the Center for Disease Control’s U.S. *VERB* campaign targeted parents and children to promote physical activity. Campaign evaluations demonstrated an increase in children’s free time physical activity after 1-year (Huhman et al., 2005; Huhman et al., 2010). Parental awareness of VERB was associated with positive attitudes, beliefs towards physical activity, and parental support behaviours (Price, Huhman, & Potter, 2008). These
findings suggest that mass media promotions can be effective when targeting parents to engage in supportive behaviours. To our knowledge, these types of messaging campaigns have not been created or tested for parents regarding supportive behaviours for child screen time reduction. Considering the success of previous mass media campaigns targeting parents, this is an avenue worthy of further investigation.

Both the *Think Again* and VERB campaigns used the PAG in their promotions to emphasize to parents and children what the goal of the children’s physical activity participation should be. The current study used the same approach and used the PAG and STG as a central message in the advertisements shown to parents. Thus, in this study the messages used to promote parental support behaviours for physical activity participation and screen time reduction were referred to as the PAG advertisement and STG advertisement respectively. Through basing the advertisements on the guidelines, the current study hoped that parents would align their intentions for engaging in supportive behaviours with what they thought would be necessary for their child to meet the PAG and STG respectively.

2.4 Message Believability

2.4.1 The role of message believability in message acceptance.

When investigating the impact of persuasive communications, whether consumers believe the message (i.e., message believability) is important to consider. Message believability refers to the true acceptance of the message consumers are presented (Andrews, Netemeyer, & Durvasula, 1990). Petty and Cacioppo (1986) suggest that even if a message presents strong arguments, if it is not believable it may not influence attitudes and therefore may not be effective. As such, message believability may be considered necessary to induce attitude shifts that may in turn persuade behaviour change.
One model that helps contextualize message believability in mass media advertisements is the social issue advertising believability model (Figure 1; O’Cass & Griffin, 2006). There are multiple relationships occurring in the model making it rather complex. This model proposes that:

- Involvement in a social issue (i.e., social issue involvement) and the conscious attention that is paid to an advertisement (i.e., attention) predict message believability

- How believable one finds the advertisement (i.e., message believability) and their social issue involvement with the issue being promoted through the advertisement predict their attitudes towards the issue (i.e., attitudes)

- Message believability and attitudes predict intentions to comply with the behaviour being promoted by the advertisements (i.e., intentions)

When examining the role of message believability in intention formation, this model provides a framework that has been applied previously in the literature (Berry et al., 2012; O’Cass & Griffin, 2006).

![Diagram](image)

(O’Cass & Griffin, 2006)

*Figure 1. The social issue advertising believability model.*

Because supportive behaviours for physical activity participation and screen time reduction are distinct, it is possible that model variables may differ in parents when comparing
the PAG advertisement and the STG advertisement. The behaviour health link between screen time and negative health outcomes has more recently emerged as opposed to the link between physical activity and health benefit. As such, the attitudes and beliefs of parents regarding child screen time behaviour have not been explored extensively in the literature. It is plausible that the attitudes, beliefs, social issue involvement, and message believability of parents will differ for the PAG advertisement versus the STG advertisement. Specifically, because a ceiling effect has been noted in the literature for parents attitudes towards child physical activity (Rhodes et al., 2013), and this behaviour health link is long-standing and well-accepted, it is likely that parents attitudes towards child physical activity will exceed their attitudes towards screen time reduction – a behaviour less familiar to parents. Additionally, parents’ attitudes towards these child behaviours may differ from their attitudes towards providing support for these behaviours. This is important to consider when creating messages for parents introducing screen time behaviour as a health risk in order to drive persuasion for behaviour change. Applying this model to these behaviours may help us further understand their unique determinants, and key differences, that may be useful in creating effective messages.

2.4.2 Message believability as a determinant of behaviour change.

Message believability has been assessed with the desire to predict behaviour change. A study by O’Cass and Griffin (2006) explored the believability of advertisements for anti-smoking and anti-excessive drinking using the social issue advertising believability model. In line with the model, it was concluded that one’s personal involvement in the social issue as well as the attention paid to process the advertisement influenced the perceived believability of the advertisement (O’Cass & Griffin, 2006). Social issue involvement and message believability subsequently influenced attitudes towards the issue that ultimately influenced intentions to comply with the message recommendations (O’Cass & Griffin, 2006). This study provides
evidence that message believability can indirectly influence intentions to engage in a behaviour recommended by a mass media advertisement.

A similar study by Berry, Jones, McLeod, & Spence (2011) tested the social issue advertising believability model in the context of exercise information and appearance-based information and discovered that the model demonstrated good fit to the data. These studies provide insight towards how message believability may relate to changes in attitudes and intention formation through mass media advertisements. It is well established that intentions to engage in a health behaviour can predict behaviour change in the context of physical activity (Hagger, Chatzisarantis, & Biddle, 2002). Taken together, making an advertisement believable may be an important precursor to intention formation often considered necessary for behaviour change to occur. As such, how to improve the believability of messages and advertisements should be investigated as a mechanism for making advertisements more effective for initiating behaviour change.

2.4.3 Assessing message believability in parents.

Implicit processing refers to responses that occur without cognitive processing or reflection whereas explicit processing allows for conscious reflection (Berry et al., 2011). As such, implicit believability measures assess immediate perceived believability to a given stimuli and explicit believability measures will ask how believable a given stimuli is perceived to be. A study by Berry and colleagues (2012) assessed mother’s intentions to provide parental support for child physical activity in response to the Think Again campaign advertisements. Explicit message believability, implicit agreement with the advertisements, social issue involvement, concern for youth inactivity, attention paid to the advertisement, and attitudes were assessed (Berry et al., 2012). Significant correlations emerged between parents’ intentions to engage in supportive behaviours and explicit believability, social issue involvement, attention paid to the advertisement, concern for their own children as well as concern for the lack of physical activity
of Canadian children. Explicit message believability was further related to social issue involvement, attention, concern for Canadian children’s activity and attitudes towards children gaining self-confidence through physical activity (Berry et al., 2012). Findings from the regression analyses differed from O’Cass and Griffin (2006) as attention was the only significant predictor of intentions for supportive behaviours with social issue involvement, attitudes, and believability not emerging as significant predictors of intentions (Berry et al., 2012). Berry and colleagues (2012) suggest that believability and attitudes may not have predicted intentions because parents did not implicitly agree that their children needed to be more active, a problem that was specifically aimed to be addressed by the Think Again campaign. Future research may help indicate whether message believability can alter parents’ intentions to engage in supportive behaviours when attitudes or beliefs are already consistent with the messages in the campaign advertisements.

2.5 Determinants of Message Believability

2.5.1 Determinants from the social issue advertising believability model.

The social issue advertising believability model suggests social issue involvement and attention paid to the advertisements impact how believable the advertisements are perceived to be. The study by O’Cass and Griffin (2006) indicates that the pathways from social issue involvement and attention to message believability accounted for 11.2% and 1.5% of the variance in message believability respectively. Although these determinants meet traditional cut-off criteria and therefore should be considered important determinants of message believability (O’Cass & Griffin, 2006), there is still a large amount of variance in message believability that is unaccounted for. Due to the importance of message believability in predicting attitudes and intentions, it is worthwhile to investigate other potential determinants that may influence message believability.
2.5.2 Perceived behavioural control and message believability.

To increase the understanding of message believability when promoting supportive behaviours to parents, literature suggests perceived behavioural control may be another variable related to message believability that could increase intention formation and behaviour change. A study by Jarvis, Gainforth and Latimer-Cheung (2014) assessed parents’ perceptions of advertisements promoting child physical activity. Advertisements suggesting that supporting physical activity participation is easy were considered less believable than advertisements emphasizing the benefits of physical activity. This idea is reinforced by a study that demonstrated that although attitudes towards providing support were high, perceived behavioural control, or the parents’ perceived feasibility and confidence in providing successful support, was low (Rhodes et al., 2013). As such, advertisements that can provide a realistic image of supportive behaviours required for their children to meet the PAG and STG may be more believable to parents than advertisements making supportive behaviours seem extremely easy. This idea will be investigated in this study in the context of an adapted social issue advertising believability model (Figure 2) to determine if perceived behavioural control is a predictor of message believability.

2.5.3 Perceived behavioural control and intentions.

Perceived behavioural control has been suggested to predict behavioural intentions and behaviour directly in other behaviour change theories such as the theory of planned behaviour (Ajzen, 1991). Conner and Norman (2005) summarize key articles and reviews demonstrating that perceived behavioural control often emerges as a strong predictor of intentions and behaviour. As such, perceived behavioural control will also be tested as a predictor of intentions in the context of the adapted social issue advertising believability model.
2.5.4 Differences in perceived behavioural control.

Just as screen time behaviour and physical activity behaviour are distinct, their corresponding supportive behaviours also differ. As such, parents' perceived behavioural control, and resulting message believability, concerning support for physical activity participation versus screen time reduction may differ. Specifically, we theorize that parents’ perceived behavioural control of supporting participation in physical activity for an hour a day versus supporting restricting recreational screen time to two hours of per day may differ. Considering the implications in the context of the social issue advertising believability model, believability of PAG and STG advertisements may be a more or less influential for one type of supportive behaviour versus another. Parents providing support to enable children to meet the STG involves restricting their child for many hours a day as opposed to meeting the PAG which may involve as little as one hour of supportive behaviour. Furthermore, parents’ may perceive that the supportive behaviours for screen time reduction, which involve restricting their child, might be more difficult as they may be met with more resistance from their child if they find screen time
activities enjoyable. As such, the STG may be viewed as less feasible to achieve by parents thus potentially reducing how believable parents find STG advertisements.

2.5.5 Differences in other model variables.

In addition to message believability and perceived behavioural control, it is possible that parents may have lower social issue involvement, pay less attention, and have less favourable attitudes towards child screen time and supporting screen time reductions as compared to physical activity participation. This idea is supported by the ceiling effect of parents’ attitudes for child physical activity that has been previously noted in the literature suggesting that the health benefits associated with physical activity are well understood by parents (Rhodes et al., 2013). In comparison, the health risks associated with screen time and the STG have been established more recently and may not be as well-known or accepted by parents as the PAG or benefits associated with physical activity. As a result, perceived behavioural control, message believability, and other key variables in the social issue advertising believability model may be lower for the STG advertisement versus the PAG advertisement. This discrepancy in advertisements for these different behaviours is an important area to research in health promotion in order to determine how to effectively state the STG and promote supportive behaviours to enable screen time reductions in a way that is believable to parents.

2.6 Conclusion

There is a need to promote the reduction of child recreational screen time independent of the promotion of child physical activity (Biddle et al., 2003; Rey-López et al., 2008). Engaging parents in these promotion efforts is key as they are important agents of change for their children’s health behaviours, in particular for physical activity participation and screen time reduction (Epstein et al., 1990; Lindsay et al., 2006; Salmon et al., 2011). Mass media advertisements targeting parents to support their children in meeting PAG and STG may be a strategy to promote these supportive behaviours. Current attitudes and beliefs of parents
regarding child screen time behaviour are unknown. It is important to raise awareness of the behaviour health link between screen time and negative health outcomes and to develop parents’ attitudes regarding the importance of screen time reduction. Whether parents believe these guideline advertisements may be related to their perceived behavioural control for engaging in supportive behaviours. Increasing perceived behavioural control, and subsequently message believability, through persuasive communications may allow for the creation of more effective guideline advertisements for parents that are more likely to develop strong attitudes and intentions for supportive behaviours (Berry et al., 2011; Berry et al., 2012; O’Cass & Griffin, 2006). Once believable guidelines and guideline promotion advertisements are created, they may be evaluated for their utility in promoting intentions and behaviours for supportive behaviours to enable physical activity participation and screen time reduction. Eventually, these advertisements should be integrated with other aspects of social marketing campaigns to increase the likelihood that parents’ intentions to engage in supportive behaviour translate into behaviour (Finlay & Faulkner, 2005; Grier & Bryant, 2005; Rhodes et al., 2013).

2.7 Objective

The purpose of this study was to test the social issue advertising believability model in a sample of 500 parents to determine a) if believability of PAG and STG advertisements predicts parents’ intentions to engage in behaviour to support their children’s physical activity participation and screen time reduction and b) if perceived behavioural control is predictive of message believability. A secondary objective was to determine whether message believability differed for the PAG advertisement versus the STG advertisement. In addition, I examined whether all other model variables (i.e., attention, social issue involvement, attitudes towards the issue, attitudes towards parental support, perceived behavioural control, and intentions) differed for the PAG advertisement versus the STG advertisement. These objectives were assessed in the
whole sample overall as well as separately for moms and dads. The separate analyses were conducted to determine if results varied when providing advertisements to moms versus dads.

2.8 Hypotheses

H1: Message believability would predict parents’ intentions to engage in supportive behaviours for child physical activity participation and screen time reduction.

H2: Parents’ perceived behavioural control for engaging in supportive behaviours for physical activity participation and screen time reduction would predict how believable they find the PAG and STG advertisements respectively.

H3: All social issue advertising believability model variables would be greater for the PAG advertisement compared to the STG advertisement.

2.9 References


Jarvis, J. W., Rhodes, R. E., Deshpande, S., Berry, T. R., Chulak-Bozzer, T., Faulkner, G.,


Chapter 3

Methods

3.1 Design

This study used a randomized cross-over design. Advertisement topic was manipulated (PAG versus STG advertisements). Message believability, perceived behavioural control, and all other variables in the social issue advertising believability model were also assessed. This study was conducted completely online.

3.2 Participants

3.2.1 Eligibility.

Participants were included if they 1) could read, write, and understand English and 2) they had at least one child between the ages of 5 and 11. The necessity of English language competency was to ensure full understanding of the advertisements used in the study. The child age range for parent inclusion was selected to correspond with the Canadian PAG and STG for children (5-11) and so that children were young enough that parental support may still have been influential in their health behaviours.

3.2.2 Sample size.

In line with the primary study objective of testing the adapted social issue advertising believability model, the rule of thumb for including ten participants per model variable was used as a guide (Nunnally, 1967). As there was the potential to include 39 observed indicators in the model, a minimum of 390 participants was deemed appropriate. To account for incorrect or incomplete completion of questionnaires, 500 participants were recruited for this study.

3.2.3 Recruitment.
Participants were recruited online through Survey Monkey Audience’s online panel of consumers. A random sample of consumers within the panel who met the eligibility criteria were sent the survey. This random sampling approach was implemented to reduce the selection bias of parents self-selecting the study through the online advertisement related to physical activity or screen time behaviours. Participants were provided small compensation from Survey Monkey Audience for completing the study. Participants provided their free and informed consent and confirmed they met the eligibility requirements before beginning the study.

3.3 Measures

3.3.1 Demographics.

3.3.1.1 Participant characteristics.
Parents were asked to self-report their age, gender, number of children between the ages of 5 and 11, the gender of the oldest child in that age group, education, household income, employment status, ethnicity, and marital status.

3.3.1.2 Parent physical activity.
Parent physical activity was self-reported using the International Physical Activity Questionnaire (IPAQ) short-form (Craig et al., 2003). This questionnaire defined and provided a measure of walking, moderate, and vigorous activity performed during leisure time. The IPAQ short-form has been found to be valid and reliable in an adult population in 12 countries (Craig et al., 2003).

3.3.1.3 Child physical activity.
Child physical activity behaviour of the oldest child falling in the age range was assessed using three parent-proxy items from the Canadian Health Measures Survey conducted between 2009 and 2011 (Colley et al., 2013). Participants were given a definition stating, “Physical activity refers to activities that make your child out of breath or warmer than usual. These can be
organized physical activities with a coach or instructor (i.e., swimming lessons, soccer, dance) or unorganized activities without a coach or instructor (i.e., playing in the playground, going for a bike ride, drop-in skating).” Participants were asked, “a) Over the past 7 days, on how many days was he/she physically active for a total of at least 60 minutes per day? (drop down menu 1-7 days), b) About how many hours a week does he/she usually take part in physical activity outside of school while participating in lessons or league or team sports? (drop down menu of 0-7+ hrs/week), and c) About how many hours a week does he/she usually take part in physical activity outside of school while participating in unorganized activities, either on his/her own or with friends?” (drop down menu of 0-7+ hrs/week).

### 3.3.1.4 Parent screen time.
Screen time was assessed through self-reported television and computer use. Matton and colleagues (2007); screen time measure was used which demonstrated the highest reliability and validity in a review of adult sedentary behaviour measures (Clark et al., 2009). Participants were given a definition stating, “Television/videos includes programs watched on the TV, the computer, or portable devices. Video and computer games includes games played on devices such as a computer, laptop, iPad, cell phone or iPhone, the internet, Playstation, Wii, XBOX, etc.” used previously by Carson, Rosu, and Janssen (2014) adopted from the National Longitudinal Survey of Children and Youth (NLSCY; Statistics Canada, 2010). Participants were then asked, “a) How many hours do you usually spend watching TV/video or playing computer games in your leisure time on a weekday? and b) on a weekend day?” Response options were 0, 0.5, 1, 1.5, 2, 3, 4, 5, 6+ hrs/day. Matton and colleagues (2007) demonstrated high internal reliability with this measure (α = .92).

### 3.3.1.5 Child screen time.
Screen time behaviour for children was assessed using two parent-proxy items from the Canadian Health Measures Survey conducted between 2009 and 2011 (Colley et al., 2013). The
definition of screen time (Carson et al., 2014; Statistics Canada, 2010) was repeated and participants were then asked, “a) On average, about how many hours a day does he/she watch TV or videos or play video games in their leisure time?, and b) On average, about how many hours a day does he/she spend on a computer (working, playing games, e-mailing, chatting, surfing the internet, etc.) in their leisure time?”. Responses were made on a drop down menu with the options: 0, 0.5, 1, 1.5, 2, 3, 4, 5, 6+ hrs/day. Although these items have been used in the Canadian Health Measures Survey, they have not been rigorously validated.

3.3.2 Advertisement history.

3.3.2.1 Advertisement order.

The order in which the advertisements were seen by participants was assessed by asking, “Please indicate if this is the first or second message that you saw” following both the PAG advertisement and the STG advertisement. Responses were recorded on a drop down menu with the options: first, or second.

3.3.2.2 Guideline awareness.

Parents’ past awareness of the child PAG and STG were used to assess the dose of the guideline message parents have previously received. Participants were asked, “Were you aware of the physical activity/screen time guidelines before seeing the above message?”. Responses were made on a drop down menu with options: yes, no, or unsure.

3.3.3 Social issue advertising believability model variables.

All model variable measures demonstrated acceptable internal reliability with Cronbach’s alphas being .76 or greater, and correlations being .72 or greater for two item measures (Nunnally, 1978).

3.3.3.1 Message believability.
Message believability was assessed with the Advertising Believability Scale (Beltramini, 1988), which has been validated in an adult population and has been deemed reliable. This scale has also been used in social issue advertising (O’Cass & Griffin, 2006; Berry, Jones, McLeod, & Spence, 2011) and in a parent population (Berry et al., 2012). Participants were asked to, “please rank the messages you just saw as, a) unbelievable/believable, b) untrustworthy/trustworthy, c) not convincing/convincing, d) not credible/credible, e) unreasonable/reasonable, f) dishonest/honest, g) questionable/unquestionable, h) inconclusive/conclusive, i) not authentic/authentic, j) unlikely/likely”. Participants responded using semantic differential scales ranging from 1 to 7. Berry and colleagues (2012) found the scale to be internally reliable in their sample of mothers (α = .91). According to Nunnally (1978) the reliability for this scale is good in the current study for the PAG advertisement (α = .98), and the STG advertisement (α = .98) respectively.

3.3.3.2 Attention paid to the advertisement.

Attention was measured using four items developed by Laczniaak, Muehling, and Grossbart (1989) that have been applied previously in social issue advertising (O’Cass & Griffin, 2006; Berry et al., 2011) and in a parent population (Berry et al., 2012). Participants were asked, “a) how much attention did you pay to the message, b) how much did you concentrate on the message, c) how involved were you with the message, and d) how much thought did you put into evaluating the message?”. Questions were answered using a 7-point scale ranging from 1=none to 7=very much. Berry and colleagues (2012) found the scale to be internally reliable in their population of mothers (α = .91), and it also demonstrated good reliability in the current study for the PAG advertisement (α = .97), and the STG advertisement (α = .97) respectively (Nunnally, 1978).

3.3.3.3 Social issue involvement – child physical activity participation.
An adapted version of the valid and reliable Personal Involvement Inventory Scale (Zaichkowsky, 1985) was used to assess parents’ social issue involvement with the child physical activity participation. Semantic differential scales ranging from 1 to 7 were used to respond to the question, “Please rank the issue of increasing child physical activity as… a) important/unimportant, b) of concern to me/ of no concern, c) irrelevant/relevant, d) means a lot to me/means nothing to me, e) matters to me/doesn’t matter, f) interesting/boring, g) significant/insignificant, h) needed/not needed”. This scale has been used previously to assess involvement with social issues and has been found to be reliable ($\alpha = .92$; O’Cass & Griffin, 2006), and it also demonstrated good reliability in the current study ($\alpha = .93$; Nunnally, 1978).

### 3.3.3.4 Social issue involvement – child screen time reduction.

The Personal Involvement Inventory Scale (Zaichkowsky, 1985) was also used to assess social issue involvement with screen time reduction. The initial question read, “Please rank the issue of reducing recreational child screen time as…” The same adjective pairs used for physical activity were also used for screen time and were assessed on the same semantic differential scale. This scale demonstrated good reliability in the current study ($\alpha = .98$; Nunnally, 1978).

### 3.3.3.5 Attitudes towards child physical activity.

Three items were taken from Rhodes and colleagues (2013) to assess instrumental and affective attitudes towards child physical activity. Participants were asked, “Participating in physical activity helps my child a) to be healthy, b) to have more self-confidence and c) have a chance to be with friends”. A scale ranging from $1=\text{strongly disagree}$ to $5=\text{strongly agree}$ was used to respond. This measure was validated by Huhman and colleagues (2005) and reliability was found to be adequate by Rhodes and colleagues (2013; $\alpha = .68$). Reliability for this scale was good in the current study ($\alpha = .88$; Nunnally, 1978).
3.3.3.6 Attitudes towards child screen time.

Four items adapted from He, Piché, Beynon, and Harris (2010) were used to assess attitudes towards child screen time. Participants were asked, “Children spending several hours a day on recreational screen time is…? a) harmful/beneficial, b) unhealthy/healthy, c) useful/of no use, and d) of no concern/of concern”. Semantic differential scales ranging from 1 to 7 will be used to respond to the question. The third item will be recoded for analyses purposes. These questionnaires were pilot tested by He and colleagues (2010) by 15 pairs of parents and children resulting in a change of questionnaire layout but not content. Reliability for this scale was adequate in the current study (α = .76; Nunnally, 1978).

3.3.3.7 Attitudes towards support for child physical activity participation.

Two items were used previously by Rhodes and colleagues (2013) were used to assess instrumental and affective attitudes towards providing support for child physical activity participation. Participants were asked, “a) Supporting my child (through driving, participating, or paying for their activities, etc.) in physical activity is important to me, and b) I would enjoy the time spent helping my child get active (eg. driving my child to a sport practice, watching my child participate in activities, etc.)”. A scale ranging from 1=strongly disagree to 5=strongly agree was used to respond to these items. Reliability was seen as adequate by Rhodes and colleagues (2013; α = .77) and was also found to be adequate in the current study (r = .78, p<.001).

3.3.3.8 Attitudes towards support for child screen time reduction.

Two items were adapted from Rhodes and colleagues (2013) to assess instrumental and affective attitudes towards providing support for child screen time reduction. Participants were asked, “a) Supporting my child (through limiting TV viewing, limiting computer use, or suggesting alternative activities, etc.) in reducing their recreational screen time is important to me, and b) I would enjoy the time spent helping my child reduce their recreational screen time...
(eg. helping them find other activities they enjoy, eating as a family not in front of the TV, etc.)”. A scale ranging from 1=strongly disagree to 5=strongly agree was used to respond to these items. Reliability of this scale was found to be adequate in the current study (r = .72, p<.001).

3.3.3.9 Perceived behavioural control for supporting physical activity participation.

Three items were adapted from the Activity Support Scale to assess parents’ perceived behavioural control for supporting child physical activity participation (Davison, Li, Baskin, Cox, & Affuso, 2011). This scale has been found to be reliable and valid across non-Hispanic, White, and African American parents (Davison et al., 2011). Participants were asked, “Please indicate how easy or hard you feel it would be over the next 2-weeks to…a) take my child to a place where he/she can be active, b) watch my child play sports or participate in other physical activities (i.e., playing outside, drop-in skating), c) role model active behaviour for/with my child. Two additional items were added based on the approach to assessing demographics from the Canadian Health Measures Survey (Colley et al., 2013). These items included: “d) encourage my child to engage in structured physical activity (i.e., joining a sports team such as soccer, basketball, or dance), and e) encourage my child to engage in unstructured physical activity (i.e., playing in a playground, playing outside with friends)”. One additional item was included to assess parents’ perceived behavioural control relating specifically to supporting the guidelines: “f) to control whether or not my child meets the physical activity guidelines”. Responses were made on a 5-point scale ranging from 1=extremely hard to 5=extremely easy. The original items from the Activity Support Scale have been deemed valid and reliable (Davison et al., 2011); however, the scale with the additional items has not been validated. Reliability for this scale was good in the current study (α = .89; Nunnally, 1978).

3.3.3.10 Perceived behavioural control for supporting screen time reduction.

Three items were adapted from the Activity Support Scale (Davison et al., 2011) to assess parents’ perceived behavioural control for supporting child screen time reduction. This
scale has been found to be reliable and valid across non-Hispanic, White, and African American parents (Davison et al., 2011). Participants were asked to, “Please indicate how easy or hard you feel it would be over the next 2-weeks to control…a) how long my child plays video games in their leisure time (i.e., Xbox), b) the amount of time my child can watch TV and DVD’s in a day in their leisure time (including educational and non-educational programs), c) the amount of time my child can use the computer in their leisure time for things other than homework (i.e. playing computer games, surfing the internet, chatting)”. One additional item, d) whether or not my child meets the screen time guidelines, was included. Responses were made on a 5-point scale ranging from 1=extremely hard to 5=extremely easy. Reliability for this scale was good in the current study (α = .92; Nunnally, 1978).

**3.3.3.11 Intentions to support child physical activity participation.**

Seven items from the logistic support, modeling, and use of community resources components of the Activity Support Scale for Multiple Groups were used to assess parents’ intentions to engage in supportive behaviours for physical activity participation (Davison et al., 2011). As a measure of behaviour, this measure was adapted to assess behavioural intentions. Participants were asked, “I intend to help my child meet the physical activity guidelines over the next 2-weeks by…, a) enrolling my child in sports teams such as soccer, basketball and dance, b) taking my child to places where he/she can be active, c) watching my child play sports or participate in other activities (i.e., playing at the park, drop-in skating), d) encouraging my child to be physically active by leading by example (i.e. role modeling), e) encouraging my child to use resources in our neighbourhood to be active (such as the park and the school), f) enrolling my child in community-based programs (such as Girls and Boys Club, YMCA) where he/she can be active, g) finding ways for my child to be active when school is out, for example, enrolling him/her in summer camp and after school programs”. Responses were made on a 5-point scale
ranging from 1= *strongly disagree* to 5= *strongly agree*. Reliability for this scale was good in the current study \( \alpha = .87; \) Nunnally, 1978).

### 3.3.3.12 Intentions to support child screen time reduction.

Five items from the restricting access to sedentary activities component of the Activity Support Scale for Multiple Groups (Davison *et al.*, 2011) were used to assess parents’ intentions to engage in supportive behaviours for screen time reduction. As a measure of behaviour, this measure was adapted to assess intentions to engage in these behaviours. Participants were asked to respond to the statements, “I intend to help my child meet the screen time behaviour guidelines over the next 2-weeks by…a) limiting how long my child plays video games (including on iPad’s, cell phones, and computers), b) limiting the amount of time my child can watch TV and DVD’s in a day (including educational and non-educational programs), and c) limiting the amount of time my child can use the computer for things other than homework (such as playing computer games and surfing the internet)”.

Responses will be made using a 5-point scale ranging from 1= *strongly disagree* to 5= *strongly agree*. Reliability for this scale was good in the current study \( \alpha = .95; \) Nunnally, 1978).
3.4 Procedure

After completing consent and baseline screening, participants immediately began the online questionnaire. After completing demographics, participants were randomized to view the PAG advertisement first or the STG advertisement first. Participants were presented with the corresponding guideline advertisements and completed the advertisement history and social issue advertising believability model measures (see Figure 3). Participants then completed the same process for the second advertisement. Participants saw both sets of guideline advertisements and completed both relevant questionnaires.

Figure 3. Pre and post measures for child PAG and STG advertisements.
3.5 Advertisements

Advertisements were the one page fact sheets prepared by the Canadian Society of Exercise Physiology to communicate the Canadian PAG for children and a modified version of the fact sheet for the Canadian Sedentary Behaviour Guidelines for children available for download from the Canadian Society of Exercise Physiology website (CSEP, 2011a; CSEP, 2011b). These fact sheet advertisements were used to increase the external validity of the study as the advertisements are publically available. Because the published Sedentary Behaviour Guidelines and corresponding fact sheet possess information not exclusively related to screen time behaviour this fact sheet was modified in Adobe Photoshop® to contain only the STG and screen time information. This was done to narrow the focus of the study from reducing all types of sedentary behaviour to our specific focus on reducing screen time behaviour. The main messages in the fact sheet advertisements were: 1) the PAG and the STG, 2) what counts as physical activity and screen time behaviour, 3) the benefits and consequences of child physical activity and child screen time behaviour, and 4) suggestions for how children can engage in physical activity or reduce screen time behaviour respectively. The messages emphasized that parents play a role in their children’s behaviour and provided suggestions on how parents could modify their own behaviour to provide support (i.e., instead of video games in the evening, introduce the family to a new game).

Layout and the amount of information presented in the edited STG fact sheet were matched to the published Sedentary Behaviour Guidelines fact sheet (CSEP, 2011b). This was considered beneficial to ensure that the ease of reading and attraction of the messages was similar to those in the real fact sheet advertisements available on the Canadian Society of Exercise Physiology website. Again, this approach contributes to the external validity of the study.
3.6 Data Analysis

Data analysis was completed using SPSS Software Version 22 (IBM, Armonk, NY, USA) and MPlus Version 7 (Muthén & Muthén, 1998-2012).

3.6.1 Data cleaning plan.

The data were checked for normality using skewness and kurtosis measures for all model outcome variables, the cutoff was \( z = \pm 1.96 \). If skewness and kurtosis were not normal, z-scores where \( z = \pm 3.29 \) were considered outliers. Outlier values were replaced with a value one unit above or below the last z-score under the outlier cut-off (Field 2009; Tabachnick, Fidell & Osterlind, 2001). If this was the value already entered (e.g., 2 was the value one unit below the cut-off but 2 was already entered), the value was not changed. If the skewness and kurtosis were still not normalized, log, square root, or reciprocal data transformations were attempted to normalize the data. If the data were still not normalized, the raw data were used for analyses.

3.6.2 Covariates.

Parent physical activity and screen time behaviour, child physical activity and screen time behaviour, parent age, number of children between 5 and 11, gender of oldest child in the age range, advertisement order, and guideline awareness were tested as potential covariates with model variables (i.e., message believability, attention paid to advertisements, social issue involvement, attitudes towards the issue, attitudes towards parental support, perceived behavioural control, and intentions for parental support). Continuous variables were tested using correlations, and categorical variables (i.e., advertisement order, gender of child, and guideline awareness) were tested using univariate analysis of variance tests (ANOVAs) with the variable as a fixed factor.

3.6.3 Model testing.

Structural equation modeling was used to test the adapted social issue advertising believability model for each advertisement.
3.6.3.1 Indicator selection and testing the attitudes construct.

Items selected as indicators to represent latent variables influence the overall model construct thus impacting the results and interpretation of the model (MacCallum & Austin, 2000). Due to the complexity of the model that was tested, a maximum of three indicators were used to predict each latent construct in the structural model. Selecting indicators was necessary as it is one method to rectify an overidentified model, which would have resulted in the inability of the model to run for analysis (Kelloway, 1998). Little, Lindenberger, and Nesselroade (1999) provide recommendations for how to select indictors while considering practical and theoretical implications. Indicator inclusion was determined based on face validity, within construct variability, construct independence, and the operationalization of constructs. In the case of this study, items directly related to the latent construct (i.e., “how believable did you find the message” for message believability) were selected for face validity. The range of item content in a scale was then considered to ensure that items assessing unique aspects of the construct were selected and redundant items were not selected. Cronbach alphas assisted in identifying the unique and redundant items by quantifying which items were most closely, and least closely, related to the scale overall.

Indicator selection had to occur for message believability, attention, social issue involvement, attitudes towards the issue for the STG, and intentions for supporting child physical activity participation as these variables had more than three items in their measures. One item was used for perceived behavioural control so that the model was specific to parents’ control for supporting their children in achieving the guidelines.

The attitudes construct was composed of two sub-scales of three items from attitudes towards the issue, and two items from attitudes towards parental support. Preliminary model testing was used to determine if attitudes should be included as one over-arching latent construct.
or as two separate latent constructs consisting of: 1) attitudes towards the issue, and 2) attitudes towards parental support. Specifically, the one component model (i.e., attitudes) was tested against a multicomponent model (i.e., attitudes towards the issue and attitudes towards parental support) in order to determine if the $\chi^2$ fit is significantly ($p < .05$) improved in the multicomponent model (See Figure 4 and 5 for models to be tested). Chi-square differences were calculated using the Satorra-Bentler scaled chi-square difference test protocol with an MLR estimator (Satorra & Bentler, 2001). This approach was used previously by Rhodes, Blanchard, and Matheson (2006) in order to determine the discriminant validity of instrumental versus affective attitudes.

*Figure 4.* One component attitudes model
3.6.3.2 Model hypothesis testing.

Structural equation modeling with maximum likelihood estimation and a variance/covariance matrix was used to test the model hypotheses. The models for each advertisement were subsequently tested separately for moms and dads in order to explore differences in model fit between genders. The first indicator of all constructs in the model was fixed to 1.0 in order to create a metric scale. Hu and Bentler (1999) recommend a variety of fit indices when using maximum likelihood estimation. In this study, comparative fit indices (CFI) and root mean squares error of approximation (RMSEA) values were compared against cut-off values to assess model fit. Effect sizes were interpreted using Cohen’s effect size index for correlation coefficients (Cohen, 1992). Standardized effects that were >.10 indicated a small effect, >.30 indicated a medium effect, and >.50 indicated a large effect (Cohen, 1992).

3.6.4 Advertisement hypothesis testing.

Mean scores were calculated for each of the social issue advertising believability model variables for both the PAG and STG advertisements. To evaluate the difference in model
variables between the advertisements and for moms versus dads, 2 (advertisement) X 2 (gender) mixed model ANOVAs were conducted. The within-subject repeated measures factor was advertisement type (PAG versus STG advertisements) and the between-subject factor was gender. Cohen’s $d$ was calculated to interpret ANOVA effect sizes where values of >.2 indicated a small effect, >.5 indicated a medium effect, and >.8 indicated a large effect (Cohen, 1992).

3.7 References


Chapter 4

Results

4.1 Data cleaning

Skewness and kurtosis measures for all model outcome variables indicated that the majority of the data were negatively skewed and positively kurtosed. Continuous model variables were checked for outliers which were identified as having $z = \pm 3.29$. For the PAG advertisement, outliers were found for message believability (n=61), social issue involvement (n=37), attitudes towards the issue (n=14), attitudes towards parental support (n=6), perceived behavioural control (n=4), and intentions (n=8). For the STG advertisement, outliers were found for message believability (n=41), social issue involvement (n=46), and attitudes towards parental support (n=9). In the majority of cases, the entered values were already one below the last z-score under the outlier cut-off and therefore were not recoded. For the PAG advertisement 19.2% (n=25) of outliers were recoded and for the STG advertisement 0% (n=0) of the outliers were recoded. Data transformations were attempted to resolve skewness and kurtosis; however, log, square root, and reciprocal data transformations were unsuccessful in normalizing the data. As such, analyses were conducted using the raw data with the 25 recoded outliers for the PAG advertisement and the raw data for the STG advertisement. As a result of violating the assumption of normality for the structural equation modeling analyses, a corrected normal theory method was applied to the model testing analyses (Kline, 2005). Specifically, maximum likelihood parameter estimates with standard errors and a mean adjusted chi-square test statistic were applied beyond the maximum likelihood conventional estimate as they are more robust to account for the non-normal data (Muthén & Muthén, 1998-2012). The ANOVA test is considered robust (Field, 2009; Schmider, Ziegler, Danay, Beyer, & Bühner, 2010) with a meta-analysis demonstrating that even with unequal sample sizes, violation of the assumption of normality has negligible impact on the alpha
and power of the F-statistic when calculated with a traditional ANOVA (Harwell, Rubinstein, Hayes, & Olds, 1992). Thus, no modifications were made to the analysis plan for the ANOVAs for advertisement type.

### 4.2 Participant Characteristics

In total, 617 members of the Survey Monkey Audience participant panel opened and entered some information into the survey. Of the 617 people who opened the survey, 500 (81.0%) completed the survey (i.e., respondents), 65 (10.5%) were not eligible to participate, and 52 (8.4%) failed to complete the survey (i.e., non-respondents). Chi-square and t-test analyses, for categorical and continuous variables respectively, indicated that demographic characteristics of the 52 non-respondents were similar to those of 500 respondents ($p_s > .05$). There was minimal missing data for all social issue advertising believability model variables: 0.9% and 1.1% of the data points were missing for PAG advertisement variables and STG advertisement variables respectively.

Of the 500 respondents, one self-identified as transgendered. Unfortunately, because we categorized moms and dads according to gender rather than self-report, this individual was excluded from the analyses examining differences in advertisement evaluations between moms and dads. Thus, the analyses of moms and dads had a sample size of 499. Demographic information can be found in Table 1.
<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Moms</th>
<th>Dads</th>
</tr>
</thead>
<tbody>
<tr>
<td>% (n)</td>
<td>100 (500)</td>
<td>75.6 (377)</td>
<td>24.4 (122)</td>
</tr>
<tr>
<td>Age, Mean Years (SD)</td>
<td>37.4 (7.1)</td>
<td>36.7 (6.6)</td>
<td>39.4 (8.1)</td>
</tr>
<tr>
<td>Ethnicity, % (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No visible minority</td>
<td>76.0 (380)</td>
<td>78.2 (295)</td>
<td>69.7 (85)</td>
</tr>
<tr>
<td>Black</td>
<td>3.8 (19)</td>
<td>4.0 (15)</td>
<td>3.3 (4)</td>
</tr>
<tr>
<td>Chinese</td>
<td>5.8 (29)</td>
<td>4.8 (18)</td>
<td>9.0 (11)</td>
</tr>
<tr>
<td>Filipino</td>
<td>1.8 (9)</td>
<td>2.4 (9)</td>
<td>0</td>
</tr>
<tr>
<td>South Asian/East Indian</td>
<td>5.6 (28)</td>
<td>3.7 (14)</td>
<td>11.5 (14)</td>
</tr>
<tr>
<td>Other</td>
<td>9.4 (47)</td>
<td>7.7 (29)</td>
<td>13.9 (17)</td>
</tr>
<tr>
<td>Aboriginal Status, % (n)</td>
<td>4.6 (23)</td>
<td>5.0 (19)</td>
<td>2.5 (3)</td>
</tr>
<tr>
<td>Education, % (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>1.4 (7)</td>
<td>1.9 (7)</td>
<td>0</td>
</tr>
<tr>
<td>High school</td>
<td>12.6 (63)</td>
<td>13.5 (51)</td>
<td>9.8 (12)</td>
</tr>
<tr>
<td>Some college (no degree)</td>
<td>16.8 (84)</td>
<td>19.4 (73)</td>
<td>8.2 (10)</td>
</tr>
<tr>
<td>College degree</td>
<td>22.2 (111)</td>
<td>23.3 (88)</td>
<td>18.9 (23)</td>
</tr>
<tr>
<td>Some university</td>
<td>9.0 (45)</td>
<td>8.2 (31)</td>
<td>11.5 (14)</td>
</tr>
<tr>
<td>University degree (bachelors)</td>
<td>26.5 (132)</td>
<td>24.1 (91)</td>
<td>33.6 (41)</td>
</tr>
<tr>
<td>Masters level</td>
<td>9.2 (46)</td>
<td>7.7 (29)</td>
<td>13.9 (17)</td>
</tr>
<tr>
<td>Marital Status, % (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Single</td>
<td>9.6 (48)</td>
<td>11.1 (42)</td>
<td>4.9 (6)</td>
</tr>
<tr>
<td>Common-law</td>
<td>15.4 (77)</td>
<td>16.2 (61)</td>
<td>12.3 (15)</td>
</tr>
<tr>
<td>Married</td>
<td>69.3 (346)</td>
<td>67.9 (256)</td>
<td>73.8 (90)</td>
</tr>
<tr>
<td>Divorced</td>
<td>4.2 (21)</td>
<td>3.2 (12)</td>
<td>7.4 (9)</td>
</tr>
<tr>
<td>Other</td>
<td>0.8 (4)</td>
<td>1.1 (4)</td>
<td>0</td>
</tr>
<tr>
<td>Do not wish to specify</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Households Income, % (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34 999$ or less</td>
<td>16.6 (83)</td>
<td>19.4 (73)</td>
<td>8.2 (10)</td>
</tr>
<tr>
<td>35 000$-49 999$</td>
<td>10.8 (54)</td>
<td>9.3 (35)</td>
<td>15.6 (19)</td>
</tr>
<tr>
<td>50 000$-64 999$</td>
<td>16.2 (81)</td>
<td>16.4 (62)</td>
<td>14.8 (18)</td>
</tr>
<tr>
<td>65 000$-74 999$</td>
<td>10.0 (50)</td>
<td>9.0 (34)</td>
<td>13.1 (16)</td>
</tr>
<tr>
<td>75 000$-99 999$</td>
<td>20.2 (101)</td>
<td>19.9 (75)</td>
<td>21.3 (26)</td>
</tr>
<tr>
<td>100 000$-149 999$</td>
<td>17.2 (86)</td>
<td>16.2 (61)</td>
<td>20.5 (25)</td>
</tr>
<tr>
<td>150 000$ or more</td>
<td>4.0 (20)</td>
<td>3.7 (14)</td>
<td>4.9 (6)</td>
</tr>
<tr>
<td>Do not wish to report</td>
<td>4.8 (24)</td>
<td>5.8 (22)</td>
<td>1.6 (2)</td>
</tr>
<tr>
<td>Employment Status, % (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>49.3 (246)</td>
<td>39.5 (149)</td>
<td>79.5 (97)</td>
</tr>
<tr>
<td>Part time</td>
<td>16.2 (81)</td>
<td>19.4 (73)</td>
<td>6.6 (8)</td>
</tr>
<tr>
<td>Student</td>
<td>2.8 (14)</td>
<td>2.9 (11)</td>
<td>2.5 (3)</td>
</tr>
<tr>
<td>Homemaker</td>
<td>25.6 (128)</td>
<td>32.6 (123)</td>
<td>3.3 (4)</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>Not currently employed</td>
<td>5.2 (26)</td>
<td>4.2 (16)</td>
<td>8.2 (10)</td>
</tr>
<tr>
<td>Do not wish to report</td>
<td>0.4 (2)</td>
<td>0.5 (2)</td>
<td>0</td>
</tr>
<tr>
<td>Number of Children Total, Mean (SD)</td>
<td>2.3 (1.1)</td>
<td>2.3 (1.2)</td>
<td>2.2 (1.0)</td>
</tr>
<tr>
<td>Number of Children 5-11, Mean (SD)</td>
<td>1.4 (0.7)</td>
<td>1.4 (0.7)</td>
<td>1.5 (0.9)</td>
</tr>
<tr>
<td>Parent Physical Activity, Mean MET/Minute/Week (SD)</td>
<td>1323.7</td>
<td>1118.1 (1534.6)</td>
<td>1978.4 (3676.7)</td>
</tr>
<tr>
<td>Parent Screen Time Per Day, Mean Hours (SD)</td>
<td>5.7 (2.0)</td>
<td>5.7 (2.0)</td>
<td>5.5 (2.1)</td>
</tr>
<tr>
<td>Child Physical Activity, Mean Hours Per Week (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structured</td>
<td>3.1 (2.0)</td>
<td>3.1 (2.0)</td>
<td>3.3 (1.8)</td>
</tr>
<tr>
<td>Unstructured</td>
<td>4.2 (2.2)</td>
<td>4.3 (3.2)</td>
<td>4.0 (2.1)</td>
</tr>
<tr>
<td>Child Screen Time, Mean Hours Per Day (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Television and Videos</td>
<td>4.5 (1.9)</td>
<td>4.5 (1.9)</td>
<td>4.5 (2.0)</td>
</tr>
<tr>
<td>Computer</td>
<td>3.4 (2.0)</td>
<td>3.3 (1.9)</td>
<td>3.9 (2.1)</td>
</tr>
<tr>
<td>Children Meeting Guidelines, % (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Activity Guidelines</td>
<td>17.6 (88)</td>
<td>20.4 (77)</td>
<td>9.0 (11)</td>
</tr>
<tr>
<td>Screen Time Guidelines</td>
<td>2.2 (11)</td>
<td>2.4 (9)</td>
<td>1.6 (2)</td>
</tr>
<tr>
<td>Guidelines Awareness, % (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Activity Guidelines</td>
<td>51.0 (255)</td>
<td>54.4 (205)</td>
<td>41.0 (50)</td>
</tr>
<tr>
<td>Screen Time Guidelines</td>
<td>34.6 (173)</td>
<td>37.7 (142)</td>
<td>25.4 (31)</td>
</tr>
</tbody>
</table>
4.3 Covariates

None of parent physical activity and screen time behaviour, child physical activity and screen time behaviour, parent age, number of children between 5 and 11, gender of the oldest child in the age range, advertisement order, and guideline awareness were significantly associated with all of the key outcomes and therefore none were included as covariates in the analyses.

4.4 Model Testing

4.4.1 Indicator selection.

Due to the complexity of the model, three items were selected as indicators to predict each latent construct in the models and five items were selected to predict the overall attitudes construct. One item was used for perceived behavioural control making this a measured variable instead of a latent construct in the structural equation model. This measured variable was selected as there was one item for each advertisement that reflected parents’ perceived behavioural control specifically for supporting their children to meet the respective guidelines. The other perceived behavioural control items assessed parents’ perceived behavioural control for engaging in supportive behaviours specific to physical activity participation or screen time reduction and therefore were different items between advertisement type. The one item was assessed to keep the models more uniform between advertisement types. Table 2 provides a list of the selected items applied as indicators in the models.
Table 2. Items Selected for the Structural Equation Model Analyses

<table>
<thead>
<tr>
<th>Message Believability</th>
<th>PAG Advertisement</th>
<th>Selected</th>
<th>STG Advertisement</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please rank the message you just saw as…</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) unbelievable…believable</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2) untrustworthy/trustworthy</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3) not convincing…convincing</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4) not credible/credible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) unreasonable/reasonable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) dishonest/honest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) questionable…unquestionable</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>8) inconclusive/conclusive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9) not authentic/authentic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10) unlikely/likely</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attention</th>
<th>PAG Advertisement</th>
<th>Selected</th>
<th>STG Advertisement</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) How much attention did you pay to the message?</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2) How much did you concentrate on the message</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) How involved were you with the message?</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4) How much thought did you put into evaluating the message?</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Issue Involvement</th>
<th>PAG Advertisement</th>
<th>Selected</th>
<th>STG Advertisement</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please rank the issue of increasing child physical activity/reducing child recreational screen time as…</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) unimportant…important</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2) of concern to me/ of no concern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitudes towards the issue</td>
<td>Participating in physical activity helps my child….</td>
<td>Children spending several hours a day on recreational screen time is…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Attitudes towards parental support | 1) Supporting my child (through driving, participating, or paying for their activities, etc.) in physical activity is important to me.  
2) I would enjoy the time spent helping my child get active (e.g. driving my child to a sport practice, watching my child participate in activities, etc.) | 1) Supporting my child (through limiting TV viewing, limiting computer use, or suggesting alternative activities, etc.) in reducing their recreational screen time behaviour is important to me  
2) I would enjoy the time spent helping my child reduce their recreational screen time (e.g. helping them find other activities they enjoy, eating as a family not in front of the TV, etc.) |

| 1) To be healthy | ✓ | 1) harmful…beneficial | ✓ |
| 2) To have more self-confidence | ✓ | 2) unhealthy…healthy | ✓ |
| 3) To have a chance to be with friends | ✓ | 3) useful/of no use | |
| 4) | ✓ | 4) of no concern…of concern | ✓ |

Perceived

Please indicate how easy or hard you feel

Please indicate how easy or hard you feel
<table>
<thead>
<tr>
<th>Behavioural Control</th>
<th>it would be over the next 2-weeks to control…</th>
<th>it would be over the next 2-weeks to control…</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1) take my child to a place where he/she can be active</td>
<td>1) how long my child plays video games in their leisure time (i.e., Xbox)</td>
</tr>
<tr>
<td></td>
<td>2) watch my child play sports or participate in other physical activities (i.e., playing outside, drop-in skating),</td>
<td>2) the amount of time my child can watch TV and DVD’s in a day in their leisure time (including educational and non-educational programs)</td>
</tr>
<tr>
<td></td>
<td>3) role model active behaviour for/with my child</td>
<td>3) the amount of time my child can use the computer in their leisure time for things other than homework (i.e. playing computer games, surfing the internet, chatting)</td>
</tr>
<tr>
<td></td>
<td>4) encourage my child to engage in structured physical activity (i.e., joining a sports team such as soccer, basketball, or dance)</td>
<td>4) whether or not my child meets the screen time guidelines</td>
</tr>
<tr>
<td></td>
<td>5) encourage my child to engage in unstructured physical activity (i.e., playing in a playground, playing outside with friends)</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>6) control whether or not my child meets the physical activity guidelines</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intentions</th>
<th>I intend to help my child meet the PAG over the next 2-weeks by…</th>
<th>I intend to help my child meet the STBG over the next 2-weeks by…</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1) enrolling my child in sports teams such as soccer, basketball and dance</td>
<td>1) limiting how long my child plays video games in his/her leisure time (including on their iPad’s, cell phones, computers)</td>
</tr>
<tr>
<td></td>
<td>2) taking my child to places where he/she can be active</td>
<td>2) limiting the amount of time my child can watch TV and DVD’s in a day during his/her leisure time (including educational and non-educational programs)</td>
</tr>
<tr>
<td></td>
<td>3) watching my child play sports or participate in other physical activities (e.g., playing in the park, drop-in skating)</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
4) encouraging my child to be physically active by leading by example (e.g., role modeling)
5) encouraging my child to use resources in our neighbourhood to be active (such as the park and the school)
6) enrolling my child in community-based programs (such as Girls and Boys Club, YMCA) where he/she can be active
7) finding ways for my child to be active when school is out, for example, enrolling him/her in summer camp and after school programs

✓ 3) limiting the amount of time my child can use the computer in his/her leisure time for things other than homework (such as playing computer games, surfing the internet, chatting)

✓

Note. The selected items for message believability, attention, social issue involvement, and perceived behavioural control were the same for the PAG and STG advertisements.
4.4.2 Testing formative versus independent attitudes constructs.

See results from the one component and multicomponent model comparisons in Table 3. For both advertisement types, the $\chi^2$ fit was significantly improved in the multicomponent model ($ps < .001$). As a result, the multicomponent attitude structure was used in model analyses for both the PAG and STG advertisements (see Figure 6).
<table>
<thead>
<tr>
<th>Attitude</th>
<th>Single Component</th>
<th>Multicomponent 1 and 2</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>p-value</th>
<th>Composite Reliability (( \alpha ))</th>
<th>Chi-Square Difference (p-value)</th>
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<tr>
<td>Physical Activity Attitudes</td>
<td></td>
<td></td>
<td>257.248</td>
<td>19</td>
<td>.000</td>
<td>.90</td>
<td>&lt;.001</td>
</tr>
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<td>17</td>
<td>.001</td>
<td>.88</td>
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</tr>
<tr>
<td>Multicomponent 2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>Screen Time Attitudes</td>
<td></td>
<td></td>
<td>450.772</td>
<td>19</td>
<td>.000</td>
<td>.87</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Multicomponent 1</td>
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<td>42.804</td>
<td>17</td>
<td>.001</td>
<td>.88</td>
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<td>Multicomponent 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.84</td>
<td></td>
</tr>
</tbody>
</table>

Note. The chi-square values represent the standard chi-square results without the application of the MLR estimator. The single component refers to the formative attitudes construct. Multicomponent 1 refers to the attitudes towards the issue and multicomponent 2 refers to the attitudes towards parental support. The chi-square difference p-value was calculated based on the test-statistic and degrees of freedom calculated using the Satorra & Bentler (2001) approach.
4.4.3 Physical activity model hypothesis testing.

The physical activity model was tested first in the whole sample and then separately for moms and dads.

4.4.3.1 Model fit.

In the physical activity model testing analyses forty-nine cases were missing on at least one variable and were therefore excluded from the analyses due to constraints of the maximum likelihood parameter estimate. Model fit statistics reflect good data fit for the whole sample model $\chi^2 (123, N = 451) = 246.29; p < .001$; CFI = .97; RMSEA = .05, and for the gender separated model $\chi^2 (268, N = 450) = 462.23; p < .001$; CFI = .96; RMSEA = .06, respectively (Hu & Bentler, 1999). For the gender separated models, the chi-square contributions from each group were $\chi^2 = 263.48$ and $\chi^2 = 198.74$ for moms and dads respectively. Based on the theoretical implications and observation of the modification indices, no logical adjustment to the model were
made to improve fit. Most of the misfit was from a series of small correlated error, cross-loadings, or general misfit.

4.4.3.2 Factor loadings.

The measurement estimations for each version of the model (whole sample, moms, and dads) are presented in Table 4. Visual representation of the individual models with standardized effects can be seen in Figures 7, 8 and 9. All freed factor loadings onto the latent constructs in each of the models were significant (\( ps < .001 \)). Factor loadings ranged from .54-.95, .53-.95, and .62-.94 for the whole sample, moms, and dads models respectively.
<p>| Table 4. Means and Factor Loadings for the Physical Activity Model Indicators |
|--------------------------------------------------|----------------|----------------|----------------|
|                                                 | Whole         | Moms           | Dads           | Whole   | Moms | Dads |
| Message Believability                           |               |                |                |         |      |      |
| Item 1                                          | 6.01 (1.17)   | 6.08 (1.19)    | 5.80 (1.10)    | .83     | .85  | .79  |
| Item 2                                          | 5.80 (1.35)   | 5.89 (1.33)    | 5.52 (1.40)    | .90     | .91  | .88  |
| Item 3                                          | 5.63 (1.30)   | 5.71 (1.29)    | 5.38 (1.31)    | .81     | .81  | .82  |
| Attention                                       |               |                |                |         |      |      |
| Item 1                                          | 5.48 (1.38)   | 5.52 (1.42)    | 5.36 (1.22)    | .93     | .93  | .92  |
| Item 2                                          | 5.26 (1.42)   | 5.28 (1.47)    | 5.17 (1.27)    | .95     | .95  | .93  |
| Item 3                                          | 5.38 (1.40)   | 5.39 (1.43)    | 5.34 (1.32)    | .91     | .92  | .88  |
| Social Issue Involvement                        |               |                |                |         |      |      |
| Item 1                                          | 6.33 (.90)    | 6.40 (.87)     | 6.12 (.98)     | .92     | .91  | .91  |
| Item 2                                          | 6.18 (1.07)   | 6.26 (1.02)    | 5.96 (1.18)    | .89     | .92  | .81  |
| Item 3                                          | 6.15 (1.05)   | 6.21 (1.03)    | 5.96 (1.10)    | .87     | .88  | .84  |
| Attitudes Towards the Issue                     |               |                |                |         |      |      |
| Item 1                                          | 4.63 (.65)    | 4.68 (.61)     | 4.46 (.76)     | .82     | .82  | .83  |
| Item 2                                          | 4.46 (.81)    | 4.54 (.75)     | 4.22 (.94)     | .90     | .88  | .93  |
| Item 3                                          | 4.40 (.81)    | 4.46 (.77)     | 4.31 (.85)     | .82     | .78  | .86  |
| Attitudes Towards Parental Support              |               |                |                |         |      |      |
| Item 1                                          | 4.37 (.78)    | 4.39 (.76)     | 4.31 (.85)     | .91     | .91  | .90  |</p>
<table>
<thead>
<tr>
<th>Item 2</th>
<th>4.29 (.82)</th>
<th>4.31 (.82)</th>
<th>4.24 (.83)</th>
<th>.86</th>
<th>.83</th>
<th>.94</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Behavioural Control</td>
<td>3.75 (1.00)</td>
<td>3.77 (1.03)</td>
<td>3.70 (.87)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Intentions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item 1</td>
<td>4.08 (1.00)</td>
<td>4.06 (1.05)</td>
<td>4.11 (.82)</td>
<td>.79</td>
<td>.76</td>
<td>.85</td>
</tr>
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<td>3.83 (1.08)</td>
<td>3.94 (.89)</td>
<td>.73</td>
<td>.72</td>
<td>.83</td>
</tr>
<tr>
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<td>3.69 (1.20)</td>
<td>3.62 (.99)</td>
<td>.54</td>
<td>.53</td>
<td>.62</td>
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</tbody>
</table>

*Note.* Results are reported with the standardized values. No factor loadings are reported for perceived behavioural control and this was a measured variable.
Figure 7. Whole sample physical activity model results. Non-significant standardized effects are presented in brackets.

Figure 8. Moms physical activity model results. Non-significant standardized effects are presented in brackets.
4.4.3.3 Model pathways.

Message believability did not significantly predict intentions and perceived behavioural control did not significantly predict message believability in the whole sample, in moms, or in dads. In both relationship cases the effect sizes were negligible.

Other relationships predicted by the social issue advertising believability model were supported. Attention predicted message believability with medium sized effects in all versions of the model. Social issue involvement predicted attention, attitudes towards the issue, and attitudes towards parental support with large sized effects in all versions of the model. Social issue involvement also predicted message believability in all models with a resulting medium sized effect. Attitudes towards parental support and perceived behavioural control predicted intentions with medium to large effects in the whole sample and in moms. Perceived behavioural control also predicted intentions among dads; however, the effect was small. In all models, attitudes towards the issue were associated with attitudes towards parental support with medium to large effects. Among moms, message believability predicted attitudes towards the issue with small
effects. Interestingly among dads, message believability negatively predicted attitudes towards the issue with small effects. Among dads, attitudes towards the issue predicted intentions with a small effect.

**4.4.3.4 Variance explained.**

Variance explained was calculated using 1-standardized residual variance in all cases. The models accounted for 62%, 64%, and 53% of the variance in message believability and 53%, 55%, and 58%, of the variance in intentions to engage in parental support in the whole sample, moms, and dads respectively. The models also accounted for 33%, 32%, and 42% of the variance in attention, 54%, 55%, and 61% of the variance in attitudes towards the issue, and 60%, 57%, and 70% of the variance in attitudes towards parental support in the whole sample, moms, and dads respectively.

**4.4.4 Screen time model hypothesis testing.**

The screen time model was tested in the whole sample and then as a gender separated model for moms and dads.

**4.4.4.1 Model fit.**

In the screen time model testing analyses 47 cases were missing on at least one variable and were therefore excluded from the analyses due to constraints of the maximum likelihood parameter estimate. Model fit statistics reflect good data fit for the whole sample model $\chi^2 (123, N = 453) = 256.71; p < .001; \text{CFI} = .98; \text{RMSEA} = .05$, and for the gender separated model $\chi^2 (268, N = 452) = 484.40; p < .001; \text{CFI} = .97; \text{RMSEA} = .06$, respectively (Hu & Bentler, 1999). For the gender separated models, the chi-square contributions from each group were $\chi^2 = 248.50$ and $\chi^2 = 235.91$ for moms and dads respectively. Based on the theoretical implications and observation of the modification indices, no logical adjustment to the model were made to improve fit. Most of the misfit was from a series of small correlated error or cross-loadings.
4.4.4.2 Factor loadings.

The measurement estimations of the whole and gender separated samples of the model are presented in Table 5. Visual representation of the individual models with standardized effects can be seen in Figures 10, 11 and 12. All freed factor loadings onto the latent constructs in each of the models were significant (ps < .001). Factor loadings ranged from .74-.95, .72-.95, and .77-.95 for the whole sample, moms, and dads models respectively.
### Table 5. Means and Factor Loadings of the Screen Time Model Indicators

<table>
<thead>
<tr>
<th></th>
<th>Whole</th>
<th>Moms</th>
<th>Dads</th>
<th>Whole</th>
<th>Moms</th>
<th>Dads</th>
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<td>.90</td>
<td>.91</td>
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<td>.91</td>
<td>.90</td>
<td>.94</td>
</tr>
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<td>5.55 (1.43)</td>
<td>5.34 (1.37)</td>
<td>.83</td>
<td>.82</td>
<td>.87</td>
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<tr>
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<tr>
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<td>.94</td>
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<td>.91</td>
<td>.89</td>
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<td>5.77 (1.19)</td>
<td>.93</td>
<td>.93</td>
<td>.90</td>
</tr>
<tr>
<td>Item 3</td>
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<td>5.85 (1.35)</td>
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<td>.87</td>
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<td><strong>Attitudes Towards Screen Time</strong></td>
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<td></td>
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<tr>
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<td>3.61 (1.17)</td>
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<td>.94</td>
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<td>5.77 (1.19)</td>
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<td>.94</td>
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<td>5.76 (1.23)</td>
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<td><strong>Attitudes Towards Parental Support</strong></td>
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</tr>
<tr>
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<td>4.08 (.86)</td>
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<td>3.69 (1.16)</td>
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</tr>
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<td>4.04 (.97)</td>
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<td>.94</td>
<td>.95</td>
<td>.93</td>
</tr>
<tr>
<td>Item 2</td>
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<td>3.99 (.97)</td>
<td>3.89 (.90)</td>
<td>.94</td>
<td>.93</td>
<td>.95</td>
</tr>
<tr>
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<td>4.00 (.98)</td>
<td>4.03 (.98)</td>
<td>3.89 (.97)</td>
<td>.90</td>
<td>.90</td>
<td>.90</td>
</tr>
</tbody>
</table>

*Note.* Results are reported with the standardized values. No factor loadings are reported for perceived behavioural control as this was a measured variable.
Figure 10. Whole sample screen time model results. Non-significant standardized effects are presented in brackets.
4.4.4.3 Model pathways.

Message believability did not significantly predict intentions and perceived behavioural control did not significantly predict message believability in the whole sample, or in moms, or in dads. In both relationship cases the effect sizes were negligible.
Other relationships predicted by the social issue advertising believability model were supported. Attention predicted message believability with medium sized effects in all versions of the model. Social issue involvement predicted attention, attitudes towards the issue, and attitudes towards parental support with medium to large effects. Social issue involvement also, predicted message believability in all versions of the model with small to medium effects. Attitudes towards parental support significantly predicted intentions, as did perceived behavioural control with large and small effects respectively in all versions of the model. In the whole sample, and in moms, attitudes towards the issue were associated with attitudes towards parental support with small to medium effects.

**4.4.4.4 Variance explained.**

Variance explained was calculated using 1-standardized residual variance in all cases. The models accounted for 73%, 72%, and 81% of the variance in message believability and 64%, 63%, and 68%, of the variance in intentions to engage in parental support in the whole sample, moms, and dads respectively. In addition, the models accounted for 50%, 49%, and 52% of the variance in attention, 42%, 46%, and 31% of the variance in attitudes towards the issue, and 73%, 69%, and 90% of the variance in attitudes towards parental support in the whole sample, moms, and dads respectively.

**4.5 Differences Between Advertisement Types**

Descriptive statistics of the mean composite scores are available in Table 6. Levene’s test statistic was significant for attitudes towards the issue for the PAG advertisement, perceived behavioural control for both PAG and STG advertisements, and intentions for the PAG advertisement thus violating the assumption of homogeneity of variance for ANOVAs comparing means between advertisement type and moms versus dads involving those variables. However, in large sample sizes this violation of homogeneity of variance shown by a significant Levene’s test often occurs even with small differences in group variances (Field, 2009).
Table 6. Descriptive Statistics for Physical Activity and Screen Time Mean Composite Scores

<table>
<thead>
<tr>
<th></th>
<th>PAG Advertisement</th>
<th>STG Advertisement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Whole</td>
<td>Moms</td>
</tr>
<tr>
<td>Message Believability, Mean (SD)</td>
<td>5.79  (1.20)</td>
<td>5.90  (1.15)</td>
</tr>
<tr>
<td>Attention, Mean (SD)</td>
<td>5.41  (1.31)</td>
<td>5.45  (1.34)</td>
</tr>
<tr>
<td>Social Issue Involvement, Mean (SD)</td>
<td>6.10  (.93)</td>
<td>6.16  (.90)</td>
</tr>
<tr>
<td>Attitudes Towards the Issue, Mean (SD)</td>
<td>4.50  (.69)</td>
<td>4.56  (.63)</td>
</tr>
<tr>
<td>Attitudes Towards Parental Support, Mean (SD)</td>
<td>4.33  (.76)</td>
<td>4.35  (.74)</td>
</tr>
<tr>
<td>Perceived Behavioural Control, Mean (SD)</td>
<td>3.82  (.84)</td>
<td>3.82  (.87)</td>
</tr>
<tr>
<td>Intentions, Mean (SD)</td>
<td>3.78  (.83)</td>
<td>3.75  (.86)</td>
</tr>
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Table 7. Effect Sizes for Physical Activity and Screen Time ANOVAs

<table>
<thead>
<tr>
<th></th>
<th>Effect Size by Advertisement Type (d)</th>
<th>Effect Size by Gender PAG Advertisement (d)</th>
<th>Effect Size by Gender STG Advertisement (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message Believability, Mean (SD)</td>
<td>.06</td>
<td>.38*</td>
<td>.22*</td>
</tr>
<tr>
<td>Attention, Mean (SD)</td>
<td>.03</td>
<td>.12</td>
<td>.07</td>
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<tr>
<td>Social Issue Involvement, Mean (SD)</td>
<td>.29***</td>
<td>.28</td>
<td>.09</td>
</tr>
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<td>Attitudes Towards the Issue, Mean (SD)</td>
<td>1.14***</td>
<td>.36*</td>
<td>.28*</td>
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<td>Attitudes Towards Parental Support, Mean (SD)</td>
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<td>.09</td>
<td>.15</td>
</tr>
<tr>
<td>Perceived Behavioural Control, Mean (SD)</td>
<td>.11*</td>
<td>.01</td>
<td>.13</td>
</tr>
<tr>
<td>Intentions, Mean (SD)</td>
<td>.24***</td>
<td>.09*</td>
<td>.15*</td>
</tr>
</tbody>
</table>

Note. *= p<.05, *** = p<.001.
4.5.1 Message believability.

The ANOVA revealed a significant main effect for gender, $F(1, 439) = 8.52, p = .004$. Pairwise comparisons revealed that moms found both advertisements significantly more believable than dads ($ps < .05; ds > .22$). The effect size was small. No other effects were significant. See Table 7 for individual effect sizes.

4.5.2 Attention.

No effects were significant, effect sizes were negligible.

4.5.3 Social issue involvement.

The ANOVA revealed a significant main effect for advertisement type, $F(1, 441) = 37.77, p < .001$. Pairwise comparisons revealed that after reading the advertisements, parents were more involved with the issue of physical activity participation than screen time reduction ($p < .001; d > .28$). The effect size was small. No other effects were significant.

4.5.4 Attitudes towards the issue.

The ANOVA revealed significant main effects for advertisement type, $F(1, 483) = 369.33, p < .001$, and for gender, $F(1, 483) = 14.02, p < .001$. Pairwise comparisons revealed that after reading the advertisements, parents had more favourable attitudes towards physical activity participation than less favourable attitudes towards child screen time ($p < .001; d > 1.13$) with a large effect size, and that moms had more favourable attitudes towards physical activity participation and screen time reduction than dads ($ps < .05; ds > .27$) with a small effect size. No other effects were significant.

4.5.5 Attitudes towards parental support.

The ANOVA revealed a significant main effect for advertisement type, $F(1, 480) = 20.93, p < .001$. Pairwise comparisons revealed that after reading the advertisements, parents had more favourable
attitudes towards supportive behaviours for physical participation than for screen time reduction \((p < .001; d > .20)\). The effect size was small. No other effects were significant.

### 4.5.6 Perceived behavioural control.

The ANOVA revealed a significant main effect for advertisement type, \(F(1, 473) = 6.72, p < .01\). Pairwise comparisons revealed that after reading the advertisements, parents had greater perceived behavioural control for supportive behaviours for physical activity participation than for supporting screen time reduction \((p = .024; d > .10)\). The effect size was negligible. No other effects were significant.

### 4.5.7 Intentions.

The ANOVA revealed a significant main effect for advertisement type, \(F(1, 472) = 10.74, p < .001\). Pairwise comparisons revealed that after reading the advertisements, parents had greater intentions to engage in supportive behaviours enabling screen time reduction versus physical activity participation \((p < .001; d > .23)\). The effect size was small.

A significant advertisement type by gender interaction emerged, \(F(1, 472) = 4.85, p = .03\). The interaction was decomposed by gender. Dads’ intentions were not significantly different between behaviours after reading both advertisements \((p > .05)\); however, after reading the advertisements, moms had greater intentions to support their children in screen time reduction versus physical activity participation \((p < .001; d > .30)\). The effect size was small.

### 4.6 References


Chapter 5

Discussion

The investigation of the believability of PAG and STG advertisements and parents’ perceived behavioural control to support their children’s physical activity participation and screen time reduction, in the context of the social issue advertising believability model, led to several important conclusions. Contrary to our hypotheses, message believability did not predict intentions, and perceived behavioural control did not predict message believability. Nonetheless, in all models tested, the data fit well and provided indication of determinants of parents’ intentions to support their children’s physical activity participation and screen time reduction (Hu & Bentler, 1999). Parents’ evaluations of the guideline advertisements varied when considering the sample of moms and dads as a whole versus as separate groups (i.e., moms only; dads only). Taken together these findings provide theoretical and practical direction for creating advertisements encouraging parents to support their children’s physical activity participation and screen time reduction.

How believable parents found the guideline advertisements did not significantly predict their intentions to engage in supportive behaviours for the whole sample, moms, or dads. These findings are similar to Berry and colleagues (2012) who did not find a significant relationship between explicit believability of ParticipACTION’s Think Again advertisements and intentions to engage in parental support for their child’s physical activity. They suggested that parents believed children in general are not active; however, implicitly believed that their child was sufficiently active (Berry et al., 2012). Put into the context of the current study, it is possible that parents did not believe that their child needed to increase their physical activity participation or reduce their screen time in order to meet guidelines. As a result, even though parents believed the guideline advertisements (suggested by the high mean scores), they may not have felt the need to develop intentions to engage in supportive behaviours concerning their own child.
Perceived behavioural control did not emerge as a significant predictor of message believability for the whole sample, moms, or dads. As such, our hypothesis that perceived behavioural control would predict how believable parents found the advertisements was not confirmed. The majority of parents, regardless of whether they felt it would be challenging to support their child to meet the guidelines or not, believed the advertisements. Message believability was so high, as a reflection of parents’ high attention and social issue involvement, that perceived behavioural control predicted a negligible amount of the variance in message believability in comparison. Exploratory post hoc analyses revealed that perceived behavioural control indeed predicted a negligible amount of variance in message believability in all versions of the model.

Although the hypothesized relationships of message believability as a predictor of intentions and perceived behavioural control as a predictor of message believability were not supported, several relationships predicted by the social issue advertising believability model were supported and warrant discussion. Perceived behavioural control successfully predicted parents’ intentions to engage in supportive behaviours. As such, how easy or hard parents felt it was to engage in supportive behaviours was related to their intentions to perform these behaviours. This finding is consistent with the literature demonstrating that for many health behaviours, perceived behavioural control successfully predicts intentions (Ajzen, 1991; Conner & Norman, 2005). This relationship is therefore supported and could be a beneficial addition to the model.

When moms and dads were considered together as one sample, the significant pathways were the same for the PAG and STG advertisements. Specifically, a) attention predicted message believability with medium sized effects; b) social issue involvement predicted attention, attitudes towards the issue, and attitudes towards parental support with large sized effects; c) social issue involvement predicted message believability with small to medium sized effects; and d) attitudes towards parental support predicted intentions with medium to large sized effects. These findings supported that similar determinants predicted supportive behaviour intentions for child physical activity participation and screen time.
reduction. As such, guideline advertisements should focus on similar types of content to promote parents’ intentions to engage in these unique supportive behaviours for these distinct child behaviours.

Of further interest, the two categories of attitudes (attitudes towards the issue and attitudes towards parental support) were distinct for both advertisements. Attitudes towards parental support was the strongest predictor of intentions for both advertisements suggesting that it is important to persuade parents that engaging in supportive behaviours is both enjoyable and valuable. Advertisements need to focus on developing favourable attitudes towards supportive behaviours specifically beyond persuading parents that physical activity participation and screen time reduction is beneficial and enjoyable for their children. This is logical considering that the intention for engaging in a behaviour is predicted from the attitude toward that specific behaviour (Ajzen & Fishbein, 1977). The behavioural intentions evaluated in this study were for parental support behaviours. Thus, these intentions should be predicted by attitudes towards parental support directly, not to the eventual intended benefit of the secondary outcome of physical activity participation and screen time reduction.

Of interest, the strength of some of the social issue advertising believability model relationships varied between moms and dads. In conducting separate models for moms and dads several unique findings were observed. For moms in the PAG advertisement, message believability predicted attitudes towards the issue with small effects. As predicted by the model (O’Cass & Griffin, 2006), moms who strongly believed the PAG advertisement had more favourable attitudes towards child physical activity. This supports the idea that believing the advertisement may be a necessary component in developing strong attitudes and behavioural intentions to comply with the advertisement (Petty & Cacioppo, 1986). The differences between physical activity and screen time also suggest that how message believability relates to attitudes towards the issue differs for the two behaviours for moms.

Distinct model findings also emerged when the model was tested among dads. In both advertisements, attitudes towards the issue, in addition to attitudes towards parental support, significantly predicted intentions with a small effect in line with the proposed model (O’Cass & Griffin, 2006). Unexpectedly, dads who found the PAG advertisement believable had less favourable attitudes towards
child physical activity participation with small effects. A review by Guttman and Salmon (2004) suggests that when parents receive health advertisements about supportive behaviours that they cannot fulfill due to life circumstances (i.e., being at work, living away) it may induce feelings of self-blame and helplessness. Participant demographics indicated that almost 80% of dads are employed full time as compared to about 40% of moms. Perhaps dads who believed the PAG advertisement realized they are unable to engage in the necessary supportive behaviours to increase their child’s physical activity participation to guideline levels due to more restricting work commitments. As such, their attitudes towards child physical activity were lower when they believed the advertisements. The only additional unique finding for dads for the STG advertisement is that attitudes towards the issue and attitudes towards parental support were not related. This further supports the multicomponent attitude model especially in the context of screen time reduction for dads.

This study also highlights social issue advertising believability model relationships requiring additional research. Message believability did not significantly predict attitudes towards the issue or attitudes towards parental support in most samples. High mean message believability indicated that the majority of parents believed the advertisements regardless of their attitudes towards the issue, attitudes towards parental support, or intentions for engaging in supportive behaviours. High mean scores with low variability in both message believability and attitudes suggests these variables may have displayed a ceiling effect, especially for the PAG advertisement (Rhodes et al., 2013). As such, message believability may not have predicted attitudes as the majority of parents indicated they had positive attitudes and believed the guideline advertisements regardless.

The results from the secondary analyses examining parents’ evaluations of the advertisements revealed that parents demonstrated greater social issue involvement, attitudes towards the issue, attitudes towards parental support, and perceived behavioural control for the PAG advertisement as compared to the STG advertisement. Interestingly, parents had greater intentions to engage in supportive behaviours to reduce screen time as compared to increase physical activity participation. After reading the advertisements, moms believed the advertisements, and had more favourable attitudes towards the issues,
compared to dads. In addition, dads’ intentions to engage in supportive behaviours did not differ by advertisement type; however, moms had significantly greater intentions for engaging in supportive behaviours for screen time reduction versus physical activity participation with small effects. Moms traditionally engage in more authoritative parenting than dads, which involves limit setting as a key component (Simons & Conger, 2007; Winsler, Madigan, & Aquilino, 2005). Due to the nature of the supportive behaviours for screen time reduction involving limit setting and enforcing consistent rules (Carlson et al., 2010) it is logical that moms have greater intentions to support these behaviours if it aligns with their parenting style more so than dads.

These findings support that physical activity and screen time are separate behaviours that require separate messaging interventions for parents (Andersen et al., 1998; Biddle et al., 2003; Mark & Janssen, 2008; Rey-López et al., 2008). Discrepancies in social issue involvement and attitudes between PAG and STG advertisements suggest that the health benefits of physical activity are more well-known and well-accepted than the health risks associated with screen time despite parents believing both advertisements. It is possible that due to the integration of technology at school and in everyday life parents associate screen time with child education and productivity. As such, more work may be required to shift parents’ attitudes towards screen time to be in line with STG recommendations.

Differences in perceived behavioural control between advertisements, although the effect size was negligible, can be understood in the context of the different supportive behaviours involved. Examples of supportive behaviours for physical activity participation involve participating with your child, transporting them to places where they can be active, and enrolling them in teams (Gustafson & Rhodes, 2006; Yao & Rhodes, 2013). The most effective supportive behaviours for screen time reduction involve setting and enforcing consistent rules and limits (Carlson et al., 2010). Supportive behaviours for physical activity participation may be perceived to be easier by parents as they would be supporting activities they think their children would enjoy. Conversely, parents may perceive setting screen time limits and enforcing rules to be challenging as they think their child would not enjoy these restrictions.
For both advertisements, perceived behavioural control was low (means = 3.82/5 and 3.72/5 in PAG and STG advertisements respectively) when compared to attitudes towards parental support (means = 4.33/5 and 4.17/5 for PAG and STG advertisements respectively). In addition, message believability was high and did not vary between advertisements (means = 5.79/7 and 5.72/7 for PAG and STG advertisements respectively). Parents indicated they knew and believed the information presented in the guideline advertisements; however, for the most part, their believability did not predict their attitudes or intentions. It is possible that parents who believed the guideline advertisements the most realized that they represented an unrealistic goal, demonstrated through low perceived behavioural control, and therefore did not indicate having intentions to engage in supportive behaviours for their children meeting the guidelines. Perhaps increasing message believability should not be the target of mass media intervention efforts to increase supportive behaviours and that what is required is a way to increase parents’ perceived behavioural control for providing support. In relation to the differences in perceived behavioural control between advertisement types, increasing perceived behavioural control may be more about convincing parents that their child will enjoy the outcome of the supportive behaviours than convincing them they are able to successfully perform the supportive behaviours. As such, developing strategies for supportive behaviours for screen time reduction that parents perceive as enjoyable for their child should be investigated.

5.1 Strengths

There were several strengths of the current study. First of all, the sample was large (N=500) and was made up of Canadian parents. Importantly, both moms and dads were included in the sample, which is rather novel considering the historic lack of dads being involved in child health research (Phares, 1992; Phares, Fields, Kamboukos, & Lopez, 2005).

This study is the first that we are aware of to compare behavioural determinants in the same parent population. This design allowed for the comparison of findings for supporting child physical activity participation versus screen time reduction. The analysis of variance in addition to the structural
equation modeling analyses provided further depth and interpretation to the results allowing for greater understanding of how the message believability may be related to intentions and perceived behavioural control in parents for both advertisements.

The advertisements used in the study offered external validity as the PAG advertisements are currently used in practice and the STG advertisements mirrored closely the Sedentary Behaviour Guideline advertisements used in practice. As such, this study provides understanding of how the believability of these health communications relates to intentions to engage in supportive behaviours in the target audience for whom they were designed.

5.2 Limitations

Although there were many strengths in this study, this study is not without limitation. Specifically, there was no assessment of parental support behaviour outcomes. Assessing parental support behaviours would have added more depth to the literature. In addition, assessing behaviour would have provided information on the translation of intentions to engage in supportive behaviours into actual behaviour.

Another limitation was the inability to have consistent measures on certain model variables between the PAG and STG advertisements. Attitudes towards the issue, perceived behavioural control, and intentions measures needed to be different between advertisements to reflect the differences in health benefits and risks of physical activity and screen time as well as differences in the supportive behaviours required to encourage the distinct behaviours in children. In addition, the content of the STG advertisement was more explicitly directed at parents (i.e., parents can set these rules) versus the PAG advertisement that was less explicitly focused on parents (i.e., children can do this activity).

Although demographic characteristics suggested that the sample was representative of Canadian parents, these parents were recruited because they were a part of the Survey Monkey Audience panel of consumers. Considering the recruitment method, it is possible that these parents may engage in more screen time than the general population as they had indicated their willingness to complete online
questionnaires. In order to complete these questionnaires screen time is required. Furthermore, covariates were not accounted for in the analysis due to the inconsistent nature of their relationships.

5.3 Future Directions

This research should be extended to further understand parental support behaviours enabling physical activity participation and screen time reduction. This study supports that advertisements should include content designed to increase parents’ perceived behavioural control especially for supportive behaviours for screen time reduction. After these advertisements have been altered, a longitudinal study that looks at the impact of guideline advertisements on increasing supportive behaviours should be completed. This study should be completed separately for physical activity participation and screen time reduction as the current investigation further supports these being distinct behaviours.

Some of the conclusions from the current study suggest it may be beneficial to perform a qualitative study to investigate what supportive behaviours parents currently engage in, and strategies they think might work, to support their child in screen time reduction. A study recently completed by Carson, Clark, Berry, Holt, & Latimer-Cheung (2014) asked parents of young children about the Sedentary Behaviour Guidelines (i.e., perceived feasibility, barriers, guideline beliefs, etc.) and the advertisements associated with their promotion. As such, a similar study focusing on children ages 5 to 11, and that is specific to screen time reduction instead of all sedentary behaviour reduction, would be beneficial. The purpose of such a study would be to determine supportive behaviours that would be effective in reducing screen time but that parents would still perceive to have an enjoyable outcome for their child instead of limiting them or restricting them. The results from such a study could later be applied to interventions designed to increase parents’ perceived behavioural control for supportive behaviours for screen time reduction.

5.4 Theoretical Implications

This study confirms previous findings supporting the application of the social issue advertising believability model in a parent population to promote parental support for child physical activity
participation. In addition, this study demonstrated that this model can be applied in the same way when promoting supportive behaviours for child screen time reduction. Interestingly, the same determinants emerged for the PAG and STG advertisements in the whole sample, emphasizing that the model is working in the same way for both behaviours. The model fit also justifies that the model can be used to predict these behaviours in moms and in dads.

This study extends previous findings of the model by adding in perceived behavioural control as a predictor of message believability and intentions. Perceived behavioural control successfully predicted variance in intentions; however, it did not predict message believability. These findings support the long-standing relationship that perceived behavioural control predicts behavioural intentions (Ajzen, 1991; Conner & Norman, 2005). The relationship between perceived behavioural control and message believability requires further exploration before integrating it into the model.

5.5 Practical Implications

There are several practical implications that can be derived from this study. When creating advertisements promoting parental support behaviours, attitudes towards parental support need to be targeted not the benefits of the physical activity participation and screen time reduction for children. Importantly, separate messages or advertisements are needed to promote supportive behaviours for child physical activity participation and screen time reduction. This study supported that feasible strategies should be developed for supporting screen time reduction that parents perceive might still be enjoyable for their children. Screen time activities could ideally be replaced with non-sedentary light intensity physical activities (i.e., walking outside, movement games) or physical activity of a higher intensity that could then contribute to children meeting the PAG.

5.6 Conclusions

Guideline advertisements encouraging parents to engage in behaviours supporting their children’s physical activity participation and screen time reduction should focus on the same behavioural determinants to develop intentions for these unique behaviours. A particular focus on perceived
behavioural control may be beneficial. Moreover, parents’ evaluations of PAG advertisements and the supportive behaviours were generally more positive than the evaluations of the STG advertisements and behaviours. These differences underscore the need for initiatives addressing screen time reduction. In conclusion, parents tend to believe guideline advertisements; however, future advertisements need to emphasize supportive behaviours for screen time reduction that are feasible and may be enjoyable for children.

5.7 References


Appendix A

Letter of Information and Consent

Study 1: Online Study Evaluating Advertisements Promoting Child Physical Activity and Reducing Child Screen Time to Parents

Investigators:

Dr. Amy Latimer                     Jocelyn Jarvis
Supervising Professor                Primary Investigator
School of Kinesiology                School of Kinesiology
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Queen’s University                   Queen’s University
Kingston, Ontario, Canada            Kingston, Ontario, Canada
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The primary investigator has met the Course in Human Research Participant Protection (CHRPP) requirements for a student investigator.

Purpose of the Study
The purpose of the study is to assess the believability of advertisements promoting child physical activity or reducing child screen time to parents.

Procedures Involved in the Research
This online study will take about 20 minutes to complete. First you will be asked to complete a confidential demographic form. Next, you will be asked to complete a brief questionnaire about child physical activity and screen time. You will then be asked to read a print advertisement about child
physical activity OR child screen time and to complete a brief questionnaire about the ad. This process will repeat so that you will see both ads (1 for child physical activity, 1 for child screen time).

**Compensation**
You will be compensated for completion of this study in line with Survey Monkey Audience compensation procedures.

**Potential Harms, Risks or Discomforts:**
There are no known risks to participation in this online study.

**Potential Benefits**
As a participant, you will be contributing to a study involving physical activity and screen time behaviour advertising to better the health of children. Through your involvement, you are allowing a research study to occur where the findings might help in the development of more effective health advertisements. These future advertisements are important as they will meet the needs of parents so they can be informed and help their children get active and reduce their screen time. You will be compensated for completion of this study in line with Survey Money Audience compensation procedures.

**Confidentiality**
The information gathered by the research team from the online study will be kept confidential. Only the primary investigator and supervising professor will have access to the data. The data from the study will be stored in a password-protected folder on a computer in the Messaging and Motion Lab. The data will be published in a composite form and the researchers will have no ability to identify you as an individual. All records are stored safely under password protection.

**Participation and Withdrawal**
Your participation is completely voluntary and you may withdraw from this study at any time without any consequences. You may withdraw from the study by exiting the online browser for the study at any time. If you would like your data removed from the study please contact Jocelyn Jarvis by e-mailing 7jwj@queensu.ca.

**Information about the Study Results**
If you would like a brief summary of the results, please contact Jocelyn Jarvis by e-mailing 7jwj@queensu.ca.
Questions or Concerns
If at any time you have further questions, problems, and concerns or would like to withdraw from the study, you can contact:

Jocelyn Jarvis
Primary Investigator
Queen’s University
School of Kinesiology and Health Studies
7jwj@queensu.ca
(613) 533-6000 ex. 78841

Any ethical concerns about the study may be directed to the Supervising Professor or the Chair of the General Research Ethics Board.

Dr. Amy Latimer
Supervising Professor
Queen’s University
School of Kinesiology and Health Studies
amy.latimer@queensu.ca
(613) 533-6000 ex. 78773

Dr. Joan Stevenson
Chair of General Research Ethics Board
Chair.GREB@queensu.ca
(613) 533-6081
Subject Statement of Consent

I have read and understand the consent form for this study. I have been given sufficient time to consider the above information and to seek advice if I chose to do so. I understand how to contact the primary investigator if I have further questions. I understand the confidentiality measures and that my participation is voluntary and I can withdraw from the study at any time.

If you understand and accept these conditions, please indicate your consent by pressing “Yes, I consent”.

**Please keep a copy of this form for your records**

This study was granted clearance by the General Ethics Board for compliance with the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans, and Queen’s policies.
Appendix B

Canadian Physical Activity Guidelines

FOR CHILDREN - 5 – 11 YEARS

Guidelines

For health benefits, children aged 5-11 years should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily. This should include:

- Vigorous-intensity activities at least 3 days per week.
- Activities that strengthen muscle and bone at least 3 days per week.
- More daily physical activity provides greater health benefits.

Let’s Talk Intensity!

Moderate-intensity physical activities will cause children to sweat a little and to breathe harder. Activities like:

- Bike riding
- Playground activities

Vigorous-intensity physical activities will cause children to sweat and be ‘out of breath’. Activities like:

- Running
- Swimming

Being active for at least 60 minutes daily can help children:

- Improve their health
- Do better in school
- Improve their fitness
- Grow stronger
- Have fun playing with friends
- Feel happier
- Maintain a healthy body weight
- Improve their self-confidence
- Learn new skills

Parents and caregivers can help to plan their child’s daily activity. Kids can:

☑ Play tag – or freeze-tag!
☑ Go to the playground after school.
☑ Walk, bike, rollerblade or skateboard to school.

☑ Play an active game at recess.
☑ Go sledding in the park on the weekend.
☑ Go “puddle hopping” on a rainy day.

60 minutes a day. You can help your child get there!

PARTICIPATION

www.csep.ca/guidelines
Canadian Screen Time Behaviour Guidelines

FOR CHILDREN - 5 – 11 YEARS

Guidelines

For health benefits, children aged 5 – 11 years should minimize their recreational screen time each day. This may be achieved by

Limiting recreational screen time to no more than 2 hours per day.

Lower levels of screen time are associated with additional health benefits.

The lowdown on the slowdown: what counts as screen time?
Screen time is time when children are using devices with screens while doing very little physical movement. Some examples are:
- Playing on the computer (i.e., chatting, surfing the web, playing games, facebook)
- Playing or chatting on cell phones or iPads
- Watching television
- Playing passive video games

Less recreational screen time can help children:
- Maintain a healthy body weight
- Do better in school
- Improve their self-confidence
- Have more fun with their friends
- Improve their fitness
- Have more time to learn new skills

Help children swap screen time with other activities!

<table>
<thead>
<tr>
<th>Wake Up</th>
<th>Eat Breakfast</th>
<th>School</th>
<th>After School</th>
<th>Physical Activity</th>
<th>Leisure Time</th>
<th>Bed Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>🕒</td>
<td>🛋️</td>
<td>📚</td>
<td>🎥</td>
<td>🏃️</td>
<td>🎮</td>
<td>🛌️</td>
</tr>
<tr>
<td>Eating Together</td>
<td>Instead of letting your child eat in front of the TV try eating at the kitchen table together</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play</td>
<td>Limit after school TV and computer time. Plan time outdoors with friends!</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Family Time</td>
<td>Instead of video games in the evening, introduce the family to a new game.</td>
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</tbody>
</table>

There is no time like right now for children to put their screens away!
Appendix C

Questionnaires

Demographics (for both Studies)

Please ensure you are the only parent completing this study.

Please provide the following information about yourself

1. Are you…?
   - Male
   - Female
   - Transgender

2. What is your date of birth?
   Day _____ Month _____ Year _____

3. Can you read, write, and understand English?
   - No
   - Yes

4. Are you the parent of a child between the ages of 5 and 11?
   - No
   - Yes

A member of a visible minority/racialized group in Canada is someone (other than an Aboriginal Person) who self-identifies as non-white in colour or non-Caucasian in racial origin, regardless of birthplace or citizenship. Members of ethnic or national groups (such as Portuguese, Italian, Greek, etc.) are not considered to be racially visible unless they also meet the criteria above.

5. Are you a member of a visible minority group in Canada?
If YES please check all responses that apply

- Black (e.g., African American, Canadian, Caribbean)
- Chinese
- Filipino
- Japanese
- Korean
- Indigenous person from outside North America
- South Asian/East Indian (e.g., Bangladeshi, Pakistani, Indian from India, East Indian from Guyana, Trinidadian, Sri Lankan, East African)
- South East Asian (e.g., Burmese, Cambodian/Kampuchean, Laotian, Malaysian, Thai, Vietnamese, Indonesian)
- Non-White West Asian (e.g., Iranian, Lebanese, Afghan)
- Non-White North African (e.g., Egyptian, Libyan)
- Arab
- Non-White Latin American (including indigenous persons from Central and South America) Person of mixed origin (with one parent in one of the visible minority groups listed above)
- Other (please specify): __________________

An Aboriginal Person is a North American Indian, Métis or Inuit, or a member of a North American First Nation. An Aboriginal Person may be a treaty status or a non-status, registered or non-registered Indian.

6. Are you an Aboriginal Person?

- No
- Yes

7. What is your highest level of education?

- Less than high school
- High school
- Some college (no degree)
- College degree
- Some university
☐ University – Bachelor-level Degree (BA, BSc, etc.)
☐ University – Master-level degree (MS, MA, etc.)
☐ University – Doctorate-level degree (Ph.D.)
☐ University – Professional Post-Graduate (M.D., etc.)

8. What is your marital status?

☐ Single
☐ Common-law
☐ Married
☐ Divorced
☐ Other
☐ Do not wish to specify

9. How many individuals contribute to your household income? _____________

10. What is your household income?

☐ $35,000 or less.
☐ $35,000 - $49,999
☐ $50,000 - $64,999
☐ $65,000 - $74,999
☐ $75,000 - $99,999
☐ $100,000 - $149,999
☐ $150,000 or more
☐ Do not wish to report

11. What is your employment status?

☐ Employed full time (35 hours a week or more)
☐ Employed part time (20-34 hours a week)
☐ Student
☐ Homemaker
☐ Not currently employed
☐ Do not wish to report

In answering the following questions,
**Vigorous physical activities** are activities that take hard physical effort and require you to breathe much more than normal.

**Moderate physical activities** are activities that take moderate physical effort and require you to breathe somewhat harder than normal.

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

   ____ Days (drop down menu of 0-7)

   How much time in total did you usually spend on one of those days doing vigorous physical activities?

   ____ Minutes

2. Again, think only about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking

   ____ Days (drop down menu of 0-7)

   How much time in total did you usually spend on one of those days doing moderate physical activities?

   ____ Minutes

3. During the last 7 days, on how many days did you walk for at least 10 minutes at a time? This includes walking at work and at home, walking to travel from place to place, and any other walking that you did solely for recreation, sport, exercise or leisure.

   ____ Days (drop down menu of 0-7)

   How much time in total did you usually spend walking on one of those days?

   ____ Minutes

In answering the following questions,
Television includes programs watched on the television or computer. Videos and DVDs include programs or movies watched on the television, computer or portable DVD player.

Video and computer games includes games played on devices such as a computer, laptop, iPad, cell phone or iPhone, the internet, Playstation, Wii, XBOX, etc.

4. How many hours do you usually spend watching TV/video or playing computer games on a weekday?
   _____ Hours (drop down menu of 0, 0.5, 1, 2, 3, 4, 5, 6+ hours/day)

5. On a weekend day?
   _____ Hours (drop down menu of 0, 0.5, 1, 2, 3, 4, 5, 6+ hours/day)

Please provide the following information about your family.

1. How many children do you have? _____

2. How many children do you have between the ages of 5 and 11? _____

In answering the next few questions please think about your child between the ages of 5-11 years. If you have more than one child in that age range, please think about the child who is older.

3. Is this child a boy or a girl? _____

Physical activities refers to activities that make your child out of breath or warmer than usual. These can be organized physical activities with a coach or instructor (i.e., swimming lessons, soccer, dance) or unorganized activities without a coach or instructor (i.e., playing in the playground, going for a bike ride, drop-in skating).
1) Over the past 7 days, on how many days was he/she physically active for a total of at least 60 minutes per day? (drop down menu of 0-7 days/week)
2) About how many hours a week does he/she usually take part in physical activity outside of school while participating in lessons or league or team sports? (drop down menu of 0-7+ hrs/week)
3) About how many hours a week does he/she usually take part in physical activity outside of school while participating in unorganized activities, either on his/her own or with friends? (drop down menu of 0-7+ hrs/week)

Television/videos includes programs watched on the TV, the computer, or portable devices. Video and computer games includes games played on devices such as a computer, laptop, iPad, cell phone or iPhone, the internet, Playstation, Wii, XBOX, etc.

1) On average, about how many hours a day does he/she watch TV or videos or play video games in their leisure time? (drop down menu of 0, 0.5, 1, 2, 3, 4, 5, 6+ hours/day).
2) On average, about how many hours a day does he/she spend on a computer in their leisure time (working, playing games, e-mailing, chatting, surfing the internet, etc.)? (drop down menu of 0, 0.5, 1, 2, 3, 4, 5, 6+ hours/day).

Study 1 – Questionnaires

Condition 1: Physical Activity Messages

Baseline for Physical Activity Condition

Advertisement Order

Please indicate if this is the first or second message that you saw:

☐ First
☐ Second

Guideline Awareness

Were you aware of the child physical activity guidelines before seeing the previous messages?
Attention Paid to Advertisements

Please indicate your answer using the following scale:

<table>
<thead>
<tr>
<th>None</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very much</th>
</tr>
</thead>
</table>

1) How much attention did you pay to the message?
2) How much did you concentrate on the message?
3) How involved were you with the message?
4) How much thought did you put into evaluating the message?

Message Believability

Please rank the advertisements you just saw as…

a)

<table>
<thead>
<tr>
<th>Unbelievable</th>
<th>1</th>
<th>2</th>
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<th>6</th>
<th>7</th>
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</table>

b)

<table>
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<tr>
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<th>4</th>
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<th>6</th>
<th>7</th>
<th>Trustworthy</th>
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</table>

c)

<table>
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<th>7</th>
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</thead>
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</tbody>
</table>

<table>
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<tr>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>Conclusive</th>
</tr>
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</tbody>
</table>

<table>
<thead>
<tr>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>Authentic</th>
</tr>
</thead>
<tbody>
<tr>
<td>j)</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
Attitudes Towards Child Physical Activity

Please indicate your answer using the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Participating in physical activity helps my child…

a) to be healthy

b) to have more self-confidence

c) have a chance to be with friends

Attitudes Towards Parental Support for Child Physical Activity

Please indicate your answer using the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Supporting my child (through driving, participating, or paying for their activities, etc.) in physical activity is important to me.

2) I would enjoy the time spent helping my child get active (eg. driving my child to a sport practice, watching my child participate in activities, etc.)

Social Issue Involvement with Child Physical Activity

Please rank the issue of increasing child physical activity as…

a)
b) | Of no concern to me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|

c) | Irrelevant | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|

d) | Means nothing to me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|

e) | Doesn’t matter to me | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|

f) | Boring | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|

108
g)

<table>
<thead>
<tr>
<th>Insignificant</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

h)

<table>
<thead>
<tr>
<th>Not needed</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

**Perceived Behavioural Control for Parental Support for Child Physical Activity**

Please indicate how easy or hard you feel it would be over the next 2-weeks to…

a) take my child to a place where he/she can be active

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely hard</td>
<td></td>
<td></td>
<td></td>
<td>Extremely easy</td>
</tr>
</tbody>
</table>

b) watch my child play sports or participate in other physical activities (i.e. playing outside, drop-in skating)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely hard</td>
<td></td>
<td></td>
<td></td>
<td>Extremely easy</td>
</tr>
</tbody>
</table>

c) role model active behaviour for/with my child

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely hard</td>
<td></td>
<td></td>
<td></td>
<td>Extremely easy</td>
</tr>
</tbody>
</table>

d) encourage my child to engage in structured physical activity (i.e., joining a sports team such as soccer, basketball, or dance)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>
e) encourage my child to engage in unstructured physical activity (i.e., playing in a playground, playing outside with friends)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely hard</td>
<td></td>
<td></td>
<td></td>
<td>Extremely easy</td>
</tr>
</tbody>
</table>

f) to control whether or not my child meets the physical activity guidelines of 60 minutes of moderate to vigorous physical activity each day.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely hard</td>
<td></td>
<td></td>
<td></td>
<td>Extremely easy</td>
</tr>
</tbody>
</table>

**Intentions to Provide Parental Support for Child Physical Activity**

Please indicate your answer using the following scale:

| Strongly disagree | | | | Strongly agree |
| 1 | 2 | 3 | 4 | 5 |

I intend to…

a) enroll my child in sports teams such as soccer, basketball and dance

b) take my child to places where he/she can be active

c) watch my child play sports or participate in other activities such as martial arts or dance

d) encourage my child to be physically active by leading by example (i.e. role modeling)

e) encourage my child to use resources in our neighbourhood to be active (such as the park and the school)
f) enroll my child in community-based programs (such as Girls and Boys Club, YMCA) where he/she can be active

g) find ways for my child to be active when school is out, for example, enrolling him/her in summer camp and after school programs

**Condition 2: Screen Time Behaviour Messages**

**Advertisement Order**

Please indicate if this is the first or second message that you saw:

- [ ] First
- [ ] Second

**Guideline Awareness**

Were you aware of the child screen time behaviour guidelines before seeing the previous messages?

- [ ] Yes
- [ ] No
- [ ] Unsure

**Attention Paid to Advertisements**

Please indicate your answer using the following scale:

<table>
<thead>
<tr>
<th>None</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Very much</th>
<th>7</th>
</tr>
</thead>
</table>

1) How much attention did you pay to the message?

2) How much did you concentrate on the message?

3) How involved were you with the message?
4) How much thought did you put into evaluating the message?

**Message Believability**

Please rank the advertisements you just saw as…

a) 

<table>
<thead>
<tr>
<th>Unbelievable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

b) 

<table>
<thead>
<tr>
<th>Untrustworthy</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

c) 

<table>
<thead>
<tr>
<th>Not convincing</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

d) 

<table>
<thead>
<tr>
<th>Not credible</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

e) 

<table>
<thead>
<tr>
<th>Unreasonable</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

f) 

<table>
<thead>
<tr>
<th>Dishonest</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

g)
# Attitudes Towards Child Screen Time Behaviour

1) Children spending several hours a day on recreational screen time is…

<table>
<thead>
<tr>
<th>Questionable</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Unquestionable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

h) Inconclusive

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Conclusive</th>
</tr>
</thead>
</table>

i) Not authentic

<table>
<thead>
<tr>
<th>1</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Authentic</th>
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</table>

j) Unlikely

<table>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Likely</th>
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</table>

## Attitudes Towards Child Screen Time Behaviour

1) Children spending several hours a day on recreational screen time is…

a) Harmful

<table>
<thead>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Beneficial</th>
</tr>
</thead>
</table>

b) Unhealthy

<table>
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<th>5</th>
<th>6</th>
<th>7</th>
<th>Healthy</th>
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</table>
c)  

<table>
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<th>Of no use</th>
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<th>2</th>
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<th>6</th>
<th>7</th>
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</table>


d)  

<table>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Of concern</th>
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</table>

**Attitudes Towards Parental Support for Child Screen Time Behaviour**

Please indicate your answer using the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>Strongly agree</th>
<th>5</th>
</tr>
</thead>
</table>

1) Supporting my child (through limiting TV viewing, limiting computer use, or suggesting alternative activities, etc.) in reducing their screen time is important to me.

2) I would enjoy the time spent helping my child reduce their screen time (eg. helping them find other activities they enjoy, eating as a family not in front of the TV, etc.).

**Social Issue Involvement with Child Screen Time**

Please rank the issue of reducing child screen time behaviour as…

a)  

<table>
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</table>

114
b) Of no concern to me

<table>
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<th></th>
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<th>3</th>
<th>4</th>
<th>5</th>
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</tbody>
</table>

Of concern to me

<table>
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c) Irrelevant

<table>
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Relevant

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</tbody>
</table>

d) Means nothing to me

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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Means a lot to me

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</table>

e) Doesn’t matter to me

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
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</table>

Matters to me

<table>
<thead>
<tr>
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<th>3</th>
<th>4</th>
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<th>7</th>
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<td></td>
</tr>
</tbody>
</table>

f) Boring

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Interesting

<table>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

g) 115
h)

<table>
<thead>
<tr>
<th>Not needed</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
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<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Perceived Behavioural Control for Parental Support for Child Screen Time Reduction**

Please indicate how easy or hard you feel it would be over the next 2-weeks to control…

a) how long my child plays video games in their leisure time (i.e., Xbox)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely hard</td>
<td></td>
<td></td>
<td></td>
<td>Extremely easy</td>
</tr>
</tbody>
</table>

b) the amount of time my child can watch TV and DVD’s in a day during leisure time (including educational and non-educational programs)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely hard</td>
<td></td>
<td></td>
<td></td>
<td>Extremely easy</td>
</tr>
</tbody>
</table>

c) the amount of time my child can use the computer in their leisure time for things other than homework (i.e. playing computer games, surfing the internet, chatting)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely hard</td>
<td></td>
<td></td>
<td></td>
<td>Extremely easy</td>
</tr>
</tbody>
</table>

d) whether or not my child meets the screen time guidelines of spending no more than 2 hours each day on recreational screen time.
Intentions to Provide Parental Support for Child Screen Time Reduction

Please indicate your answer using the following scale:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

I intend to…

a) limit how long my child plays video games (including PlayStation, Xbox, and Gameboys)

b) limit the amount of time my child can watch TV and DVD’s in a day (including educational and non-educational programs)

c) limit the amount of time my child can use the computer for things other than homework (such as playing computer games and surfing the internet).

Debriefing Note

Thank you for completing this research study.

PLEASE NOTE. For the purpose of this study, the Canadian Society of Exercise Physiology (CSEP) Child Sedentary Behaviour Guideline fact sheet was modified to include only the screen time guidelines and information on child screen time. If you desire the complete and published child sedentary behaviour guideline fact sheet please follow this link on the CSEP website:

http://www.csep.ca/CMFiles/Guidelines/CS
Appendix D

Ethics Approval

March 03, 2014

Ms. Jocelyn Jarvis
Master’s Student
School of Kinesiology and Health Studies
Queen’s University
28 Division Street
Kingston, ON, K7L 3N6

GREB Ref #: GPH1-165-14; Romeo #: 6011906
Title: "GPH1-165-14 Investigating the Role of Message Believability in Advertisements Targeting Parents’ Promoting Reducing Child Sedentary Behaviour"

Dear Ms. Jarvis,

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled "GPH1-165-14 Investigating the Role of Message Believability in Advertisements Targeting Parents’ Promoting Reducing Child Sedentary Behaviour" for ethical compliance with the Tri-Council Guidelines (TCPS) and Queen’s ethics policies. In accordance with the Tri-Council Guidelines (article D.1.6) and Senate Terms of Reference (article G), your project has been cleared for one year. At the end of each year, the GREB will ask if your project has been completed and if not, what changes have occurred or will occur in the next year.

You are reminded of your obligation to advise the GREB, with a copy to your unit REB, of any adverse event(s) that occur during this one year period (access this form at https://services.queensu.ca/romeo_researcher/ and click Events - GREB Adverse Event Report). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes to the level of risk, applicant characteristics, and implementation of new procedures. To make an amendment, access the application at https://services.queensu.ca/romeo_researcher/ and click Events - GREB Amendment to Approved Study Form. These changes will automatically be sent to the Ethics Coordinator, Gail Irving, at the Office of Research Services or irvingg@queensu.ca for further review and clearance by the GREB or GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

Joan Stevenson, Ph.D.
Chair, General Research Ethics Board

c: Dr. Amy Lammer-Cheung, Faculty Supervisor
Dr. Valerie Carson and Dr. Tanya Berry, Co-investigators
Dr. Brendon Gard, Chair, Unit REB
Appendix E

Ethics Amendment Approval

March 06, 2014

Ms. Jocelyn Jarvis
Master’s Student
School of Kinesiology and Health Studies
Queen’s University
28 Division Street
Kingston, ON, K7L 3N6

Dear Ms. Jarvis:

RE: Amendment for your study entitled: GPHE-165-14 Investigating the Role of Message Believability in Advertisements Targeting Parents’ Promoting Reducing Child Sedentary Behaviour; ROMEO# 6011906

Thank you for submitting your amendment requesting the following changes:

1) To substitute some questions on the questionnaire;
2) To change the analysis procedure to include structural equation modelling;
3) To increase sample size to 500 participants;
4) To edit the sedentary behavior guideline messages to only include the screen time behavior guidelines;
5) To replace the terminology of “sedentary behavior” with “screen time behavior” in the Letter of Information and Consent Form;
6) Revised documents: (1) Edited Screen Time behaviour guideline messages (version March 3, 2014); (2) Updated questionnaire with tracked changes (version February 13, 2014); Letter of Information / Consent Form (version March 4, 2014).

By this letter you have ethics clearance for these changes.

Good luck with your research.

Sincerely,

Joan Stevenson, Ph.D.
Chair
General Research Ethics Board

c:: Dr. Amy Latimer-Cheung, Supervisor
Dr. Valerie Carson and Dr. Tanya Berry, Co-investigators