THE SPINAL CORD INJURY ACTIVE LIVING GUIDE:

USEFUL AND DESIRED CONTENT TO ENCOURAGE A HEALTHY AND ACTIVE LIFESTYLE

THE SPINAL CORD INJURY ACTIVE LIVING GUIDE: USEFUL AND DESIRED CONTENT TO ENCOURAGE A HEALTHY AND ACTIVE LIFESTYLE

By

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Abstract

Regular physical activity for people with spinal cord injury (SCI) has been related to numerous benefits, yet half of this population remains inactive (Martin Ginis et al., 2010). The SCI community desires useful physical activity information (Boyd & Bardak, 2004). It has been suggested that Canada's Physical Activity Guide for Adults Living with SCI (CPAG-SCI) be created (Martin Ginis & Hicks, 2007). This study sought to determine what people with SCI would find useful in CPAG-SCI and to establish effective means for providing information to maximize thoughts about being physically active. Firstly, 78 people with SCI (M_{age}=45.06) were asked what content to include in CPAG-SCI and how to present it. Participants indicated that physical activity knowledge, motivational information, safety and health information, sources of information and social support, and self-regulation information were desired. CPAG-SCI as a booklet or interactive website was preferred (both 43.6%), text with pictures (83.3%), photographs (57.7%), bright colours (48.7%), simple messages (61.5%), and a calendar pull-out (70.5%). Secondly, the effectiveness of an experimental vignette aimed at changing physical activity social cognitions was explored. Based on the Health Action Process Approach (Schwarzer, 1992; 2004), participants were classified as in the motivational (n=32, M_{age}=45.31) or volitional phase (n=47, M_{age}=43.36), and then randomly assigned to an experimental or control vignette exposure condition. Social cognitions were measured one-week before, and immediately following, exposure to the vignette. Repeated measures ANOVAs showed that social cognitions generally decreased in those exposed to the experimental vignette, with coping plans approaching a

significant decrease among those in the motivational phase ($t(17) = 2.10, p < .05$). Exploratory analyses suggest that perceived similarity to the vignette character may be a key variable contributing to the ineffectiveness of the experimental vignette. Overall, it is suggested that physical activity vignettes in CPAG-SCI not target social cognition change.

Keywords: spinal cord injury, physical activity, vignette, perceived similarity, social cognitions

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Literature Review

Spinal cord injury (SCI) results in significant reductions in physical functioning and physical capacity (Wolfe et al., 2008). SCI is often related to decreases in fitness levels, increases in secondary complications, increases in psychosocial problems, and a reduction in quality of life (Wolfe et al.). Regular participation in physical activity by people with SCI has shown positive increases in cardiovascular fitness, strength, functional independence, social reintegration, subjective and psychological well-being, and decreases in chronic health problems (Wolfe et al.; Kennedy, Taylor & Hindson, 2006; Hicks et al., 2003; Martin Ginis et al., 2003). Despite the numerous advantages of physical activity participation, only half of the SCI population is physically active (Martin Ginis et al., 2010a) and thus, are at increased health risk (Martin Ginis & Hicks, 2007). Since approximately 41,000 Canadians currently live with a SCI (Rick Hansen Foundation, 2008), it would be beneficial to identify ways to successfully encourage and promote physical activity participation in the SCI population.

Physical Activity Guides

Although there are Canadian Physical Activity Guides for Healthy Active Living for the general population, older adults, children and youth (Public Health Agency of Canada, 1998), no such guide exists for the SCI community. Members of the SCI community have expressed the desire for useful and easily accessible information regarding physical activity and its benefits (Boyd & Bardak, 2004). Despite this desire and the fact that the SCI community is indeed one of the most sedentary segments of

society, there has been no systematic attempt to provide the SCI community with the information they want and need.

Martin Ginis and Hicks (2007) recently discussed this need, identified benefits of, and barriers to, physical activity for the SCI population, and most notably, suggested steps to approach a solution. Their overarching recommendation was that Canada's Physical Activity Guidelines and Guide for Adults Living with Spinal Cord Injury be developed. Martin Ginis and Hicks suggested that guide development is vital to disseminating the information on the physical and psychosocial well-being, quality of life and general health benefits of regular participation in physical activity, as well as strategies to increase physical activity, to the SCI population. Their suggestions are currently being implemented through an ongoing five-phase project leading to the development of Canada's Physical Activity Guidelines and Guide for Adults with SCI (CPA Guidelines-SCI and CPAG-SCI). The five-phases include: a scientific review process with an expert panel; preliminary marketing research; prototype development; national concept testing; and final launch activities. The present thesis study represents phase two of this ongoing project, with a specific focus on the preliminary marketing research for the CPAG-SCI.

A useful CPAG-SCI would teach and encourage people with SCI how to make smart and informed choices about being physically active. This objective parallels the purpose of the existing CPAGs (Public Health Agency of Canada, 1998). CPAG is used to deliver physical activity Guidelines to the target population in an attempt to get the population to successfully understand and follow the Guidelines (Brawley & Latimer,

2007). In a study conducted regarding the impact of CPAG-Older Adults (Jiang, Cooper, Porter & Ready, 2004), individuals that were exposed to the CPAG alone, or combined with a behaviour change program, demonstrated increases in strength, flexibility and energy expenditure. However, those who received the behaviour change program combined with the CPAG showed a greater increase in energy expenditure and we more likely to actively look for more ways to be physically active. It seems the CPAG is a useful instrument for physical activity prescription; however, its impact is not as strong as when combined with a behaviour change program. This study demonstrates the usefulness of the current CPAG, but it is clear that CPAG may not be a stand-alone strategy to get people to be physically active. It may, however, get the targeted population to start thinking about physical activity by encouraging a physically active and healthy lifestyle.

A CPAG for People with SCI

In order to meet its objective, a CPAG-SCI has to address issues specific to the SCI population, in addition to those addressed in the able-bodied CPAGs. As mentioned above, the SCI population is one of the most sedentary segments of society, and is faced with more barriers and problematic factors than the general population when attempting any type of physical activity (Wolfe et al., 2008). Frequently listed barriers are lack of motivation, self-efficacy, time, energy, accessible location, finances, transportation and knowledge, as well as pain and health complications and environmental issues (Martin et al., 2002; Martin Ginis & Hicks, 2007; Scelza, Kalpakjian, Zemper & Tate, 2005). In

order to increase receptivity and usefulness of the CPAG-SCI, additional content is needed to adequately address these barriers.

What Types of Information do People with SCI Need?

Lavis and colleagues (2003) posit that the first step to successful dissemination of information to a targeted population is to thoroughly understand the needs of the target population. The logical way to thoroughly understand what people with SCI would find most useful in a CPAG-SCI is to ask them. Indeed, Martin Ginis and Hicks (2007) recommended that SCI consumers be actively involved in the development of the CPAG-SCI in order to maximize its applicability, practicality, and relevance.

Hence, the first purpose of this study was to determine what people with SCI want and would find most useful in a CPAG-SCI to encourage thoughts about being more physically active. The second purpose was to establish effective means to provide information in a CPAG-SCI in order to enhance thoughts about being more physically active. To successfully change physical activity, we need to change underlying cognitions about oneself and physical activity (Bandura, 1986; 1997; Schwarzer, 1992; 2004). Both of these objectives were addressed within the framework of the Health Action Process Approach (HAPA; Schwarzer, 1992; 2004).

Health Action Process Approach

The Health Action Process Approach (HAPA; Schwarzer 1992; 2004) is a health behaviour change model that identifies psychosocial influences on intention formation and the translation of that intention into the corresponding behaviour. When an intention is formed, a behaviour is not a guaranteed outcome. This is referred to as the intention-

behaviour gap. HAPA attempts to close this gap by describing intention formation, and behaviour initiation and maintenance as distinct processes with different determinants (Schwarzer). People who have not yet created a goal or intention are considered to be in the motivational phase; risk perceptions, outcome expectations and task self-efficacy are posited to influence their intention formation. People who have an intention or currently engage in the behaviour are considered to be in the volitional phase; action and coping planning, action control and maintenance and recovery self-efficacy are suggested to impact their behaviour engagement and sustainment (see Figure 1).

The motivational phase. An individual in the motivational phase has not yet formed an intention for the behaviour. In this phase, the goal of interventions is intention formation. Intentions are motivational levels one has to reach a certain goal (Ajzen, 1985). Risk perception, outcome expectations and task self-efficacy are all thought to influence intention formation. Risk perception is how probable an individual thinks he/she is at risk for a health certain outcome associated with not performing the behaviour (Rodger, 1983). Outcome expectations are one's own perceptions of possible consequences of engaging in a particular health behavior (Bandura, 1986). Task self-efficacy is self-confidence that is specific to the present task or situation (Bandura 1997; 1986). In a study with cardiac rehabilitation patients (Scholz, Sniehotta & Schwarzer, 2005), a linear regression model demonstrated risk perceptions, outcome expectations and task-specific self-efficacy significantly contributed to the prediction of intentions to be physically active, with task self-efficacy having the most predictive power. This study

confirms the influence of all motivational constructs specified in HAPA (risk perceptions, outcome expectations and task self-efficacy) on intention formation (Schwarzer, 2004).

The volitional phase. Once an intention is formed, the individual is in the volitional phase (Schwarzer, 1992; 2004). Within the volitional phase, the focus of interventions is on initiating behaviour and learning how to control that behaviour. For those who enter this phase with intentions already formed, planning has been found to be an important mediator between intention and behaviour (Lippke, Ziegelmann & Schwarzer, 2004; Reuter, Ziegelmann, Lippke & Schwarzer, 2009).

In HAPA, planning has been divided into two different types to encompass the different facets of planning: action planning and coping planning (Sniehotta, Scholz & Schwarzer, 2006). Action planning, also known as implementation intentions, involves identifying when, where and how to execute the intended behaviour (Gollwitzer, 1999; Leventhal, Singer & Jones, 1965). Coping planning involves preparing an individual to successfully overcome any specific encountered barriers that may prevent an intention from being translated to an actual behaviour (Sniehotta, Schwarzer, Scholz & Schüz, 2005).

In an intervention study (Sniehotta et al., 2006), cardiac rehabilitation patients were assigned to either an action planning group, a combined action planning and coping planning group, or a control group. Individuals in the combined action planning and coping planning group participated in significantly more physical activity two months post-discharge, as compared to the other intervention groups. Since participants in the combined intervention group did more physical activity at follow-up than the action

planning group alone, this study illustrates the distinction between different planning types and the usefulness of both in translating an intention into an actual behaviour. Essentially, individuals who form plans to execute a behaviour and develop plans to overcome barriers that may impede behaviour will have a better chance at successfully maintaining the intended behaviour (Sniehotta et al.).

Another self-regulatory construct that has been recently included in HAPA is action control. Action control refers to the continuous assessment of the present situation, while comparing it to a behavioural standard specific to the current intention (Sniehotta, Nagy, Scholz & Schwarzer, 2006; Sniehotta, Scholz & Schwarzer, 2005). Studies have illustrated action control as being associated with, and adding to the prediction of, physical activity participation (Scholz, Keller & Perren, 2009; Sniehotta et al., 2005; 2006). Furthermore, Sniehotta and colleagues (2006) state that action control may be the key to closing the intention-behaviour gap because it establishes a more proximate self-regulatory antecedent to behaviour participation, beyond planning.

Self-efficacy has also been suggested as a construct that may close the intention-behaviour gap (Bandura, 1997; Schwarzer & Renner, 2000). Self-efficacy plays numerous roles in HAPA. As mentioned above, in the motivational phase, task self-efficacy is vital for intention formation (Scholz et al., 2005). Within the volitional phase, self-efficacy has been found to moderate the proposed mediation role of planning on the intention-behaviour relationship. Specifically, for planning to successfully mediate the intention-behaviour relationship, self-efficacy needs to be high (Lippke, Wiedemann, Ziegelmann, Reuter & Schwarzer, 2009).

In the volitional phase, two different types of self-efficacy are important: maintenance and recovery self-efficacy (Scholz et al., 2005). Maintenance self-efficacy, also known as coping self-efficacy, is one's confidence in his/her ability to overcome any presented barriers that may impede behaviour (Martlett, Baer & Quigley, 1995; Scholz et al.). Recovery self-efficacy is one's confidence in his/her ability to return to the intended behaviour after a relapse or set-back (Martlet et al.; Scholz et al.). In a study with cardiac rehabilitation patients, maintenance self-efficacy was an important predictor to individuals who were just beginning to maintain a new behaviour, while recovery self-efficacy was an important predictor for those who had stopped being physically active (Scholz et al.). This study, as well as others (Schwarzer & Renner, 2000; Schwarzer et al., 2007), have supported the distinction of different types of self-efficacy during different phases of HAPA when predicting physical activity.

HAPA and physical activity. HAPA constructs have been shown to be predictive of physical activity behaviour. Sniehotta and colleagues (2005) measured HAPA constructs in coronary heart disease patients at baseline (risk perceptions, outcome expectation, task self-efficacy), two-months (action control, action planning, maintenance self-efficacy) and four-months later (physical activity) in order to test HAPA and understand what factors assist translation of an intention to be physically active into actual physical activity. All three motivational variables (risk perceptions, outcome expectations, task self-efficacy) were shown to strongly predict intention formation. All volitional variables tested (maintenance self-efficacy, action planning and action control) were found to predict physical activity over and above intentions with an additional

explained variance of 21%, resulting in 32% of variance being explained by the model. Furthermore, action control was found to have the strongest direct impact on physical activity behaviour. This study exemplifies the applicability of HAPA in explaining the formation of intentions, as well as the translation of intention into behaviour, with physical activity as the targeted behaviour. The model of intention formation from the HAPA motivational variables is confirmed and the importance of self-efficacy, planning and action control in successful future physical activity participation is demonstrated. The results of this study also show the important impact of self-regulatory strategies, like action control and planning on future physical activity participation.

Lippke and colleagues (2004) also illustrated the importance of adding self-regulation strategies, including different types of planning, to an intervention designed to increase physical activity. Orthopedic rehabilitation outpatients were randomly allocated to either a four-week planning intervention or a control group. The planning intervention involved constructing both action and coping plans to engage in physical activity. Upon completion of the study, those in the planning intervention executed more planning and physical activity behaviours, than the control group. Within the planning intervention group, those with a newly formed intention who had been physically active regularly before the study, engaged in more physical activity, as compared to those who had been engaged in physical activity regularly before the study. This study exemplifies the effectiveness of planning in HAPA (both action and coping) to encourage physical activity participation, as well as the impact of planning on those with newly formed

intentions, as opposed to individuals who have been or are currently engaged in the target behaviour.

The above review of HAPA constructs and research demonstrates the influence of HAPA motivational and volitional social cognitive constructs on intention formation and future physical activity. Based on previous studies, it is plausible that interventions targeting change in these HAPA social cognitive constructs may indeed change future physical activity intentions and behaviour. It is important to note, as HAPA is divided into two phases, the social cognitive constructs targeted are different for individuals who are currently non-intenders in the motivational phase (risk perceptions, outcome expectations, task self-efficacy) and new-intenders or actors in the volitional phase (action and coping planning, action control, maintenance and recovery self-efficacies). Although HAPA has yet to be fully explored within the SCI population in relation to physical activity, HAPA constructs have been investigated in a few SCI studies.

SCI, HAPA and Physical Activity

Some social-cognitive constructs have shown an association with physical activity in the SCI population (Arbour-Nicitopoulous, Martin Ginis & Latimer, 2009; Latimer & Martin Ginis, 2005; Latimer, Martin Ginis & Arbour, 2006; Warms, Belza, Whitney, Mitchell & Steins, 2004). Latimer and Martin Ginis (2005) looked at the predictive power of certain psychosocial constructs on intentions and LTPA in a SCI sample. Attitudes (similar to outcome expectations), subjective norms and perceived behavioural control (PBC; similar to self-efficacy), were all found to predict LTPA intentions. Intentions were the only significant predictor of LTPA behaviour, with just 16% of explained

variance. Furthermore, intentions mediated the relationship between attitudes, subjective norms and PBC with LTPA. This study demonstrates HAPA constructs, like task self-efficacy (PBC) and outcome expectations (attitudes), as predictors of LTPA intention formation among people with SCI. Additionally, this study shows the existence of the intention-behaviour gap in people with SCI, with only a small amount of LTPA variance explained by intentions.

In a pre-post evaluation of a stage-matched multifaceted program, Warms and colleagues (2004) found that providing educational material, in addition to assistance with intention and action planning, significantly increased exercise self-efficacy, decreased motivational barriers and increased upper extremity muscle strength in an SCI sample. Although not statistically significant, 60% of participants increased daily LTPA (measured via actigraph). This study demonstrated that intention and action planning were related to increases in HAPA construct task (exercise) self-efficacy and decreases in motivational barriers. Also, the changes in these HAPA constructs were associated with an increase in LTPA behaviour.

Latimer and colleagues (2006) explored the effectiveness of action planning to increase physical activity participation in a sample of people with SCI. Over the eight-week study period, individuals in the action planning condition participated in significantly more LTPA, had greater intentions to be physically active and higher maintenance self-efficacy and PBC, than the control condition. This study suggests that adding a planning aspect to mechanisms used to encourage physical activity among the

SCI population may be useful in increasing LTPA levels, via changes in intentions, maintenance self-efficacy and task self-efficacy (PBC).

Arbour-Nicitopoulos and colleagues (2009) explored the addition of coping planning to action planning, as suggested in HAPA (Schwarzer, 1992; 2004). Over a 10-week period, individuals in a combined action and coping planning condition participated in significantly more LTPA, and had greater levels of maintenance self-efficacy, (i.e. general barriers and scheduling self-efficacy) than the control condition. In concordance with the Latimer and colleagues study (2006), these findings support the addition of planning as a means of promoting physical activity in the SCI population. These findings further illustrate the valuable distinction of different facets of planning posited by HAPA (Sniehotta et al., 2006).

With these previous studies as a backdrop, the second purpose of this study is to establish effective means to provide information in CPAG -SCI in order to maximize positive changes in social cognitions. The findings from the SCI research discussed above (Arbour-Nicitopoulous et al., 2009; Latimer et al., 2006; Latimer & Martin Ginis, 2005; Warms et al., 2004) suggest the effectiveness of changing underlying cognitions in order to change physical activity behaviour. Similarly, it has been suggested that focusing on social-cognitive factors related to physical activity in Guidelines and Guides may be useful for increasing the impact on a target population (Brawley & Latimer, 2007; Rhodes, Warburton & Murray, 2009). One strategy that has been used to encourage behaviour change by altering relevant social cognitive constructs is to provide people with information via vignettes (Petraglia, 2007).

Vignettes

Vignettes, also referred to as narratives, narrative information or narrative intervention, are generally known as story-like text concentrating on the elaboration of a character's current situation, providing details about the characters, situation, factors involved and plot (Greene & Brinn, 2005; Winterbottom, Bekker, Conner & Mooney, 2008). Although there is no consistent definition or operationalisation of a vignette (Winterbottom et al.), vignettes usually include tangible, emotionally and psychologically motivating information, that aims to impact the reader of the vignette in a targeted population (deWit, Das & Vet, 2008). Thus, vignettes are a powerful means of stimulating interest in a topic in order to evoke strong emotional and cognitive reactions associated with behaviour change (Loewenstein, Weber, Hsee & Welch, 2001). Vignettes have been used in the past to promote behaviour change (Petraglia, 2007).

Vignettes are also considered a form of decision aid. Decision aids are designed and implemented to assist readers in making decisions between multiple options in a particular situation (O'Connor et al., 2003). Decision aids, such as vignettes, have been increasingly used to convey treatment information for health issues or concerns, as an alternative way to present factual information, as opposed to statistical information (Elwyn et al., 2006; Feidman-Stewart et al., 2006). In a wide range of decision aid materials (anywhere for 20-74%), vignettes about a patient's experience in choosing certain health care options have been presented (Feldman-Stewart et al., 2006; O'Connor et al., 2003). Using vignettes to express previous patients' experiences may assist readers in logically evaluating and coping with their own current health situation (Herxheimer &

Ziebland, 2004). In a systematic review (Winterbottom et al., 2008), only five out of seventeen studies found vignettes to be a successful means of impacting readers' decision making. Although these findings imply limited effectiveness, it is possible that vignettes included in the systematic review (Winterbottom et al.) were not all created with the same goal in mind (e.g., altering social cognitions versus having a direct effect on behaviour). Thus, if all the vignettes reviewed were not designed to target key cognitions related to behaviour change, this could explain why some were ineffective.

Vignette creation can be considered a form of role modeling (Petraglia, 2007). Bandura (1986; 1997) posits that role modeling is a type of vicarious experience that increases self-efficacy for a particular task or situation. A vicarious experience is a form of modeling or mimicry, in which an individual observes someone who is similar to him/herself and successfully performs a difficult task (Bandura). A social comparison occurs, and if similarity is high, then self-efficacy for that task is increased (Luszczynska & Schwarzer, 2007). Therefore, if a social comparison by the reader to the character in the vignette is high, then social cognitions, like self-efficacy, can be altered.

Vignettes are generally developed in health care to persuade readers to evaluate their personal experiences, in comparison to the character in the story, and encourage readers to alter their evaluations in a manner that promotes healthy behaviours (Petraglia, 2007). Despite an obvious utilization of social cognition mechanisms (role modeling, vicarious experience), most vignettes are constructed without much consideration of social cognition change (Petraglia). Given that changes in certain social cognitions regarding a particular behaviour have shown associations with changes in actual

behaviour (Rovniak, Anderson, Winett &Stephens, 2002), it is reasonable to propose that vignettes targeting change in social cognitions can change the target behaviour (Bandura, 1986; 1997; Schwarzer, 1992; 2004).

In a recent editorial (Petraglia, 2007), vignettes were posited to assist individuals to produce affective associations that impact social cognitive constructs, like outcome expectations, risk perceptions and different forms of self-efficacy. In a study conducted by deWit and colleagues (2008), risk perception was targeted as a motivational factor in a vignette regarding vaccination to hepatitis B virus (HBV) infection in men who were sexually active with other men. Participants who received the vignette had higher risk perceptions regarding HBV and a trend towards greater intentions to get the vaccine, than participants in other experimental conditions and the control condition. These results suggest that being exposed to a vignette targeting a social cognition within a specified population can indeed alter the target social cognition. These findings, as well as the function of vignettes as a role modeling mechanism exhibiting vicarious experience, suggest vignettes developed to alter social cognitions may be a valuable means of promoting behaviour change. Since social cognitive-based interventions aimed to change certain HAPA constructs among SCI samples have been successful in altering these constructs, as well as increasing LTPA (Arbour-Nicitopoulous et al., 2009; Latimer et al., 2006; Warms et al., 2004), it is hypothesized that using vignettes to alter social cognitions regarding physical activity may be an effective means to encouraging physical activity behaviour in the SCI population.

Vignettes are currently used in the CPAG-Healthy Active Living, but their impact has yet to be tested. Kliman and Rhodes (2008) evaluated CPAG-Healthy Active Living's overall impact on physical activity-related cognitions, but not the specific effects of the vignettes. This thesis will be the first study to specifically address the potential usefulness of vignettes in any CPAG. This will also be the first study to test effects of vignettes that include all of the HAPA constructs. Given that research on vignettes is in its infancy (Green & Brock, 2000), and findings to date have been inconsistent (Winterbottom et al., 2008), the current study results will also contribute to the vignette research literature in general.

The Current Study

The overarching objective of the current study was to maximize the applicability, usefulness and receptivity of a CPAG for the SCI population. Specifically, the first purpose was to determine what people with SCI would find most useful in CPAG-SCI to encourage regular physical activity participation. In concordance with previous recommendations by Martin Ginis and Hicks (2007), we conducted a survey of a representative sample of Canadians with SCI to determine what they want and would find most useful to include in CPAG-SCI in order to maximally promote and encourage physical activity. The survey's development was guided by the HAPA model (Schwarzer).

The second purpose was to establish effective means to provide information in CPAG-SCI in order to maximize positive changes in psychosocial cognitions related to LTPA in people with SCI. Based on HAPA, the relationship between social cognitive

predictors and physical activity in people with SCI, and literature on decision aids, it was proposed that vignettes would be an effective means of targeting and changing psychosocial cognitions related to LTPA. Using a randomized experimental design, an experiment was conducted to determine the effectiveness of HAPA-designed vignettes on altering social cognitive constructs regarding LTPA participation.

Proposed Study Hypotheses

For the CPAG-SCI content survey portion of the current study, there were no specified hypotheses. The purpose was purely exploratory and descriptive. For the experimental portion of the study, two hypotheses were proposed based on the Health Action Process Approach (Schwarzer, 1992; 2004). Specifically, those who were in the motivational phase of the HAPA would have increased outcome expectations, risk perceptions, task self-efficacy, intentions to be physically active, action and coping planning and action control, after reading the experimental vignettes, compared to a control group. Furthermore, those who were in the volitional phase of the HAPA would have increased action planning, coping planning, action control, maintenance self-efficacy and recovery self-efficacy after reading the experimental vignettes, compared to a control group. See Table 1 for clarification of hypotheses.

Methods

Participants

Sample size. Participants were both physically active and inactive adults with spinal cord injury. For the CPAG-SCI content survey portion of the study, 78 participants were recruited. For the vignette study, 79 participants were recruited, with

32 in the motivational group and 47 in the volitional group. Based on Cohen's (1992) formulae for sample size calculation, 52 participants were needed in the volitional phase and 52 in the motivational phase in order to have 80% power to detect a large-sized effect at a *p*-value less than .05. A large-sized effect was expected based on previous research examining psychosocial interventions to change HAPA cognitions, (Lippke et al., 2009; Scholz et al., 2005; 2009; Schwarzer & Renner, 2000; Schwarzer et al., 2007; Sniehotta et al., 2005; 2006) and the relationship between certain HAPA constructs and physical activity in the SCI population (Arbour-Nicitopoulous et al., 2009; Latimer & Martin Ginis, 2005; Latimer et al., 2006; Warms et al., 2004). Thus, with sample sizes less than 52, the vignette study was underpowered. For the vignettes study, participants could not be currently involved in any hospital-based rehabilitation programs, and they required Internet access. Participation in both studies was completely voluntary and participants provided informed consent.

Demographics.

CPAG-SCI content survey. The mean age of the sample was 45.06 years (±12.60), with 71.8% of the sample male and 28.2% female. Half of the sample was paraplegic, and half was tetraplegic (47.4% and 52.6%, respectively). The majority of the sample used a manual wheelchair (74.4%), while the remainder used a power wheelchair (24.4%) or walked independently (1.3%). The sample was predominantly Caucasian (82.1%), had post-secondary school education (53.8%), was married (42.3%) and characterized as ASIA Classification A (37.2%; American Spinal Injury Association, 2002). All of the demographic characteristics for the sample are shown in Table 2.

Vignette study. For the motivational group, the mean age of the experimental condition was 44.06 years (±13.89), with 66.7% of the sample male and 33.3% female. About one-third of the sample was paraplegic and two-thirds tetraplegic (33.3% and 66.7%, respectively). Mean time post injury was 20.39 years (±13.41). The majority of the sample used a manual wheelchair (61.1%), while the remainder used a power wheelchair (38.9%). The sample was predominantly Caucasian (94.4%), had post-secondary school education (72.2%), was single (44.4%) and characterized as ASIA Classification A (38.9%; American Spinal Injury Association, 2002). All of the demographic characteristics for the experimental condition are shown in the left hand column of Table 3.

The mean age of the control conditions was 46.93 years (±6.97), with 50.0% of the sample male and 50.0% female. The sample was 28.6% paraplegic and 71.4% tetraplegic. Mean time post injury was 23.21 years (±10.62). The majority of the sample used a power wheelchair (64.3%), while the remainder used a power wheelchair (35.7%). The sample was predominantly Caucasian (92.9%), had a high school or post-secondary school education (both 42.9%), was single or divorced (both 42.9%) and characterized as ASIA Classification A (71.4%; American Spinal Injury Association, 2002). All of the demographic characteristics for the control condition are shown in the middle column of Table 3.

For the volitional group, the mean age of the experimental condition was 42.17 years (±10.77), with 75.0% of the sample male and 25.0% female. A little over half of sample was paraplegic and a little under half tetraplegic (54.2% and 45.8%, respectively).

Mean time post injury was 16.85 years (±10.38). The majority of the sample used a manual wheelchair (70.8%), while the remainder used a power wheelchair (29.2%). The sample was predominantly Caucasian (95.8%), had post-secondary school education (70.9%), was married (50.0%) and characterized as ASIA Classification A (50.0%; American Spinal Injury Association, 2002). All of the demographic characteristics for the experimental condition are shown in the left hand column of Table 4.

The mean age of the control condition was 44.61 years (±14.20), with 65.2% of the sample male and 34.8% female. The sample was 60.9% paraplegic and 39.1% tetraplegic. Mean time post injury was 12.70 years (±10.31). The majority of the sample used a power wheelchair (69.6%), while the remainder used a power wheelchair (30.4%). The sample was predominantly Caucasian (100.0%), had post-secondary school education (70.9%), was married (both 60.9%) and characterized as ASIA Classification A (47.8%; American Spinal Injury Association, 2002). All of the demographic characteristics for the control condition are shown in the middle column of Table 4.

Design

CPAG-SCI content survey. A cross-sectional design was utilized.

Vignette study. Two randomized experimental designs were implemented. Participants were assigned to the motivational or volitional group based on their HAPA phase and were then randomly assigned to either an experimental or control condition. Stratified random assignment was used to assign participants to the experimental and control conditions based on level of injury, sex and type of wheelchair (manual or electric). All three factors have shown significant associations with physical activity

participation in an SCI sample (Martin Ginis et al., 2010a). The experimental participants were exposed to a tailored physical activity vignette. In order to maximize similarity between the participant and the character in the vignette, participants read a vignette about a character with the same sex, wheelchair type, HAPA phase and injury level, as the participant. The control participants were provided with a story, similar in length to the tailored vignettes. This story did not contain any physical activity information and was not tailored to the participant's sex, wheelchair type, HAPA phase or injury level. See "Physical Activity Vignette Intervention" and "Control Vignette" sections below. For the motivational group, there were 18 and 14 participants in the experimental and control conditions, respectively. For the volitional group, there were 24 and 23 participants in the experimental and control conditions, respectively (see Figure 2). Measures of HAPA social cognitions were administered at baseline (time 1), and one week later, immediately following vignette presentation (time 2).

Measures: CPAG-SCI Content Survey

Participants in the CPAG-SCI content survey completed an online questionnaire regarding what they want to see in a CPAG-SCI, why they want to see it and how it should be presented. The CPAG-SCI content survey was developed with a list of potential content to include in the CPAG-SCI ("what" items). These content items were derived from an analysis of content in the current CPAG-Healthy Active Living, content based on HAPA social cognitive constructs (e.g., information about planning, risks of inactivity) and focus-group feedback from consumers in the SCI community, community-based organizations, researchers and academics.

For each content item (e.g., safety and injury prevention tips), follow-up question ("why" items) determined which psychosocial constructs (e.g., motivation to start physical activity, motivation to maintain physical activity, increases knowledge, increases self-confidence) would be enhanced by that component. Participants could choose as many of the four psychosocial constructs they felt explained why that content item was important. Participants were also asked about design aspects of the CPAG-SCI and how they would like the information presented ("how" items). Please see Appendix A for a copy of the content survey.

Measures: Vignette Study

See Appendix B for a copy of the social cognitions questionnaire. Questionnaire items are described below.

Physical activity phase of change. In order to determine whether a potential participant was in the motivational or volitional phase of HAPA, participants were asked about their current physical activity phase of change using Prochaska, Redding and Evers' (2002) stages of change measure. Participants were asked the following question: "Regular leisure time physical activity refers to doing 30 minutes or more of moderate to heavy leisure time physical activity at least three times per week. Do you engage in moderate to heavy leisure time physical activity on a 'regular basis'?" Participants were asked to choose one of the following statements that best describes them: "Yes, I have been doing LTPA regularly for MORE than 6 months; Yes, I have been doing LTPA regularly for LESS than 6 months; No, but I intend to start doing LTPA regularly in the next 30 days; No, but I intend to start doing LTPA regularly in the next 6 months; No,

and I do NOT intend to start doing LTPA regularly in the next 6 months." Those who chose the two former responses were classified as in the volitional phase (physically active), while those who chose the three latter responses were classified as in the motivational phase (physically inactive).

Risk perceptions. Risk perceptions were measured in both the motivational and volitional groups at time 1 and time 2. The questionnaire items have been used in past studies (Milne, Orbell & Sheeran, 2002) and have recently been used with a SCI sample (Bassett, Martin Ginis & Latimer, 2010). Participants were asked their perceived chance of developing certain health (*cardiovascular disease, type 2 diabetes, obesity*) and mental health (*depression, chronic pain, fatigue*) conditions in the future. Participants rated each of these items on a 7-point Likert-type scale, as to whether they felt they had a chance of developing a certain problem (*not at all strong/very strong*) and whether it was unlikely for them to develop the problem (*strongly disagree/strongly agree*). Within this study, the health risk perceptions items displayed adequate internal consistency for time 1 (α_m = .91, α_v = .89) and time 2 (α_m = .85, α_v = .92), as did the mental health risk perception items for time 1 (α_m = .84, α_v = .85) and time 2 (α_m = .91, α_v = .91), for the motivational and volitional groups, respectively.

Outcome expectations. Outcome expectations were measured at both time 1 and time 2 in the motivational and the volitional groups. Participants were asked the following statement: "For me, engaging in moderate-heavy intensity physical activity 3 days per week over the next 4 weeks would be…". This statement was followed by adjective pairs positioned on 7-point Likert-type scales. These adjective pairs were used

in previous SCI research and have shown to be an internally consistent measure (Latimer & Martin Ginis, 2005) of attitudes of people living with a SCI for engaging in regular LTPA (*boring/interesting, unenjoyable/enjoyable, unpleasant/pleasant, painful/not painful, exhausting/energizing, not fun/fun*). Within this study, the items displayed adequate internal consistency for time 1 ($\alpha_m = .82$, $\alpha_v = .94$) and time 2 ($\alpha_m = .91$, $\alpha_v = .89$), for the motivational and volitional groups, respectively.

Task self-efficacy. Task self-efficacy was measured at time 1 and time 2 in both the motivational and volitional groups. Task-specific self-efficacy was measured for aerobic activity focusing on two different intensity levels. These questions were developed for multiple ongoing studies (SCI Action Canada, 2009) and all questions were measured on a 7-point Likert-type scale, rated on a *not confident/completely confident* dimension. Aerobic self-efficacy was further divided into moderate and heavy intensity aerobic self-efficacy. Participants were provided with a description and examples of aerobic activity. They were asked the following question: "If you had all of the resources you needed, such as specialized equipment or an assistant, how confident are you that you could physically do the following amounts of moderate intensity aerobic activity without stopping." This question was followed by 5 different time periods (10, 20, 30, 45, 60 minute intervals). The same series of questions were presented for heavy intensity aerobic activity. Within this study, the moderate aerobic self-efficacy items displayed adequate internal consistency for time 1 ($\alpha_m = .95$, $\alpha_v = .92$) and time 2 ($\alpha_m = .93$, $\alpha_v = .87$), as did the heavy aerobic self-efficacy items for time 1 ($\alpha_m = .92$, $\alpha_v = .95$) and time 2 ($\alpha_m = .93$, $\alpha_v = .92$), for the motivational and volitional groups, respectively.

Intentions. Intentions to be physically active were measured at time 1 and time 2 in both the motivational and volitional groups. Intentions were measured using two items that have been used in previous research evaluating LTPA intentions in an SCI sample (Latimer & Martin Ginis, 2005; Latimer et al., 2006). Participants were asked the following questions: "I will try to do at least 30 minutes of moderate to heavy intensity physical activity 3 days per week over the next month; I intend to do at least 30 minutes of moderate to heavy intensity leisure time physical activity at least 3 days per week over the next 4 weeks." Responses were positioned on 7-point Likert-type scales, with the former two questions rated on a *definitely false/definitely true* dimension, and the latter question rated on an *extremely unlikely/extremely likely* dimension. Within this study, the items displayed adequate internal consistency for time 1 ($r = .85$, $r = .96$) and time 2 ($r = .87$, $r = .89$), for the motivational and volitional groups, respectively.

Action planning. Action planning was assessed at both time 1 and time 2 in both the motivational and volitional groups. Participants were asked four questions that have demonstrated high reliability in a cardiac rehabilitation sample (Scholz et al., 2005), and were recently used in a SCI sample (Arbour-Nicitopoulos et al.,2009). Participants were asked the following question: "To what extent are the following statements true for you?" The question was followed by four items regarding action plans for physical activity participation (*when, where, what, how often*) that will be positioned on a 7-point Likert type scale that was rated on a *definitely false/definitely true* dimension. Within this study, the items displayed adequate internal consistency for time 1 ($\alpha_m = .94$, $\alpha_v = .93$) and time 2 ($\alpha_m = .98$, $\alpha_v = .93$), for the motivational and volitional groups, respectively.

Coping planning. Coping planning was measured in both motivational and volitional groups at time 1 and time 2. Coping planning was measured using items previously used with a cardiac rehabilitation sample (Sniehotta et al., 2005). Participants were presented with the item stem: "I have made a detailed plan regarding…". Five items followed the stem regarding coping planning (e.g., "what to do if something interferes with my plans to exercise"). Each item response was rated on a 4-point Likert type scale on a *completely disagree/completely agree* dimension. Within this study, the items displayed adequate internal consistency for time 1 (α_m = .90, α_v = .93) and time 2 (α_m = .95, α_v = .91), for the motivational and volitional groups, respectively.

Action Control. Action control was assessed in both groups at both time points. Action control was measured using items employed in a previous study with cardiac rehabilitation patients (Sniehotta et al., 2005). Participants were asked: "To what extent are the following statements true for you?" This statement was followed by six items entailing aspects of action control: "monitor whether I engage in LTPA often enough;" "careful to ensure that I am active for at least 30 minutes at a moderate to heavy intensity each time;" "physical activity program is often on my mind;" "constantly aware of my physical activity program;" "really tried to engage in LTPA regularly;" and "try my best to meet my own standard for being physically active." Each item was rated on a 7-point Likert type scale on a *definitely false/definitely true* dimension. Within this study, the items displayed adequate internal consistency for time 1 (α_m = .88, α_v = .90) and time 2 (α_m = .93, α_v = .89), for the motivational and volitional groups, respectively.

Maintenance self-efficacy. Maintenance or coping self-efficacy was measured in the volitional group only, at time 1 and time 2. Items used have been used in previous research with SCI samples (Latimer et al., 2006; Martin et al., 2002). Participants were asked the following question: "How confident are you that you could participate in moderate to heavy leisure time physical activity for at least 30 minutes 3 days per week over the next month even if:" Participants were presented with a list of six physical activity barriers, and each barrier were measured on a 7-point Likert-type scale, rated on a *not confident/completely confident* dimension. Physical activity barriers assessed were: "feeling tired/fatigued"; "you are busy or have limited time"; "you have transportation problems"; "you have pain or soreness"; "the weather is very bad"; and " you do not have someone to exercise with." Within this study, the items displayed adequate internal consistency for time 1 ($\alpha_v = .77$) and time 2 ($\alpha_v = .81$).

Recovery self-efficacy. Recovery self-efficacy was measured in the volitional group only, at time 1 and time 2. Items used have been used in previous research with cardiac rehabilitation patients (Scholz et al., 2005). Participants were asked: "Over the next month, how confident are you that you can:", followed by items pertaining to recovery self-efficacy (*return to exercise after you miss a few days, after you miss a weeks*). These items were rated on a 7-point Likert type scale on a *not at all confident/completely confident* dimension. Within this study, the items displayed adequate internal consistency for time 1 ($\alpha_v = .93$) and time 2 ($\alpha_v = .93$).

Social support. Social support (subjective norms) was measured in both groups at both time points. Although not included in HAPA (Schwarzer, 1992; 2004), social

support is touched upon in the experimental vignettes and has been shown to influence intentions to be physically active in a sample of people with spinal cord injury (Latimer & Martin Ginis, 2005). Items have been used in previous research with spinal cord injury samples (Latimer & Martin Ginis). Participants were asked: "Most people important to me:" followed by two items regarding subjective norms (*think I should participate in 40 minutes of LTPA 3 days per week over the next four weeks, approve of me participating in 30 minutes of LTPA 3 days per week over the next four weeks*). These items were rated on a 7-point Likert type scale on a *strongly disagree/strongly agree* dimension. Within this study, the items displayed adequate internal consistency for time 1 ($r = .82$, $r = .80$) and time 2 ($r = .79$, $r = .91$), for the motivational and volitional groups, respectively.

Manipulation Checks: Vignettes Study

Perceived similarity. Perceived similarity to the character in the tailored vignette was measured in both the motivational and the volitional groups immediately following the time 2 questionnaire. All participants were asked: "How similar do you think you are to the person with SCI in the story that you read based on:", followed by items concerning perceived similarity (*sex, age, level of injury, cause of injury, type of wheelchair used daily, previous level of physical activity, types of physical activities enjoyed*). Participants in the control condition were asked all items, except the latter two. These items were rated on a 7-point Likert type scale on a *not at all like me/exactly like me* dimension. Please see Appendix C for a copy of the perceived similarity items.

Procedure

This research protocol was approved by the McMaster Research Ethics Board prior to initiation of recruitment and data collection.

CPAG-SCI content survey.

Internet-based content survey. Interested individuals clicked on a link provided in an email. They were redirected to a letter of information on a secure online survey website. Individuals were instructed to review the letter of information and if they agreed to participate, gave informed consent by clicking a button at the bottom of the screen. Participants were redirected to a demographics questionnaire and the content survey. Once they completed the survey and clicked the submit button, a window popped up thanking them for their time and providing a date when debriefing information would be available via the SCI Action Canada website.

Vignettes study.

Time 1. The participant was sent an email with instructions and a link (based on their condition assignment) to a secure online survey website. Upon clicking the link, a consent form was presented. If participants agreed to give informed consent, they simply clicked the button on the bottom of the page indicating so. Once consent was provided, participants were directed to a new window that contained the Time 1 Questionnaire, which included the demographics questionnaire, and items measuring HAPA constructs based on phase assignment. If individuals were in the motivational group, their risk perceptions, social support, outcome expectations, task self-efficacy, intentions to be physically active, action planning, coping planning and action control were measured. If individuals were in the volitional group, all the motivational constructs, plus maintenance

and recovery self-efficacy were measured. Upon completion of the Time 1 Questionnaire, participants hit the submit button at the bottom of the page. A window popped up reminding participants that in seven days, they would be contacted via email to complete another questionnaire.

Time 2. Seven days following the Time 1 questionnaire completion, participants were sent another email instructing them to go to the link listed for a second questionnaire. Upon clicking on the link, participants in experimental conditions were presented with a physical activity vignette based on their HAPA phase, sex, injury level and wheelchair type (see "Physical Activity Vignette Intervention" described below), while participants in the control condition were presented with a control vignette (see "Control Vignette" described below). Once they read the vignette, they wet to the next window where the Time 2 Questionnaire was presented. All the same constructs measured at Time 1 were measured again at Time 2, in addition to the perceived similarity manipulation check questions. After completing the Time 2 Questionnaire, participants hit the submit button at the bottom of the page. A window popped up thanking them for their time, and asking them to enter their address to receive a package including: a Tim Horton's gift certificate as compensation, an information card with a date when debriefing information will be available on the SCI Action Canada website and information on Get in Motion, for further physical activity participation information.

Physical Activity Vignette Intervention. Physical activity-based vignettes for participants in the experimental condition were constructed based on combinations of sex, wheelchair type, injury level and HAPA phase (see Appendix D for examples). In

total, sixteen vignettes were designed (motivational vs. volitional; female vs. male; paraplegic vs. tetraplegic; manual vs. power wheelchair use). In concordance with Bandura's idea of role modeling (1986; 1997; Luszczynska & Schwarzer, 2007), each vignette was designed to be high in similarities to the individuals who were reading them. For example, someone who has no intention to be physically active, uses a manual wheelchair and is male, would read a vignette about a male who is in the motivational phase and uses a manual wheelchair. The motivational experiment vignettes highlighted motivational constructs captured in HAPA, specifically risk perceptions, outcome expectations and task self-efficacy to impact intentions. The volitional experimental vignettes highlighted volitional constructs captured in HAPA, specifically action and coping planning, action control, maintenance and recovery self-efficacy. In addition to the vignette itself, a picture was also added to each vignette to match the character in the story in order to increased perceived similarity.

Control vignette. Participants in the control condition received a vignette about a person who was not tailored to their characteristics. Physical activity was not mentioned, and the vignette did not highlight any psychosocial constructs that were targeted in the experimental condition vignettes (see Appendix D). Overall, the control vignette used the same type of wording and was the same length as the experimental vignette, but did not contain a picture.

Statistical Analysis

CPAG-SCI content survey. The results from the what, why and how items of the content survey were analyzed using descriptive statistics, including means and

frequencies. Frequencies were calculated for the "what" items based on the percentage of respondents who wanted a particular content item included in CPAG-SCI. For the "why" explanation items, frequencies were also calculated. These frequencies were calculated only for the items that were desired by 90% or more of the sample. Additionally, χ^2 was calculated for each "why" item, based on the null hypothesis that 50% of the participants would respond "yes" and 50% of the participants would choose "no" for a particular reason for wanting that corresponding content item. The analysis was conducted separately for the tetraplegic and paraplegic subsamples. Also, χ^2 was calculated for each formatting question ("how") and tested the null hypothesis that the percent of participants endorsing a particular option should be equal across all possible options for that item. It should be noted that for presentation format (i.e. booklet, pamphlet, text-only website, interactive website, DVD or computer disk), participants were not restricted to one preference; therefore, χ^2 could not be calculated.

Vignettes study. Separate 2 (experimental vs. control condition) X 2 (pre-post) Repeated Measures Analyses of Variances (Repeated Measures ANOVAs) were conducted on each of the scales administered in the motivational group (i.e. risk perceptions, outcome expectations, task self-efficacy, intentions, action planning, coping planning and action control). Next, separate 2 (experimental vs. control condition) X 2 (pre-post) Repeated Measures ANOVAs were conducted on each of the scales administered in the volitional group (i.e. action planning, coping planning, action control, maintenance and recovery self-efficacy). Post-hoc *t*-tests were calculated if significant time x condition interactions were found.

Results

CPAG-SCI Content Survey: What, Why & How

WHAT content items to include in CPAG-SCI. Frequency statistics were calculated for all content items. It should be noted that 97.3% of paraplegics and 95.1% of tetraplegics preferred to have information tailored based on injury characteristics (see item #11 in Table 5). Although there is not enough evidence to create separate physical activity guidelines for paraplegics and tetraplegics, it is possible to tailor the guide in a manner that includes the content desired by each subgroup. For this reason, the content item analysis was conducted separately for the tetraplegic subsample and the paraplegic subsample.

Tetraplegic subsample. The percent of respondents desiring each content item is presented in the right hand column in Table 5. The majority of the items were desired by approximately 85% of respondents. The most and least desired items were wanted by 97.6% (physical activity in different seasons) and 78% (planning tips; tips on how to monitor progress; tips for body temperature regulation) of the sample, respectively.

Paraplegic subsample. The percent of respondents desiring each content item is presented in the left hand column in Table 5. The majority of the items were desired by approximately 85% of respondents. The most and least desired items were wanted by 100% (stretching activity definition) and 67.6% (tips on how to monitor progress) of the sample, respectively.

WHY preferred content items were important. Tables 6 and 7 show the reasons why people wanted each content item. For brevity, only items desired by 90% or more of the respondents are shown.

Tetraplegic subsample. Roughly equal numbers of respondents thought that the items would be useful for motivation to start physical activity (42.11%), to maintain physical activity (52.37%) and to increase knowledge (54.57%). These percentages did not significantly differ from chance ($\chi^2 = 1.24$, ns; $\chi^2 = .11$, ns; $\chi^2 = .42$, ns; respectively). However, only 35.82% of respondents indicated that the content items would be useful to increase self-confidence. This proportion was significantly less than would be expected by chance ($\chi^2 = 4.02$, $p<.05$).

Paraplegic subsample. Roughly equal numbers of respondents thought that the items would be useful for motivation to start physical activity (51.36%), to maintain physical activity (43.54%) and to increase self-confidence (49.76%). These percentages did not significantly differ from chance ($\chi^2 = .04$, ns; $\chi^2 = .83$, ns; $\chi^2 = .00$, ns; respectively). However, 64.74% of respondents indicated that the content items would be useful to increase knowledge. This proportion was significantly more than would be expected by chance ($\chi^2 = 4.34$, $p<.05$).

HOW the preferred content items should be presented. Table 8 shows the percent of respondents preferring each formatting option. The respondents preferred CPAG-SCI to be presented in a booklet (43.6%) or interactive website (43.6%). Text with pictures were preferred over text only ($\chi^2=23.94$, $p<.05$). Photographs were preferred over drawings or cartoons ($\chi^2=17.87$, $p<.05$). Bright colours were preferred

over neutral colours or black and white (χ^2=7.12, p<.05). Simple messages were preferred over detailed messages (albeit not-significant; χ^2=2.64, ns). A calendar pull-out was desired by most respondents (χ^2=8.41, p<.05). The respondents preferred CPAG-SCI to be either 5-10 pages (25.6%) or 16-20 pages (21.8%).

Vignettes Study

Demographic characteristics for the motivational and the volitional groups are presented in Table 3 and Table 4.

Motivational group: Hypotheses tests

Repeated Measures ANOVAs. Means and standard deviations for both the experimental and control conditions pre- and post-intervention, as well as the results of the Repeated Measures ANOVAs are presented in Table 9. There were no main effects for time or condition. There was a significant time X condition interaction for coping plans (F(1, 29)= 4.95, p<.05).

Bonferonni-corrected post hoc t-tests (p<.025) were computed in order to determine whether being exposed to either the experimental or the control vignette led to changes in coping plans. For those exposed to the experimental vignette, the decrease in coping plans between pre- and post-intervention approached significance, t(17) =2.10, p<.05, while there were no significant changes for those exposed to the control vignette (see Table 10). This finding indicates that non-significant decreases in coping plans only occurred after reading the experimental vignette.

Volitional group: Hypotheses tests

Repeated Measures ANOVAs. Means and standard deviations for both the experimental and control conditions pre- and post-intervention, as well as the results of the repeated measures ANOVAs are presented in Table 11. There were no main effects for time or condition. There was a significant time x condition interaction for coping plans ($F(1,45)= 4.95, p<.05$), and the time x condition interaction approached significance for self-regulation ($F(1,45)=3.45, p<.10$).

Bonferonni-corrected post hoc *t*-tests ($p<.025$) indicated that the increases in coping plans and self-regulation between pre- and post-intervention approached significance ($t(22) =-1.82, p<.10$; $t(22) = -2.02, p<.10$; respectively) for those exposed to the control vignette, while there were no significant changes for those exposed to the experimental vignette (see Table 12). These findings indicate that the non-significant increases in coping plans and self-regulation only occurred after reading the control vignette, not the experimental vignette.

Exploratory analysis. Among those exposed to the experimental vignette, the majority of social cognitions consistently stayed the same or decreased. As a manipulation check, participants were asked how similar they felt to the character in the story on a number of attributes. It was suspected that perceived similarity may have influenced the effects of the experimental vignette on change in social cognition. Thus, *t*-tests were performed in order to examine the difference between the two conditions on the perceived similarity items. Additionally, Pearson bivariate correlations were calculated to determine the association between the perceived similarity items and change in social cognitions. The means and standard deviations for each perceived similarity

item for both conditions are listed in Tables 13 and 14. "Common items" are perceived similarity items that were measured in both the experimental and the control conditions. "Unique items" are items that were only measured in those exposed to the experimental vignette (i.e. previous LTPA level & type of LTPA enjoyed).

Motivational Group: Differences in perceived similarity between conditions. For the common items, significant differences were found between conditions for similarity in level of injury, $t(30) = 3.14, p < .01$, cause of injury, $t(30) = 3.94, p < .001$, and mobility mode, $t(30) = 5.58, p < .001$ (please see Table 7), indicating that those exposed to the experimental vignette felt more similar to the character in the vignette than those exposed to the control vignette.

Volitional group: Differences in perceived similarity between conditions. There were significant between-group differences for perceived similarity for sex, $t(45) = 3.83$, $p < .001$, age, $t(45) = 3.83, p < .001$, level of injury, $t(45) = 2.85, p < .01$, cause of injury $t(45) = 4.41, p < .001$, and mobility mode $t(45) = 8.42, p < .001$, indicating that those exposed to the experimental vignette felt more similar to the character in the vignette than those exposed to the control vignette. Given the differences, it seemed prudent to determine whether perceived similarity was related to change in social cognitions.

Motivational group: Associations between perceived similarity items and changes in social cognitions. Standardized residual change scores were calculated for all social cognitions. Following Tabachnick & Fidell's (2001) suggestions, any z-scores >3.29 or < -3.29 were considered outliers, and removed from further analyses (n=1). Pearson bivariate correlations were calculated between the standardized residual change

scores for social cognitions and the perceived similarity items (see Table 15 for experimental condition and Table 16 for control condition).

Experimental condition. Several significant positive associations emerged. Sex perceived similarity was significantly correlated with changes in action plans (r=+.51, p<.05). Age perceived similarity was significantly correlated with changes in coping plans (r=+.47, p<.05). Cause of injury perceived similarity was significantly correlated with changes in moderate and heavy aerobic self efficacy (r=+.51, p<.05; r=+.56, p<.01; respectively) and overall task self-efficacy (r=+.61, p<.01). Mobility mode perceived similarity approached significance for the correlation with changes in action plans (r=+.44, p<.10). Among the unique items, previous LTPA level was significantly correlated with changes in outcome expectations (r=+.60, p<.01). Type of LTPA enjoyed perceived similarity approached significance for the correlation with changes in outcome expectations (r=+.41, p<.10). There were also several significant negative correlations. Sex perceived similarity was significantly correlated with changes in health risk perceptions (r=-.50, p<.05), and approached significance for the correlation with changes in moderate aerobic self-efficacy (r=-.41, p<.10). Mobility mode perceived similarity showed approached significance for the correlation with changes in health risk perceptions (r=-.42, p<.10) and mental health risk perceptions (r=-.42, p<.10).

Control condition. Cause of injury perceived similarity was significantly correlated with changes in social support (r=+.58, p<.01). There were also two negative correlations approaching significance. Sex perceived similarity approached significance

for the correlation with changes in mental health risk perceptions (r=-.49, p<.10) and intentions (r=-.50, p<.10).

Volitional group: Associations between perceived similarity items and change in social cognition. See Table 17 for experimental condition and Table 18 for control condition correlations.

Experimental condition. Mobility mode perceived similarity was significantly positively correlated with barrier self-efficacy (r=+.49, p<.01). There were also several negative associations. Age perceived similarity approached significance for the correlation with changes in action plans (r=-.36, p<.10), and barrier self-efficacy (r=-.47, p<.05). Level of injury perceived similarity approached significance for the correlation with change in action plans (r=-.39, p<.10). Cause of injury perceived similarity was significantly correlated with changes in action plans (r=-.50, p<.01).

Control condition. There were no positive correlations within the control condition in this group. However, mode of mobility perceived similarity was significantly negatively correlated with changes in action control and recovery self-efficacy (r=-.42, p<.05; r=-.44, p<.05).

Discussion

The overall objective of the current study was to maximize the applicability, usefulness and receptivity of a CPAG for the SCI population. The first specific purpose was to determine what the SCI population would find most useful in CPAG-SCI to encourage regular physical activity participation. From a researcher's standpoint, the content survey showed that physical activity knowledge, motivational information, safety

and health information, sources of information and social support, and self-regulation information were all desired. Also, tetraplegics did not desire items that increased self-confidence, while paraplegics did desire items that increased knowledge, as opposed to other items. The second purpose was to establish effective means for providing information in CPAG-SCI in order to maximize positive changes in psychosocial cognitions related to LTPA. It was proposed that exposure to physical activity vignettes would be an effective means of improving social cognitions related to LTPA. However, contrary to the hypotheses, overall, there were no positive effects for the experimental vignettes. Each set of findings will be discussed in turn.

CPAG-SCI Content Survey

What content items to include in CPAG-SCI. For both the tetraplegic and paraplegic subsamples, approximately 85% of the respondents desired the majority of the items. The least desired items, with the exception of tips on body temperature regulation, were items pertaining to self-regulation (e.g., planning tips, how to monitor progress). Since past research has shown that self-regulation is the most important aspect of physical activity participation among the SCI population (Martin Ginis, Latimer, Bassett, Arbour-Nicitopoulos & Wolfe, 2010b), it is surprising that participants did not perceive this type of content as important as other content. From a researcher's standpoint, the most desired content consistently pertained to physical activity knowledge, motivational information, safety and health information and sources of information and social support.

The content desired by the SCI sample paralleled the majority of content items included in the current CPAG-Healthy Active Living (Public Health Agency of Canada,

1998), along with some additional unique content. Most of the content in CPAG-Healthy Active Living pertains to physical activity knowledge, sources of information and social support, and some self-regulation information, with minimal content pertaining to motivational, and safety and health information. The additional content requested by this SCI sample pertained mostly to motivational information, safety and health information, and some additional self-regulation information. The desire for the content currently in CPAG-Healthy Active Living, along with unique content, likely reflects the information required to meet the special needs and physical activity barriers faced daily by people with SCI, in order to adequately encourage physical activity.

Based on the content survey results, it is recommended that content pertaining to physical activity knowledge, motivational information, safety and health information, sources of information and social support and self-regulation information be included in CPAG-SCI, since the vast majority of the respondents desired all of the content. With regards to the second part of this thesis, it should also be noted that "real life stories" were wanted by 90% of tetraplegic respondents and 95% of paraplegic respondents (see item #14 in Table 5), which indicates that people with SCI think vignettes are a useful and interesting means of conveying physical activity information.

Why desired content items were important. For tetraplegics, approximately equal numbers of respondents thought the desired items would be useful for increasing motivation to start physical activity, motivation to maintain physical activity and increase knowledge, while only a little over one-third of the subsample thought that the desired items would increase self-confidence. For paraplegics, approximately equal numbers of

respondents thought desired the items would be useful for increasing motivation to start physical activity, to maintain physical activity and to increase self-confidence, while almost two-thirds of the respondents thought that the desired items would increase knowledge.

As mentioned in the Methods section, these "why" items were developed based on the HAPA model (Schwarzer 1992; 2004), with the intention that participants' responses would help decipher which types of HAPA-based cognitions need to be targeted in the CPAG. In hindsight, there was likely a disconnect between how researchers versus study participants interpreted these items. This may be why the respondents did not perceive the content in the same manner as we intended.

How the preferred content items should be presented. The preferences for format options for CPAG-SCI are discussed below.

Respondents preferred the CPAG-SCI *in booklet or interactive website form.* Since print form information, such as the current CPAG-Healthy Active Living (Public Health Agency of Canada, 1998), has shown to have low recall (Bauman, Craig & Cameron, 2005; Spence, Plotnikoff & Mummery, 2002), it may be useful to produce both a print and an interactive website option. In a recent cost analysis study by Lewis and colleagues (2010), over a long period of time, web-based physical activity promotion was most cost-effective, as compared to a print-based intervention.

Text in combination with pictures was preferred over text alone. This is in concordance with previous research on the effectiveness of text and pictures, over text alone, to enhance recall and comprehension of information (Houts, Doak, Doak &

Loscalzo, 2006; Katz, Kripalani & Weiss, 2006; Kools, Van de Weil, Ruiter, Cruts & Kok, 2006; Moll, 1986), and what is currently presented in CPAG-Healthy Active Living (Public Health Agency of Canada, 1998).

Photographs were preferred over drawings or cartoons within CPAG-SCI. This contradicts what is presented in the current CPAG-Healthy Active Living (Public Health Agency of Canada, 1998); however, Berry and colleagues (2008) found that consumers did not favour the cartoons that are presented in CPAG-Healthy Active Living. In concordance, Moll (1986) also found that photographs increased perception of information over other picture sources.

Bright colours were preferred for CPAG-SCI over neutrals or a black and white colour scheme. This is consistent with what is presented in CPAG-SCI (Pubic Health Agency of Canada, 1998); however, Berry and colleagues (2008) found that consumers of CPAG-Healthy Active Living did not like the bright "rainbow" colours. It is suggested that using bright colours that are not primary colours in combination with photographs, not cartoons, will be more appealing.

Simple messages were preferred over detailed messages for CPAG-SCI, although not significantly. Moll (1986) found simple text did not necessarily lead to an increase in communication ability of an educational booklet for people with osteoporosis; however, Berry and colleagues (2008) found that people preferred messages in CPAG-Healthy Active Living that were similar to those in advertisements and magazines, which all have a simple message structure. Although research is somewhat contradictory, simple messages are preferred by the SCI sample for CPAG-SCI.

A *calendar pull-out* was desired for CPAG-SCI as opposed to not having one available in the Guide. The calendar pull-out is packaged in CPAG-Healthy Active Living as well. This will be a useful tool since self-regulation has been found to be the most important predictor of physical activity participation in a sample of people with SCI (Martin Ginis et al., 2010b), and planning and monitoring with use of a calendar have been shown to increase LTPA among people with SCI (Arbour-Nicitopoulos et al., 2009; Latimer et al., 2006).

Respondents preferred CPAG-SCI to be *5-10 pages or 16-20 pages*, although these preferences were not significantly favoured over the other options. The current CPAG-Healthy Activity Living Guide is four pages, while the handbook is 32 pages. The SCI sample preferred something more than the current Guide, but less than the handbook itself.

Implications of content survey findings.

The what, why and how findings from the content survey should be applied to the development of CPAG-SCI to make it as helpful, motivating and as user-friendly as possible for this population. All of the content desired should be included, since 85% of respondents did desire the majority of items presented. The CPAG-SCI should be more tailored to both the tetraplegic and paraplegic subpopulations, as both subsamples desired this information (see item #11 in Table 5). Tailoring to the subpopulations is also supported by tetraplegics not desiring content items increasing self-confidence, while paraplegics desiring content items increasing knowledge. Also, the format preferences should be implemented. Therefore, CPAG-SCI should be in booklet and interactive

website forms, with simple messages and photographs, bright colours and anywhere from five to twenty pages, including a pull-out calendar.

"Real life stories" desired. As mentioned above, "real life stories" were wanted by 90% of tetraplegic respondents and 95% of paraplegic respondents, which implies that people with SCI think vignettes are a useful and interesting means of conveying physical activity information. This is also in concordance with Berry and colleagues' (2008) findings among people evaluating the current CPAG-Healthy Active Living. Taking these findings into account, the discussion will shift now to the results of the vignette study.

Vignettes Study

For the motivational group, it was hypothesized that risk perceptions (both health and mental health), outcome expectations, social support, task self-efficacy (moderate and heavy aerobic), intentions, action control, action and coping planning and self-regulation would all increase among participants, after reading the experimental vignette, as compared to the control vignette. Coping plans were the only social cognition change that approached significance, but they decreased following exposure to the experimental vignette intervention. For the volitional group, it was hypothesized that action control, action and coping plans, self-regulation, maintenance and recovery self-efficacy would increase among participants after reading the experimental vignette. Social cognitions did not significantly change after reading the experimental vignette; however, coping plans and self-regulation approached a significant increase after exposure to the control vignette.

In general, the hypotheses were not supported, since experimental vignettes did not significantly improve social cognitions. The principles of Social Cognitive Theory (Bandura, 1986) and Social Comparison Theory (Buunk & Gibbons, 2007; Festinger, 1954), in addition to previous research (deWit et al., 2008) support vignette exposure as a means of improving LTPA-related social cognitions. However, the results from the current study suggest that physical activity based-vignette exposure is not an effective means to enhance LTPA cognitions among people with SCI.

Why weren't the vignettes effective? It was hypothesized that the experimental vignettes would improve LTPA-related social cognitions because they would function as a vicarious experience, as suggested by Bandura's Social Cognitive Theory (1986; 1997). It was assumed that if participants could relate more to the character in the experimental vignette, a greater improvement in social cognitions would occur (Duck & Barnes, 1992). This did not happen within the current study.

Rather, perceived similarity may explain the ineffectiveness of the experimental vignettes. Both positive and negative correlations were found between change in social cognitions and perceived similarity, indicating that perceived similarity may have had both an enhancing and detrimental impact on the ability of the experimental vignette to improve social cognitions. If certain aspects of perceived similarity aid, and others hinder, changes in social cognitions, this may explain why the overall net effect of exposure to the experimental vignette on social cognitions was null.

Why can perceived similarity decrease cognitions? Similar to Social Cognitive Theory's tenets regarding vicarious experiences (Bandura, 1986; 1997), Social

Comparison Theory (Buunk & Gibbons, 2007; Festinger, 1954) posits that exposure to information about the behaviour of similar others may influence one's thoughts, feelings and motivation about that particular behaviour. Furthermore, Social Comparison Theory (Buunk & Gibbons; Festinger) states that an individual can either identify with, or contrast oneself with, another individual in social comparison situations (Buunk & Ybema, 1997). Buunk and colleagues (2006a) describe *identification* as viewing others as your potential future self, and *contrast* as viewing others as your competition. These concepts are both divided further into upward and downward identification and contrast. *Upward identification* is a positive reaction to observing someone who is superior to you on a particular dimension as your potential future, while *downward identification* is a negative reaction to observing someone who is inferior to you on a particular dimension as your potential future. *Upward contrast* is a negative reaction to seeing someone who is superior to you on a particular dimension, while *downward contrast* is a positive reaction to observing someone who is inferior to you on a particular dimension.

People with serious health problems, like SCI, diabetes and cardiovascular diseases, may try to socially compare themselves to similar others in order to understand their feelings and to assess the outcomes of different treatments and activities (Kulik & Mahler, 2000). In a recent study by Buunk and colleagues (2006b), 70 people with SCI reported socially comparing themselves to others "sometimes", with the most frequent comparisons made to other people with SCI. A second study by Buunk and colleagues (2006a) examined social comparison strategies used among people with SCI with respect to coping and depression. Positive comparison strategies (upward identification and

downward contrast) were found to be more prevalent than negative comparison strategies (downward identification and upward contrast). However, since people with SCI have been found to compare themselves to others based on physical activity more than any other dimension and prefer to learn about similar others who are coping effectively (Buunk et al., 2006b), it is possible that people with SCI contrast upwards with regards to physical activity. For example, if a role model wheels five days a week, for an hour each day, and the reader does not, the reader will contrast his/herself upwards to the role model. The reader can either be motivated by the role model and work to wheel more (upward identification), or feel worse about his/herself and become less motivated to wheel (upward contrast).

In the current study, one social cognition (coping plans) approached a significant decrease after exposure to the experimental vignette, while the majority of other social cognitions showed non-significant decreases. Participants exposed to the experimental vignette who were both active and inactive likely socially compared themselves upwards to the vignette character because the experimental vignette character was very active. The use of an upward contrast comparison strategy is indicated by social cognitions that decreased after reading the vignette, reflecting a negative self-evaluation (Buunk & Gibbons, 2007). For example, when readers evaluated themselves against the character's coping planning ability, and realized they do not plan for physical activity as well as the character, this could have made them feel inferior to the character. As a result, perceptions of their own coping plans declined.

It seems that the majority of participants exposed to the experimental vignette used an upward contrast comparison strategy, indicated by the general decrements in social cognitions. Also, perceived similarity was greater among those who were exposed to the experimental vignette, as opposed to the control vignette. Taken together with the many negative associations between perceived similarity and change in social cognitions, these results parallel past literature that indicates that individuals can feel similar to another through social comparison, but still simultaneously feel as if that other person is superior to them on a particular dimension (Collins, 1996). Under such conditions, an upward contrast comparison strategy would likely occur, causing the person to feel worse on the particular dimension (e.g., physical activity cognitions).

Boomerang effects. It is also possible that social cognitions decreased among people exposed to the experimental vignette because of a boomerang effect caused by the gain-framed message style of the vignette. The boomerang effect is defined as the shift of consumers' thoughts and feelings in the opposite direction than what was intended by the persuasive material (Cox & Cox, 2001). When constructing the experimental vignette, gain-framed messages (messages emphasizing the benefits of regular LTPA) were integrated, based on the literature suggesting that these types of messages are beneficial for composing effective physical activity messages (Latimer, Brawley & Bassett, 2010). The pleasantness of gain-framed messages in the experimental vignette may have undermined the manipulation's effects. Past literature (Cox & Cox) found that pleasant stimulus exposure (e.g., gain-framed message) may lead participants to think they are less vulnerable to the consequences of not engaging in a behaviour (e.g., cardiovascular

disease, obesity, depression), thus making them less eager to participate in a behaviour they perceive as unpleasant (e.g., physical activity for those who are inactive). The same may be true about social cognitions related to LTPA (e.g., poorer intentions, coping plans, action plans, recovery self-efficacy). In support of this notion, a recent study (Bassett et al., 2010) found loss-framed messages (emphasizing the risks of not engaging in regular LTPA) to significantly improve LTPA-related social cognitions, as opposed to gain-framed messages, among people with SCI.

In this study, the experimental vignette consisted of gain-framed messages, possibly making the vignette itself counter-persuasive, not supplying participants with ample rationalization for initiating physical activity or maintaining physical activity (Cox & Cox, 2001). Prospect theory (Tversky & Kahnmen, 1981) suggests that individuals are influenced by both gains and losses; however, individuals attribute greater importance to potential losses, especially when rewards or consequences of that particular behaviour are delayed or progressive (Madden, 2000), such as with physical activity. Within the current study, the pleasant gain-framed nature of the tailored vignette paired with the delayed benefits of physical activity may have led to a boomerang effect, as indicated by a trend towards poorer social cognitions after exposure to the experimental vignette.

Why did some social cognitions improve after exposure to the control vignette? Interestingly, increases approaching significance in coping plans and overall self-regulation were found for those exposed to the control vignette. The control vignette was selected for use in this study because of the perceived neutrality of the story and character. In retrospect, there were a few facets of the control vignette that could have

positively influenced social cognitions for individuals. First, there were aspects the reader could relate to. For example, the control character was injured via a traumatic accident and approximately 81% of Canadians with SCI acquired their injury through traumatic events (Hitzig et al., 2008). The control character was male, similar to the majority of participants in the control condition (65%).

Second, there were aspects of the vignette that could enhance physical activity social cognitions. The character mentioned that he still endures a lot of pain, inconveniences and discomfort, but doesn't let these factors impact his daily life. Pain, discomfort and soreness have all been listed as perceived barriers to physical activity by SCI samples (Martin et al., 2002; Scelza et al., 2005). Furthermore, the control character had a positive outlook on his situation and was very inspirational, learning to walk after injury. Bandura (1997) posited that vicarious models who cope effectively can heighten social cognitions.

It is possible that reading such an inspirational story about someone who coped well with his injury, both physically and emotionally, may have increased coping plans and self-regulation based on upward identification. With regards to coping, people with SCI were found to use upward identification frequently (Buunk et al., 2006a) and coping plans are particularly useful for people with SCI with regards to LTPA participation (Arbour-Nicitopoulus et al., 2009), as is self-regulation overall (Martin Ginis et al., 2010b). Bandura (1997) suggests that individuals actively search for qualities in a model that they desire for themselves. Since people with SCI are thought to compare themselves more frequently to others who are coping better (Buunk et al.), it is possible

that this control character acted as an inspirational model (Bandura), motivating self-enhancement for coping plans and overall self-regulation via upward identification (Buunk & Gibbons, 2007; Festinger, 1954). Thus, social cognitions improved in controls.

Summary of vignettes study. In general, the hypotheses were not supported, since the social cognitions did not significantly improve in participants exposed to the experimental vignette. Perceived similarity may explain the ineffectiveness of the experimental vignette, as there were many negative correlations between perceived similarity and change in social cognitions. Given that there were also some positive correlations, perceived similarity may dually help and hinder changes in social cognitions. Greater perceived similarity in those exposed to the experimental vignette may have resulted in most social cognitions getting worse due to the use of upward contrast comparison strategies. Also, the gain-framed message style of the vignette may have been counter-persuasive, causing a boomerang effect. Lastly, the control vignette may not have been as neutral as intended, serving as an inspirational model, leading to improvements in coping plans and self-regulation in the control condition.

Implications of Vignettes Study

Theory. Based on the main analyses of the vignettes study, conclusions and implications regarding the effectiveness of HAPA as a basis for vignette creation and implementation cannot be put forth because overall, the manipulation failed. Post hoc and exploratory analyses suggest Social Comparison Theory (Buunk & Gibbons, 2007; Festinger, 1954) and Social Cognitive Theory (Bandura, 1986; 1997) are important

frameworks for understanding the ineffectiveness of the vignettes. The upward comparison strategies posited by Social Comparison Theory (Buunk & Gibbons; Festinger) could explain why there was a general detrimental effect on social cognitions. Thus, poorer social cognitions could be explained by the evaluation of oneself to a character that is perceived as being better at regular physical activity. The notion that perceived similarity needs to be high in order for a comparison to occur is supported by Social Cognitive Theory (Bandura), since perceived similarity was higher among those exposed to the experimental vignette, as opposed to the control vignette. However, even if perceived similarity is high, it may be possible that vicarious experiences do not have the same results when identifying versus contrasting upwards, as suggested by the results of this study.

CPAG-SCI. Based on the results of this study, it is recommended that this type of physical activity vignette, aimed at changing LTPA-related cognitions, not be used in CPAG-SCI. Social cognitions generally decreased, which will not lead to consumers of CPAG-SCI to think positively about being more physically active. This conclusion is, however, preliminary until more is known regarding the role of perceived similarity on the effects of exposure to an experimental physical activity-based vignette within an SCI sample. This issue needs to be explored further, to determine when perceived similarity is detrimental or beneficial to change in social cognitions.

We are not suggesting, however, that vignettes be excluded completely from CPAG-SCI. Based on the content survey, people with SCI desired knowledge-based information, such as basic physical activity instructions, home-based physical activity

options, information on how to progress and physical activity in different seasons. Since the content survey also found that people with SCI desired "real-life stories", it might be beneficial for this population to have vignettes incorporated in CPAG-SCI that provide physical activity instructions and information, rather than vignettes that aim to change social cognitions. In this context, people with SCI will still have a vignette character to relate to that conveys important, desired physical activity information, without targeting social cognitions and making them feel worse about their ability to perform those activities.

Limitations and Future Directions

This study had a few limitations, mainly dealing with the vignette development and presentation. First, this study only exposed participants to the experimental vignette once. Since past literature suggests that multiple exposures of tailored information would be more valuable to encourage health behaviour change (Noar, Benac & Harris, 2007) it would be interesting to explore the impact of multiple exposures to tailored physical activity vignettes within a SCI sample. Second, as noted above, the use of gain-framed messages in the experimental vignette could have caused a boomerang effect, leading to worse social cognitions. The effectiveness of gain-framed versus loss-framed messages in vignettes aimed at increasing LTPA-related social cognitions in a sample of people with SCI should be explored to establish the most beneficial type of message style to use. Third, the vignette was designed to change all social cognitions associated with the respective HAPA phase (Schwarzer 1994, 2002). If the vignettes aimed to change one key social cognition (e.g., barrier self-efficacy), the vignette would have solely been

formed around that cognition and not around an entire list of cognitions. Thus, had the vignette concentrated on changing only one cognition, changes in that cognition may have occurred. Lastly, when compared to the five effective studies (Fragerlin, Wang & Ubel, 2005, Study 1; Rook, 1987, Study 1 & 2; Ubel, Jepson & Baron 2001, Study 1 & 2) from the Winterbottom and colleagues' (2008) systematic review, some differences between those anecdotes/vignettes and this physical-activity vignette were apparent. All anecdotes were shorter in length and three of the five studies (Fragerlin et al, Study 1; Ubel et al, Study 1 & 2) used a preamble to introduce the topic, key terms and ask participants to imagine that they were experiencing that particular condition or situation (e.g. osteoporosis, heart disease). If an introductory preamble to physical activity and its key terms had been included before the experimental vignette, then results may have been different.

Additionally, the results in the correlation matrices indicate that perceived similarity plays a key role in the effects of experimental vignette exposure on change in social cognitions. Within this study, there was not enough statistical power to conduct adequate exploratory analyses to determine the role of perceived similarity. Although some meditational models were tested (please see Appendix E), it is suggested that the relationship be explored more thoroughly in the future. Also, it would be interesting to explore what types of attributes or characteristics lead to a reader using certain social comparison styles over others (e.g., contrast versus comparison), with regards to a physical activity vignette among people with SCI.

Conclusion

As a phase of CPAG-SCI development, this study sought to determine what people with SCI would find most useful in CPAG-SCI and to establish effective means for providing information in a CPAG-SCI in order to maximize thoughts about being more physically active. People with SCI desired content pertaining to physical activity knowledge, motivational information, safety and health information, sources of information and social support, and self-regulation information in CPAG-SCI (albeit there was less desire for self-regulation items). When examining the effectiveness an experimental vignette, LTPA-related cognitions generally decreased after experimental vignette exposure. Perceived similarity may be a key variable contributing to the ineffectiveness of the experimental vignette, thus highlighting the need for further study of this variable in future vignette research. Overall, it is suggested that physical activity vignettes in CPAG-SCI not target social cognition change.

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Table 1

Vignette Study: Hypotheses

	Motivational Group		Volitional Group	
HAPA constructs	Experimental	Control	Experimental	Control
Risk perception	√			
Outcome expectations	√			
Moderate aerobic self-efficacy	√			
Heavy aerobic self-efficacy	√			
Task self-efficacy	√			
Intentions	√			
Action planning	√		√	
Coping planning	√		√	
Action control	√		√	
Self-Regulation	√		√	
Maintenance self-efficacy			√	
Recovery self-efficacy			√	

Note. √ indicates hypothesized improvement post-vignette exposure.

Table 2

CPAG-SCI Content Survey Sample Demographic Characteristics

Demographic	*M*(*SD*)	%	*n*
Age (years)	45.06(12.60)		78
Sex			
Male		71.8%	56
Female		28.2%	22
Level of Injury			
Paraplegia		47.4%	37
Tetraplegia		52.6%	41
ASIA Classification			
A		37.2%	29
B		7.7%	6
C		12.8%	10
D		28.2%	22
E		2.6%	2
Primary Mode of Mobility			
Manual Wheelchair		74.4%	58
Power Wheelchair		24.4%	19
Walks Independently		1.3%	1

Ethnicity		
White	82.1%	64
Native	2.6%	2
Black	3.8%	3
Highest Level of Education Completed		
High School	29.5%	23
College	26.9%	21
University	19.2%	15
Post-Graduate	7.7%	6
Other	5.1%	4
Marital Status		
Single	23.1%	18
Common Law	6.4%	5
Married	42.3%	33
Divorced	14.1%	11
Widowed	2.6%	2

Table 3

Motivational Group: Sample Demographic Characteristics

Demographic	Experimental Condition *M* (*SD*) or n (%) n=18	Control Condition *M* (*SD*) or n (%) n=14	All participants *M* (*SD*) or n (%) n=32
Age (years)	44.06 (13.89)	46.93 (6.97)	45.31 (11.32)
Sex			
Male	12 (66.7%)	7 (50.0%)	19 (59.4%)
Female	6 (33.3%)	7 (50.0%)	13 (40.6%)
Level of Injury			
Paraplegia	6 (33.3%)	4 (28.6%)	10 (31.3%)
Tetraplegia	12 (66.7%)	10 (71.4%)	22 (68.8%)
Time Post Injury (years)	20.39 (13.41)	23.21 (10.62)	21.63 (12.17)
ASIA Classification			
A	7 (38.9%)	10 (71.4%)	17 (53.1%)
B	4 (22.2%)		4 (12.5%)
C	4 (22.2%)		4 (12.5%)
D	3 (16.7%)	4 (28.6%)	7 (21.9%)
Primary Mode of Mobility			
Manual Wheelchair	11 (61.1%)	5 (35.7%)	16 (50.0%)
Power Wheelchair	7 (38.9%)	9 (64.3%)	16 (50.0%)
Ethnicity			

White	17 (94.4%)	13 (92.9%)	30 (93.8%)
Native	1 (5.6%)		1 (3.1%)
Asian		1 (7.1%)	1 (3.1%)
Highest Level of Education Completed			
High School	3 (16.7%)	6 (42.9%)	9 (28.1%)
College	7 (38.9%)	3 (21.4%)	0 (31.3%)
University	4 (22.2%)	1 (7.1%)	5 (15.6%)
Post-Graduate	2 (11.1%)	2 (14.3%)	4 (12.5%)
Other	2 (11.1%)	2 (14.3%)	4 (12.5%)
Marital Status			
Single	8 (44.4%)	4 (28.6%)	12 (37.5%)
Common Law	2 (11.1%)		2 (6.3%)
Married	7 (38.9%)	4 (28.6%)	11 (34.4%)
Divorced	1 (5.6%)	6 (42.9%)	7 (21.9%)

Table 4

Volitional Group: Sample Demographic Characteristics

Demographic	Experimental Condition *M* (*SD*) or n (%) n=24	Control Condition *M* (*SD*) or n (%) n=23	All participants *M* (*SD*) or n (%) n=47
Age (years)	42.17 (10.77)	44.61 (14.20)	43.36 (12.49)
Sex			
Male	18 (75.0%)	15 (65.2%)	33 (70.2%)
Female	6 (25.0%)	8 (34.8%)	14 (29.8%)
Level of Injury			
Paraplegia	13 (54.2%)	14 (60.9%)	27 (57.4%)
Tetraplegia	11 (45.8%)	9 (39.1%)	20 (42.6%)
Time Post Injury (years)	16.85 (10.38)	12.70 (10.31)	14.77 (10.44)
ASIA Classification			
A	12 (50.0%)	11 (47.8%)	23 (48.9%)
B	3 (12.5%)	3 (13.0%)	6 (12.8%)
C	4 (16.7%)	5 (21.7%)	9 (19.1%)
D	5 (20.8%)	3 (13.0%)	8 (17.0%)
Primary Mode of Mobility			
Manual Wheelchair	17 (70.8%)	16 (69.6%)	33 (70.2%)
Power Wheelchair	7 (29.2%)	7 (30.4%)	14 (29.8%)

Ethnicity			
White	23 (95.8%)	23 (100.0%)	46 (97.9%)
Asian	1 (4.2%)		1 (2.1%)
Highest Level of Education Completed			
High School	7 (29.2%)	5 (21.7%)	12 (25.5%)
College	10 (41.7%)	8 (34.8%)	18 (38.3%)
University	4 (16.7%)	4 (17.4%)	8 (17.0%)
Post-Graduate	3 (12.5%)	6 (26.1%)	9 (19.1%)
Marital Status			
Single	8 (33.3%)	7 (30.4%)	15 (31.9%)
Common Law	3 (12.5%)	1 (4.3%)	4 (8.5%)
Married	12 (50.0%)	14 (60.9%)	26 (55.3%)
Divorced	1 (4.2%)	1 (4.3%)	2 (4.3%)

Table 5

Percentage of respondents desiring each content item

Content Item Name	Paraplegics (n=37)	Tetraplegics (n=41)
1. Benefits of physical activity	91.9%	95.1%
2. Risks of inactivity	91.9%	90.2%
3. Strength training definition	97.3%	90.2%
4. Aerobic activity definition	81.1%	80.5%
5. Stretching activity definition	100.0%	87.8%
6. Different intensity definitions	94.6%	82.9%
7. Example activities for each intensity	91.9%	92.7%
8. Time needed for each type of activity	83.8%	90.2%
9. Information on how to progress	94.6%	92.7%
10. Home-based physical activity options	97.3%	90.2%
11. Information tailored to specific groups	97.3%	95.1%
12. First steps if inactive	81.1%	87.8%
13. How to increase activity if already active	91.9%	90.2%
14. Real-life stories	94.6%	90.2%
15. Basic physical activity instructions	89.2%	92.7%
16. Possible risks of physical activity	91.9%	87.8%
17. Overworking warnings	94.6%	85.4%
18. Signs for adequate amounts of activity	89.2%	90.2%

19. Ways to increase confidence	81.1%	80.5%
20. Incorporate into daily life	91.9%	90.2%
21. Ways to make physical activity enjoyable	89.2%	90.2%
22. Maintenance tips	89.2%	87.8%
23. Sources of information	91.9%	87.8%
24. Who to ask for information	89.2%	82.9%
25. Resource list by region	89.2%	92.7%
26. Possible social support outlets	83.8%	80.5%
27. Planning tips	89.2%	78.0%
28. Tips on how to set a realistic goal	86.5%	85.4%
29. Tips on how to monitor progress	67.6%	78.0%
30. Pull out calendar	75.7%	80.5%
31. Nutritional information	86.5%	92.7%
32. Tips for body temperature regulation	78.4%	78.0%
33. Physical activity in different seasons	89.2%	97.6%
34. Prevention and safety tips	91.9%	87.8%
35. How to modify equipment	89.2%	90.2%
36. Ways to overcome barriers	94.6%	92.7%
37. Tips on how to stay motivated	89.2%	87.8%

Table 6

Reasons given for CPAG-SCI content items desired by 90% or more of respondents with tetraplegia

Content Item	Motivation to start physical activity	Motivation to stick to physical activity	Increase knowledge	Increase confidence
Physical activity in different seasons	29.3%	53.7%	51.2%	29.3%
Benefits of physical activity	48.8%	58.5%	65.9%	43.9%
Information to tailored to specific groups	48.8%	51.2%	65.9%	41.5%
Example activities for each intensity	43.9%	56.1%	58.5%	39.0%
Information on how to progress	36.6%	46.3%	61.0%	36.6%
Basic physical activity instructions	51.2%	48.7%	56.1%	34.1%
Resources list by region	48.8%	43.9%	46.3%	31.7%
Nutritional information	31.7%	39.0%	65.9%	39.0%
Ways to overcome barriers	46.3%	61.0%	51.2%	61.0%
Risks of inactivity	51.2%	56.1%	53.7%	31.7%

Strength training definition	43.9%	46.3%	56.1%	41.5%
Time needed for each type of intensity	31.7%	36.6%	65.9%	39.0%
Home-based physical activity options	56.1%	39.0%	43.9%	36.6%
How to increase activity if already active	41.5%	58.5%	43.9%	34.1%
Real-life stories	43.9%	41.5%	41.5%	39.0%
Signs for adequate amounts of exercise	17.1%	51.2%	65.9%	36.6%
Incorporate into daily life	43.9%	41.5%	48.8%	36.6%
Ways to make physical activity more enjoyable	39.0%	53.7%	41.5%	31.7%
How to modify equipment	46.3%	56.1%	53.7%	36.6%
	M=42.11%	M=52.37%	M=54.57%	M=35.82%
	χ^2=1.24	χ^2=0.11	χ^2=0.42	χ^2=4.02*

Note. χ^2 tests based on the null hypothesis that 50% of the participants would respond "yes" and 50% of the participants would respond "no" to a particular reason for desiring the corresponding content item.

*p<.05

Table 7

Reasons given for CPAG-SCI content items desired by 90% or more of respondents with paraplegia

Content Item	Motivation to start physical activity	Motivation to stick to physical activity	Increase knowledge	Increase confidence
Stretching activity definition	56.8%	37.8%	67.6%	43.2%
Strength training definition	54.1%	40.5%	70.3%	43.2%
Home-based physical activity options	67.6%	48.6%	62.2%	54.1%
Information tailored to specific groups	64.9%	48.6%	67.6%	56.8%
Different intensity definitions	56.8%	43.2%	70.3%	48.6%
Information on how to progress	48.6%	51.4%	64.9%	56.8%
Real-life stories	51.4%	51.4%	54.1%	59.5%
Overworking warning	18.9%	24.3%	81.1%	37.8%
Ways to overcome barriers	54.1%	48.6%	70.3%	64.9%
Benefits of physical activity	62.2%	56.8%	56.8%	59.5%

Risks of inactivity	59.5%	51.4%	56.8%	48.6%
Example activities for each intensity	62.2%	45.9%	67.6%	56.8%
How to increase activity if already active	48.6%	48.6%	51.4%	48.6%
Possible risks of physical activity	24.3%	21.6%	73.0%	32.4%
Incorporate into daily life	56.8%	48.6%	62.2%	45.9%
Sources of information	45.9%	40.5%	64.9%	51.4%
Who to ask for information	40.5%	32.4%	59.5%	37.8%
	M=51.36%	M=43.54%	M=64.74%	M=49.76%
	χ^2=0.04	χ^2=0.83	χ^2=4.34*	χ^2=0.001

Note. χ^2 tests based on the null hypothesis that 50% of the participants would respond "yes" and 50% of the participants would respond "no" to a particular reason for desiring the corresponding content item.

*p<.05

Table 8

Format Preferences for CPAG-SCI

Format Issue	Percentage of Preference	p for χ^2
Presentation Format		
Booklet	43.6%	N/A
Pamphlet	19.2%	N/A
Text-only website	11.5%	N/A
Interactive website	43.6%	N/A
DVD	26.9%	N/A
Computer Disk	15.4%	N/A
Layout		
Text only	1.3%	<.05
Text and picture combination	83.3%	<.05
Picture type		
Cartoons	5.1%	<.05
Drawings	21.8%	ns
Photographs	57.7%	<.05
Colour Scheme		
Bright Colours	48.7%	<.05
Neutral Colours	21.6%	ns
Black & White	14.1%	<.05

Message Type		
Simple	61.5%	ns
Detailed	23.1%	<.05
Calendar and Quick Facts Pull-out		
Yes	70.5%	<.05[a]
No	14.1%	ns
Ideal Length		
1-2 pages	3.8%	ns
3-4 pages	7.7%	ns
5-10 pages	25.6%	ns
11-15 pages	21.8%	ns
16-20 pages	7.7%	ns
21+ pages	17.9%	ns

Note. χ^2 tests, except for "calendar and quick facts pull-out"(see note below), were used to test the null hypothesis that the percent of participants endorsing a particular option should be equal across all possible options for that item. For presentation format, participants were not restricted to one preference; therefore, χ^2 could not be calculated.

[a] χ^2 test based on the null hypothesis that 50% of participants would respond "yes" and 50% of participants would respond "no".

Table 9

Motivational Group: Repeated Measures Analysis of Variance

	M (*SD*)		Main Effects (*F*)		Interaction (*F*)
Δ Social Cognition	Pre	Post	Time	Condition	TimeXCondition
Health Risk Perceptions					
Experimental	4.25 (1.92)	3.68 (1.42)	1.43	1.09	1.19
Control	4.51 (1.46)	4.49 (1.30)			
Mental Health Risk Perceptions					
Experimental	3.77 (1.64)	3.50 (1.48)	.23	.05	.90
Control	3.49 (1.06)	3.57 (1.42)			
Social Support					
Experimental	5.31 (1.75)	5.33 (1.56)	.60	.04	.80
Control	5.61 (1.06)	5.23 (1.83)			

Outcome Expectations					
Experimental	4.76 (1.08)	4.87 (1.10)	.90	.06	.09
Control	4.82 (1.37)	5.02 (1.60)			
Moderate Aerobic Self-Efficacy					
Experimental	3.83 (1.87)	3.88 (1.72)	.96	.93	1.54
Control	3.62 (2.02)	4.09 (1.48)			
Heavy Aerobic Self-Efficacy					
Experimental	2.60 (1.60)	2.92 (1.66)	2.39	.00	.01
Control	2.61 (1.52)	2.91 (1.41)			
Task Self-Efficacy					
Experimental	3.27 (1.65)	3.40 (1.63)	2.13	.01	.51
Control	3.11 (1.64)	3.50 (1.29)			
Intentions					
Experimental	3.42 (1.94)	3.33 (1.71)	.21	.28	.74
Control	2.92 (1.29)	3.19 (1.92)			

Action Plans					
Experimental	2.53 (1.98)	2.20 (1.64)	.39	.10	.31
Control	2.58 (1.79)	2.56 (2.10)			
Coping plans					
Experimental	2.42 (1.29)	1.81 (0.90)	1.30	.13	4.96*
Control	2.19 (1.53)	2.38 (1.81)			
Action Control					
Experimental	2.85 (1.28)	3.01 (1.42)	.86	1.91	.02
Control	3.67 (1.92)	3.79 (2.04)			
Self Regulation					
Experimental	2.60 (1.20)	2.34 (0.99)	.38	.63	2.08
Control	2.81 (1.54)	2.91 (1.86)			

Note. *$p<.05$

Table 10

Motivational Group: Post Hoc t-tests

	M (SD)			
Δ Social Cognition	Pre	Post	*t*	*p*
Coping Plans				
Experimental	2.42 (1.29)	1.81 (0.90)	+2.10	.05
Control	2.19 (1.53)	2.38 (1.81)	-1.38	.19

Table 11

Volitional Group: Repeated Measures Analysis of Variance

	M (*SD*)		Main Effects (*F*)		Interaction (*F*)
Δ Social Cognition	Pre	Post	Time	Condition	TimeXCondition
Action Plans					
Experimental	4.22 (2.03)	4.05 (1.93)	.00	1.77	1.09
Control	4.76 (1.88)	4.92 (1.75)			
Coping Plans					
Experimental	3.49 (1.94)	3.59 (1.69)	1.87	2.34	4.55*
Control	4.29 (1.48)	4.69 (1.52)			
Action Control					
Experimental	4.86 (1.31)	4.75 (1.23)	.13	.65	2.16
Control	5.04 (1.71)	5.23 (1.53)			
Self Regulation					

Experimental	4.19 (1.48)	4.13 (1.42)	1.30	2.52	3.45†
Control	4.70 (1.46)	4.95 (1.48)			
Barrier Self-Efficacy					
Experimental	4.66 (1.35)	4.62 (1.23)	.11	2.13	.47
Control	5.07 (1.05)	5.18 (1.07)			
Recovery Self-Efficacy					
Experimental	5.32 (1.39)	5.25 (1.08)	.18	2.40	.01
Control	5.80 (1.14)	5.76 (1.16)			

Note. *p<.05, †p<.10

Table 12

Volitional Group: Post Hoc t-tests

	M (*SD*)			
Δ Social Cognition	Pre	Post	*t*	*p*
Coping Plans				
Experimental	3.49 (1.94)	3.59 (1.69)	-.42	.68
Control	4.29 (1.48)	4.69 (1.52)	-.82	.08
Self Regulation				
Experimental	4.19 (1.48)	4.13 (1.42)	+.53	.60
Control	4.70 (1.46)	4.95 (1.48)	-2.02	.06

Table 13

Motivational Group: Descriptive Statistics for Perceived Similarity Items

Perceived Similarity Covariates	Experimental Condition *n*=18 *M (SD)*	Control Condition *n*=14 *M (SD)*	*p*
Common Items			
Sex	5.39 (2.25)	4.00 (3.11)	.17
Age	3.61 (1.82)	2.79 (1.58)	.19
Level of Injury	3.67 (1.28)	2.07 (1.59)	<.01
Cause of Injury	3.94 (2.53)	1.21 (0.58)	<.001
Mobility Mode	5.17 (1.95)	1.78 (1.31)	<.001
Unique Items			
Previous LTPA level	4.50 (1.89)	N/A	N/A
Type of LTPA enjoyed	4.44 (1.62)	N/A	N/A

Note. For similarity items, participants were asked how similar they perceived themselves to be to the character in the vignette. All items were measured on a 7-point Likert-type scale, where *1* was "*not at all like me*" and *7* was *"exactly like me"*. Common items are variables that were measures in both the experimental and control condition. Unique items are variables that were only measured in the experimental condition.

Table 14

Volitional Group: Descriptive Statistics for Perceived Similarity Items

Perceived Similarity Covariates	Experimental Condition *n*=24 *M (SD)*	Control Condition *n*=23 *M (SD)*	*p*
Common Covariates			
Sex	6.58 (1.21)	4.26 (2.70)	<.001
Age	5.04 (1.82)	3.04 (1.74)	<.001
Level of Injury	3.91 (2.06)	2.39 (1.55)	<.01
Cause of Injury	3.70 (2.29)	2.29 (0.95)	<.001
Mobility Mode	5.38 (2.14)	1.34 (0.83)	<.001
Unique Covariates			
Previous LTPA level	4.45 (1.77)	N/A	N/A
Type of LTPA enjoyed	4.13 (1.67)	N/A	N/A

Note. For similarity items, participants were asked how similar they perceived themselves to be to the character in the vignette. All items were measured on a 7-point Likert-type scale, where *1* was "*not at all like me*" and *7* was *"exactly like me"*. Common covariates are variables that were measures in both the experimental and control condition. Unique covariates are variables that were only measured in the experimental condition.

Table 15

Motivational Group: Experimental Condition: Pearson Bivariate Correlations between Perceived Similarity Items and Standardized Residual Change Scores for Social Cognitions

	Perceived Similarity Covariates						
Δ Social Cognition	Sex	Age	Level of Injury	Cause of Injury	Mobility Mode	Previous LTPA Level	Type of LTPA Enjoyed
Risk Perceptions: Health	-.50*	+.10	-.31	+.17	-.42†	-.09	-.17
Risk Perceptions: Mental Health	-.37	+.14	-.19	-.18	-.42†	-.24	-.18
Social Support	+.19	+.39	+.39	-.10	+.18	-.03	+.09
Outcome Expectations	-.18	+.15	+.05	+.34	+.10	+.60**	+.41†
Moderate Aerobic Self-Efficacy	-.41†	+.30	+.08	+.51*	-.28	-.04	-.13

Heavy Aerobic	-.08	+.07	+.12	+.56**	+.14	+.05	-.07
Self-Efficacy							
Intentions	-.10	+.13	-.19	+.06	-.21	-.09	-.21
Action Plans	+.51*	-.09	+.28	-.27	+.44†	-.03	+.06
Coping Plans	-.15	+.47*	+.22	-.13	-.33	-.04	+.14
Action Control	+.05	-.30	-.32	+.22	+.06	-.23	-.19
Task Self-Efficacy	-.29	+.21	+.09	+.61**	-.10	-.01	-.14
Self Regulation	+.25	+.08	+.19	-.11	+.09	-.28	-.14

Note. †$p<.10$, *$p<.05$, **$p<.01$

Table 16

Motivational Group: Control Condition: Pearson Bivariate Correlations between Perceived Similarity Items and Standardized Residual Change Scores for Social Cognitions

	Perceived Similarity Covariates				
Δ Social Cognition	Sex	Age	Level of Injury	Cause of Injury	Mobility Mode
Risk Perceptions: Health	+.13	+.16	+.29	-.11	-.33
Risk Perceptions: Mental Health	-.49†	+.18	+.06	-.24	+.02
Social Support	-.37	+.04	+.29	+.58*	+.20
Outcome Expectations	+.38	-.04	+.20	+.34	+.08
Moderate Aerobic Self-Efficacy	-.22	-.40	-.17	+.42	-.16

Heavy Aerobic	-.26	-.21	+.16	+.18	+.19
Self-Efficacy					
Intentions	-.51†	+.10	+.16	-.26	+.24
Action Plans	+.01	-.04	-.03	+.11	+.23
Coping Plans	-.10	-.25	-.24	+.06	+.12
Action Control	-.11	-.16	-.19	-.32	-.08
Task Self-Efficacy	-.30	-.38	-.05	+.10	+.02
Self Regulation	.00	-.07	-.10	+.26	+.12

Note. †$p<.10$

Table 17

Volitional Group: Experimental Condition: Pearson Bivariate Correlations Between Perceived Similarity Items and Standardized Residual Change Scores for Social Cognitions

			Perceived Similarity Covariates				
Δ Social Cognition	Sex	Age	Level of Injury	Cause of Injury	Mobility Mode	Previous LTPA Level	Type of LTPA Enjoyed
Action Plans	-.10	-.36†	-.39†	-.50**	-.31	-.38†	+.20
Coping Plans	+.33	-.01	+.15	-.07	-.03	+.15	+.28
Action Control	-.02	+.08	-.15	+.22	-.02	+.18	+.19
Barrier Self-Efficacy	-.24	-.47*	+.17	+.02	+.49**	+.23	+.01
Recovery Self-Efficacy	+.27	+.08	+.20	-.07	+.27	-.16	-.06
Self Regulation	+.25	-.05	-.07	-.17	-.23	-.14	+.06

Note. †$p<.10$, *$p<.05$, **$p<.01$

Table 18

Volitional Group: Control Condition: Pearson Bivariate Correlations Between Perceived Similarity Items and Standardized Residual Change Scores for Social Cognitions

	Perceived Similarity Covariates				
Δ Social Cognition	Sex	Age	Level of Injury	Cause of Injury	Mobility Mode
Action Plans	-.27	-.21	+.31	-.10	+.10
Coping Plans	+.25	-.28	+.02	-.05	-.18
Action Control	+.07	+.16	-.05	-.20	-.42*
Barrier Self-Efficacy	-.20	-.13	+.34	-.01	-.21
Recovery Self-Efficacy	-.04	-.11	+.14	-.09	-.44*
Self Regulation	-.27	-.17	+.08	-.10	-.2

Note. †$p<.10$, *$p<.05$, **$p<.01$

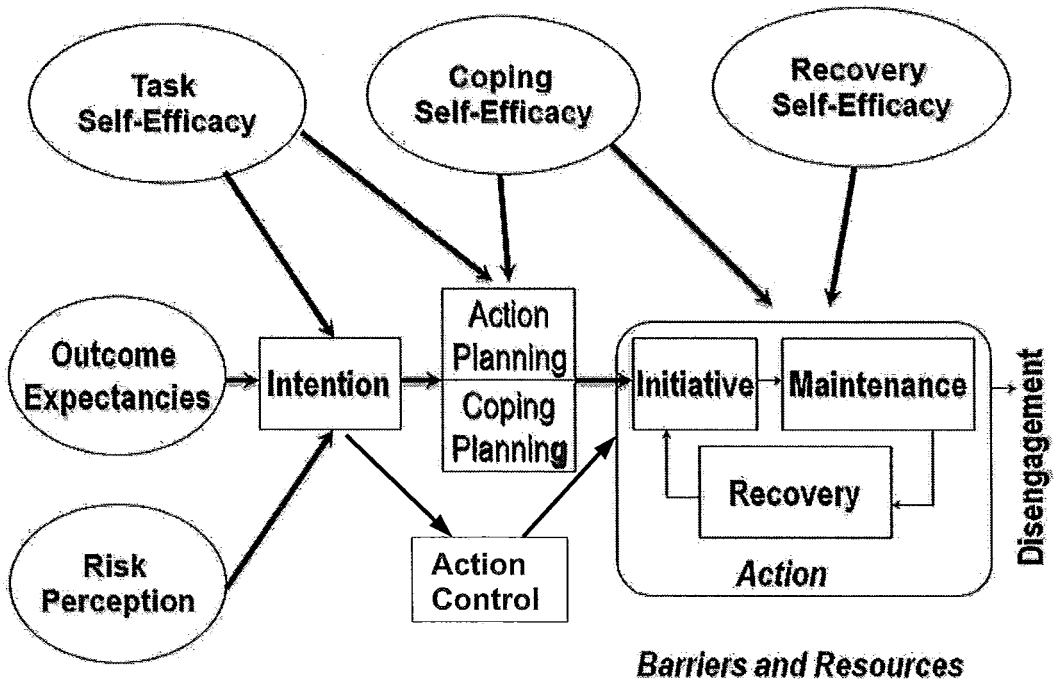


Figure 1: The Health Action Process Approach (HAPA; adapted from Schwarzer, 2004).

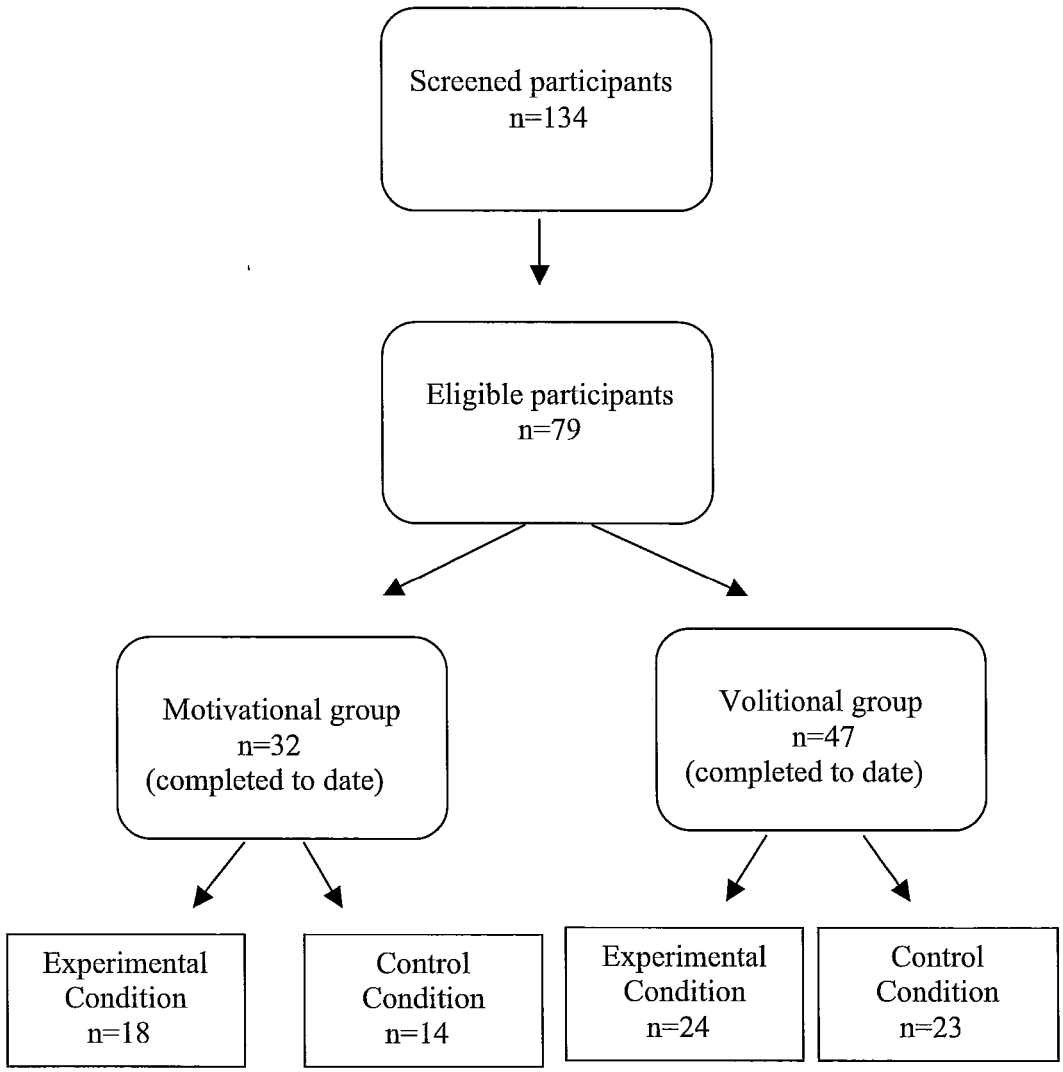


Figure 2. Condition Breakdown for Motivational and Volitional Experiments.

Appendix A:

Content Survey

Canada's Physical Activity Guide for People Living with SCI will be an accessible guide to help people with SCI make wise choices about physical activity, including how to stay healthy, get involved, have fun and get the most out of life.

Please note that the Guide will address **leisure time physical activity (LTPA)**. LTPA is physical activity that *you choose* to do *during your free time* such as physical activity, playing sports, gardening, and taking the dog for a walk. Necessary physical activity such as physiotherapy, grocery shopping, pushing/wheeling for transportation, are not considered LTPA.

What type of information would you like provided in Canada's Physical Activity Guide for People Living with SCI? (*Please check all that apply*).

If you chose a specific item please indicate how you feel this information would be useful. (*Please check all that apply*).

For example:

Enhancing/Increasing:

- ☐ *motivation to start physical activity*: high ambitions to begin physical activity on a regular basis
- ☐ *motivation to stick to physical activity:* high ambitions to continue physical activity on a regular basis
- ☐ *knowledge about benefits of physical activity:* gives you more information about why physical activity is good for you
- ☐ *confidence to be physically active:* belief that you have the skills for physical activity and feel comfortable using them on a regular basis

---

☐ Benefits of physical activity

Enhancing/Increasing:

- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Risks of inactivity

Enhancing/Increasing:

- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical activity

- ☐ A definition of strength training
  Enhancing/Increasing:
  - ☐ motivation to start physical activity
  - ☐ motivation to stick to physical activity
  - ☐ knowledge about benefits of physical activity
  - ☐ confidence to be physical active

- ☐ A definition of aerobic activity
  Enhancing/Increasing:
  - ☐ motivation to start physical activity
  - ☐ motivation to stick to physical activity
  - ☐ knowledge about benefits of physical activity
  - ☐ confidence to be physical active

- ☐ A definition of stretching activities
  Enhancing/Increasing:
  - ☐ motivation to start physical activity
  - ☐ motivation to stick to physical activity
  - ☐ knowledge about benefits of physical activity
  - ☐ confidence to be physical active

- ☐ Definitions of different intensities of physical activity (e.g., mild, moderate, heavy)
  Enhancing/Increasing:
  - ☐ motivation to start physical activity
  - ☐ motivation to stick to physical activity
  - ☐ knowledge about benefits of physical activity
  - ☐ confidence to be physical active

- ☐ Example activities for each intensity of physical activity/sport
  Enhancing/Increasing:
  - ☐ motivation to start physical activity
  - ☐ motivation to stick to physical activity
  - ☐ knowledge about benefits of physical activity
  - ☐ confidence to be physical active

- ☐ Time needed for each category of physical activity, depending on intensity
  Enhancing/Increasing:
  - ☐ motivation to start physical activity
  - ☐ motivation to stick to physical activity
  - ☐ knowledge about benefits of physical activity
  - ☐ confidence to be physical active

☐ Information on how to progress in intensity, duration, frequency
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Examples of cost-effective, home-based physical activities
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Examples of physical activity tailored to specific groups (e.g., paraplegics, quadriplegics)
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ First steps to becoming more active for people who are currently inactive
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Ways to increase activity for people who are currently active
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Real life stories about how some people with SCI became more physically active
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Instructions for basic physical activities
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Possible risks associated with being physically active
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Warning signs for when you may be overworking yourself physically
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Information for how to know if you are doing enough activity to stay healthy
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Ways to increase confidence for engaging in physical activity
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Ways to build physical activity into your daily life
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Ways to make daily physical activity enjoyable?
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Tips on how to maintain physical activity once you begin
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Sources of information including a list of websites, health professionals, and service organizations, to help you become more physically active in your community
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Who to ask for information
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ A resource list by region for accessible physical activity/sport facilities and programs
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Where/how to get support from other people
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Tips on how to develop a physical activity plan
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active'

☐ Tips on how to set realistic goals and work towards them
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Tips on how to monitor your progress
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ A calendar to help plan your physical activity
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Nutritional information for when you are increasing your physically activity level
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Tips for how to manage body temperature issues
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ How to manage physical activity in different seasons
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Safety and injury prevention tips
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Tips for building or modifying physical activity equipment
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Ways to overcome barriers that may prevent you from being physically active
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Tips to keep you motivated
Enhancing/Increasing:
- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

☐ Others:

_____

_____

Enhancing/Increasing:

- ☐ motivation to start physical activity
- ☐ motivation to stick to physical activity
- ☐ knowledge about benefits of physical activity
- ☐ confidence to be physical active

Of the items you selected above, which three do you consider to be the most important to provide in Canada's Physical Activity Guide for Adults Living with SCI?

1._____

2._____

3._____

Now that you have told us what type of information you want provided in Canada's Physical Activity Guide for People Living with Spinal Cord Injury, how would you like this information to be presented in the Guide?
For each question please indicate which design component you feel would be the best for presenting information in the Guide (*Please check one response for each question, unless otherwise specified*).

1) What formats would you prefer the Guide in?
(*Please check all that apply.*)

- ☐ A booklet (i.e. a small book, with detailed facts)
- ☐ A pamphlet (i.e. a compact version of a booklet, with the basic facts)
- ☐ Standard text-only website
- ☐ Interactive website with videos
- ☐ DVD
- ☐ Computer disk

2) The Guide would be most useful with:

- ☐ Text only
- ☐ Text and pictures

3) If pictures were included, what type of pictures would be preferred?

- ☐ Cartoons
- ☐ Drawings
- ☐ Photographs

4) What type of colour scheme would be preferred?

- ☐ Bright colours
- ☐ Neutral colours
- ☐ Black and white

5) The Guide would be most useful if messages are:

- ☐ Simple
- ☐ Detailed

6) Would it be useful to have a pull-out/print-out sheet with quick facts and a calendar to help you plan your physical activity schedule?

- ☐ Yes
- ☐ No

7) For the print form of the Guide, what is the ideal length of the Guide (number of pages)☐

- 1-2
- ☐ 3-4
- ☐ 5-10
- ☐ 11-15
- ☐ 16-20
- ☐ 21+

Appendix B:

Social Cognitions Questionnaire

Please choose the most appropriate response for each of the following questions.

My chances of developing _____ in the future are...

	Not at all strong 1	2	3	4	5	6	Extremely Strong 7
Depression							
Chronic Pain							
Fatigue							
Cardiovascular Disease							
Type 2 Diabetes							
Obesity							

I am unlikely to develop _____ in the future.

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
Depression							
Chronic Pain							
Fatigue							
Cardiovascular Disease							
Type 2 Diabetes							
Obesity							

Most people who are important to me....

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
... think I should participate in 30 minutes of leisure time							

physical activity 3 days
per week, over the
next 4 weeks.
... approve of me
participating in 30
minutes of leisure time
physical activity 3 days
per week, over the
next 4 weeks.

Please answer the following questions based on your feelings towards physical activity, on a scale from 1 to 7, where:

1= 1st adjective in the pair
4= neutral between the two adjectives
7= 2nd adjective in the pair

To what extent do you think that participating in moderate to heavy LTPA for 30 minutes, at least 3 days per week, over the next month would be:

	1	2	3	4	5	6	7
Extremely Unenjoyable/ Extremely Enjoyable							
Extremely Harmful/ Extremely Beneficial							
Extremely Unpleasant/ Extremely Pleasant							
Extremely Bad/ Extremely Good							
Extremely Stressful/ Extremely Relaxing							
Extremely Worthless/ Extremely Valuable							

Please answer the following questions based on your confidence to participate in physical activity, on a scale from 1 to 7, where:

1= not at all confident
4= moderately confident
7= completely confident

These questions are about *AEROBIC activity*. This includes activities that typically increase heart rate and breathing such as wheeling, swimming, and basketball.

If you had all of the resources you needed, such as specialized equipment or an assistant, how confident

are you that you could physically do the following amounts of *MODERATE* intensity *AEROBIC* activity without stopping:

	Not at all confident 1	2	3	Moderately confident 4	5	6	Completely confident 7
10 min							
20 min							
30 min							
45 min							
60 min							

If you had all of the resources you needed, such as specialized equipment or an assistant, how confident are you that you could physically do the following amounts of *HEAVY* intensity *AEROBIC* activity without stopping:

	Not at all confident 1	2	3	Moderately confident 4	5	6	Completely confident 7
10 min							
20 min							
30 min							
45 min							
60 min							

To what extent is the following statement true for you?

	Definitely False 1	2	3	4	5	6	Definitely True 7
I will try to do 30 minutes of moderate to heavy LTPA at least 3 days per week over the next month.							

To what extent is the following statement true for you?

	Extremely Unlikely 1	2	3	4	5	6	Extremely Likely 7
I intend to do 30 minutes of moderate to heavy LTPA at least 3 days per week over							

	Definitely False 1	2	3	4	5	6	Definitely True 7
I have made a detailed plan regarding when to participate in LTPA							
I have made a detailed plan regarding where to participate in LTPA							
I have made a detailed plan regarding what types of LTPA to do							
I have made a detailed plan regarding how often to participate in LTPA							

With regards to your physical activity program, I have made a detailed plan regarding...

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
what to do when something interferes with my plans							
how to cope with setbacks							
how to stick to my intentions, even in difficult situations							
when to be especially careful in order to avoid setbacks.							

To what extent are the following statements true for you?

	Definitely False 1	2	3	4	5	6	Definitely True 7
I constantly monitor whether I engage in LTPA often enough							
I am careful to ensure that I am active for at least 30 minutes at a							

moderate to heavy intensity, each time I engage in LTPA	
My physical activity program is often on my mind	
I am constantly aware of my physical activity program	
I really try to engage in LTPA regularly	
I try my best to meet my own standards for being physically active	

Assuming you were very motivated, how confident are you that you will participate in moderate to heavy LTPA for 30 minutes, at least 3 days per week over the next month even if:

	Not at all confident 1	2	3	Moderately confident 4	5	6	Completely confident 7
you feel tired or fatigued							
you get busy or have limited time							
you have transportation problems							
you have pain or soreness							
the weather is very bad							
you do not have someone to help you exercise							

Over the next month, how confident are you that you can:

	Not at all confident 1	2	3	Moderately confident 4	5	6	Completely confident 7
Resume regular LTPA when it's interrupted and you miss LTPA for a few days							
Resume regular LTPA when it's interrupted and you miss LTPA for							

a few weeks.
Identify key factors that trigger lapses in your LTPA program.
Accept lapses in your LTPA program as normal.
View lapses in your LTPA program as challenges to overcome rather than failures.
Set realistic goals for increasing your exercise.
Develop plans to reach your exercise goals.

Prev Next

Appendix C:

Perceived Similarity Items

Please indicate how *similar* you are to the person in the story that you read, based on the listed characteristics, on a scale from *1, not at all like me*, to *7, exactly like me*.

How similar do you think you are to the person with SCI in the story based on:

	Not at all like me 1	2	3	Somewhat like me 4	5	6	Extremely like me 7
Gender							
Age							
Level of Injury							
Cause of Injury							
Type of Wheelchair Used Daily							
Previous Level of Physical Activity							
Types of Physical Activities Enjoyed							

Appendix D:

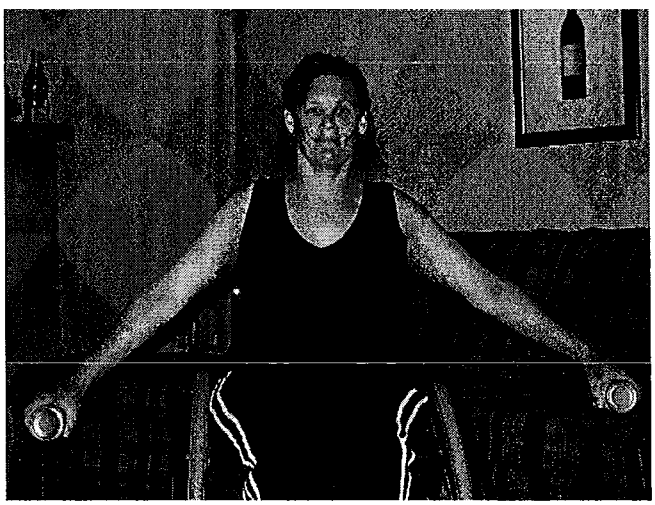
Vignette Examples

Experimental: Motivational/Female/Paraplegic/Manual

SCI ACTION CANADA

Please read the following story.

"Hello! My name is Jennifer. I am 45 years old. I was in a car accident five years ago that left me paralyzed from the T7 vertebrae down. Before my accident, I was very physically active. I played hockey in the winter, ran frequently in the summer, and went to the gym regularly. After my accident, I became very depressed and found it hard to even get up in the morning, let alone do physical activity. I accepted that physical activity was not going to fit into my new lifestyle. One day I was at my doctor's and she told me that because I have paraplegia, I have a higher chance than able-bodied people of developing diabetes, cardiovascular problems and being overweight. She then told me that being physically active would help to decrease the chances of these health problems, and may also help me feel less depressed. She gave me a copy of Canada's Physical Activity Guide for Adults Living with SCI, and a website link that helped me find accessible physical activity facilities and programs for me in my area. One day, I decided to go wheeling around the block to see if I liked it. At first I found it hard to wheel for more than a few minutes because my arms would get tired and sore. I was getting very frustrated. I felt extremely tired for days after wheeling and my muscles really hurt. Although it was difficult at first, I did decide to stick with it and to also try lifting weights to help build up my upper body endurance. After a few weeks of wheeling regularly, I finally began to enjoy it! I currently go wheeling twice a week, and lift weights at a local fitness facility twice a week. I have a lot of fun being physically active and have met a lot of nice people along the way. I have even picked up gardening! It is great that I can still be physically active in a lot of the same ways I could before the accident – it makes me feel really good about myself!"



Experimental: Volitional/Male/Tetraplegic/Electric

SCI ACTION CANADA

Please read the following story.

"Hello! My name is Will. I am 45 years old. I was in a car accident five years ago that left me paralyzed from the C8 vertebrae down. I was devastated about lifestyle changes that I thought were going to happen. Before the accident, I was physically active. I would go for bike rides most days a week and a brisk walk from time to time. I also enjoyed woodworking in my spare time. Cardiovascular disease and type 2 diabetes run in my family, which is why I always did some sort of physical activity. I decided that I needed to do something to stay active, so that tetraplegia would not increase my chances of these health complications. My daughter gave me a copy of Canada's Physical Activity Guide for Adults Living with SCI that she got at the doctor's office. It outlined different fun and easy at home physical activities that I could do to be more physically active. I used the pull-out calendar to plan at what time, where, and what activity I would be doing. I also used the calendar to keep track of the days when I exercised and whether I was meeting my goals. I slowly began using weights that strap to my hands at home daily for a small resistance work-out. I found it difficult since I had not used my arms to that intensity in a while. I also found lifting weights got boring and lonely since I would do it alone. Because of these obstacles, I skipped a few days in my schedule sometimes. I realized that I needed to fix this situation. I was trying to be active, but I was being discouraged by these small obstacles. I decided to use an arm ergometer that had a strap to keep my hands in place 3 days a week at a local facility with a group of people with disabilities. Eventually, I purchased a Thera-band (big elastic band), to go along with lifting weights, for resistance and stretching exercises. I do these exercises on days when the weather is too bad to leave the house or when my arms are too sore to use the arm ergometer. I have no excuses now. I know I will have setbacks, everyone does, but now I know how to get quickly back on track with my physical activity program. I still use my calendar. It helps to keep me on track and stay healthy. I even picked up woodworking again! I have met a lot of new people! I feel healthier, happier and more independent!"

Control

Please read the following story.

"Maple Leaf Gardens was home to CPA's first office, courtesy of Conn Smythe. Conn Smythe's interest in the Canadian Paraplegic Association was more than purely philanthropic. Conn ("Connie") Smythe, as everyone called him, had served in World War I but was anxious to serve again in World War II. In July 1940 he rejoined the army... He put together the famous anti-aircraft Sportsmen's Battery and took it overseas in October 1942. They spent 20 months in the south of England and on July 7, 1944, his unit embarked for a Normandy bound for Caen... It was July 25th: "I was helping pull a tarpaulin off an ammunitions truck so we could get the truck out of there when I was hit a terrible blow in my back...I was badly hit, I was still alive."... He eventually reached the Canadian Hospital at Basingstoke. The spinal wound came close to making him a paraplegic so he had a personal understanding of the paralyzed... Connie Smythe did recover and walk. Although he suffered severe residual pain, discomfort and inconveniences, few realized it. Connie Smythe's fighting spirit was no doubt a great boost to many of the injured veterans. But as Manager of Maple Leaf Gardens, he was to help them in many more tangible ways. He came on the Board of the Canadian Paraplegic Association on May 23, 1945. The Association was casting around for a place to set up an office. He immediately offered prime space in a small store front, facing Carlton Street, in the Maple Leaf Gardens... In 1946 Connie Smythe sponsored a program to bring paraplegic veterans from all across Canada, all expenses paid, to see the Toronto Maple Leafs play in the famous Maple Leaf Gardens which he had built in the heart of the Great Depression... This program was not only a great morale booster for the paraplegic veterans, for some the highlight of their lives, but it also raised public consciousness of the work the Association and brought the paraplegic cause broader visibility in the community."

Excerpt from: From Darkness into Light – The Founding of the Canadian Paraplegic Association, by Marian Patterson Holleman; courtesy of The Canadian Paraplegic Association website (2010): http://www.canparaplegic.org/en/Member_Profiles_39/items/28.html

Appendix E:

Mediation Exploratory Analyses

Motivational Group: Repeated Measures Analysis of Covariance

Δ Social Cognition	Unique Covariate	Time	Time*Covariate	Estimated Marginal Means	
		(*p*)	(*p*)	Pre:*M (SE)*	Post:*M (SE)*
Outcome Expectations	Previous LTPA Level	.09†	.04*	4.77 (.25)	4.87 (.20)
Outcome Expectations	Type of LTPA Enjoyed	.47	.33	N/A	

Note. Unique covariates are variables that were only measured in the experimental condition.

†$p<.10$, *$p<.05$

Motivational Group: Bootstrapped Mediation Models of Perceived Similarity Variables as Mediators of the Effect of Condition on Change in Social Cognitions

Δ Cognition	Mediator	βc	βa	βb	βc'	Sobel Test	Mediation
Risk Perceptions: Health	Sex	+.31†	+.26	-.10	+.35	ns	X
Risk Perceptions: Health	Mobility Mode	+.31†	+.71***	+.11	+.46	ns	X
Risk Perceptions: Mental Health	Mobility Mode	+.15	+.71***	-.10	+.42	ns	X
Risk Perceptions: Mental Health	Sex	+.15	+.26	-.37*	+.24*	ns	X
Social Support	Cause of Injury	-.02	+.58***	+.01	-.04	ns	X
Moderate Aerobic Self-Efficacy	Sex	-.22	+.26	-.35†	-.15	ns	X
Moderate Aerobic Self-Efficacy	Cause of Injury	-.21	+.58***	+.23	-.52*	ns	X
Heavy Aerobic	Cause of Injury	+.01	+.58***	+.32†	-.26†	√	Inconsistent

Self-Efficacy							
Intentions	Sex	-.12	+.26	-.38*	-.04	ns	X
Action Plans	Sex	-.12	+.26	+.21	-.17	ns	X
Action Plans	Mobility Mode	-.12	+.71***	+.17	-.46	ns	X
Coping plans	Age	-.38*	+.24	+.12	-.42*	ns	X
Task Self-Efficacy	Cause of Injury	-.12	+.58***	+.32†	-.46*	√	Inconsistent

Note. βc = the standardized regression coefficient for path C, which is the relationship between the independent variable (condition) and the dependent variable (Δ in social cognition), βa = the standardized regression coefficient for path A, which is the relationship between the independent variable (condition) and the mediator variable (perceived similarity), βb = the standardized regression coefficient for path B, which the relationship between the mediator variable (perceived similarity) and the dependent variable (Δ in social cognition), βc' the standardized regression coefficient for path C', which is the relationship between the independent variable (condition) and the dependent variable (Δ social cognition) , while controlling for the mediator variable (perceived similarity). Common covariates are perceived similarity variables that are measured in both the experimental and control conditions.

†p<.10, *p<.05, **p<.01, ***p<.001

Volitional Group: Repeated Measures Analysis of Covariance

Δ Social Cognition	Unique Covariate	Time	Time*Covariate	Estimated Marginal Means	
		(*p*)	(*p*)	Pre: *M (SE)*	Post: *M (SE)*
Risk Perceptions: Health	Type of LTPA Enjoyed	.02*	.05*	4.49 (.32)	4.72 (.39)
Risk Perceptions: Mental Health	Previous LTPA Level	.03*	.02*	3.81 (.32)	3.77 (.33)

Note. Unique covariates are variables that were only measured in the experimental condition.

*$p<.05$

Volitional Group: Bootstrapped Mediation Models of Perceived Similarity Variables as Mediators of the Effect of Condition on Change in Social Cognitions

Δ Cognition	Mediator	βc	βa	βb	βc'	Sobel Test	Mediation
Risk Perceptions: Health	Level of Injury	-.04	+.39**	-.17	+.03	ns	X
Risk Perceptions: Mental Health	Level of Injury	-.19	+.39**	+.03	-.24	ns	X
Social Support	Sex	-.23	+.50***	-.02	-.29	ns	X
Social Support	Cause of Injury	-.23	+.55***	-.06	-.28	ns	X
Heavy Aerobic Self-Efficacy	Age	-.31*	+.50***	-.16	-.30	ns	X
Heavy Aerobic Self-Efficacy	Cause of Injury	-.31*	+.55***	-.38**	-.14*	√	Consistent
Heavy Aerobic Self-Efficacy	Level of Injury	-.31*	+.39**	-.05	-.34†	ns	X

Intentions	Level of Injury	+.05	+.39**	-.33*	+.21*	√	Inconsistent
Intentions	Cause of Injury	+.05	+.55***	-.21	+.23	ns	X
Action Plans	Cause of Injury	-.22	+.55***	-.42**	+.02	√	Inconsistent
Action Plans	Age	-.22	+.50***	-.36**	-.05*	√	Consistent
Action Plans	Level of Injury	-.22	+.39**	-.18	-.17	ns	X
Action Control	Mobility Mode	-.26†	+.78***	-.28†	-.11	√	Consistent
Barrier Self-Efficacy	Age	-.17	+.50***	-.32*	-.02†	√	Consistent
Barrier Self-Efficacy	Mobility Mode	-.17	+.78***	-.01	-.43	ns	X
Recovery Self-Efficacy	Mobility Mode	-.13	+.78***	-.06	-.21	ns	X
Task Self-Efficacy	Level of Injury	-.34*	+.39**	-.02	-.38*	ns	X
Task Self-Efficacy	Cause of Injury	-.34*	+.55***	-.37*	-.19*	√	Consistent

Note. βc = the standardized regression coefficient for path C, which is the relationship between the independent variable (condition) and the dependent variable (Δ in social cognition), βa = the standardized regression coefficient for path A, which is the relationship between the independent variable (condition) and the mediator variable (perceived similarity), βb = the standardized regression coefficient for path B, which the relationship between the mediator variable (perceived similarity) and the dependent variable (Δ in social cognition), βc' the standardized regression coefficient for path C', which is the relationship between the independent variable (condition) and the dependent variable (Δ social cognition) , while controlling for the mediator variable (perceived similarity). Common covariates are perceived similarity variables that are measured in both the experimental and control conditions.

†p<.10, *p<.05, **p<.01, ***p<.001