

BRIEF REPORT

Developing Physical Activity Interventions for Adults With Spinal Cord Injury. Part 2: Motivational Counseling and Peer-Mediated Interventions for People Intending to Be Active

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Objective: The majority of people with spinal cord injury (SCI) do not engage in sufficient leisure-time physical activity (LTPA) to attain fitness benefits; however, many have good intentions to be active. This paper describes two pilot interventions targeting people with SCI who are insufficiently active but intend to be active (i.e., “intenders”). **Method:** Study 1 examined the effects of a single, telephone-based counseling session on self-regulatory efficacy, intentions, and action plans for LTPA among seven men and women with paraplegia or tetraplegia. Study 2 examined the effects of a home-based strength-training session, delivered by a peer and a fitness trainer, on strength-training task self-efficacy, intentions, action plans, and behavior. Participants were 11 men and women with paraplegia. **Results:** The counseling session (Study 1) yielded medium- to large-sized increases in participants' confidence to set LTPA goals and intentions to be active. The home visit (Study 2) produced medium- to large-sized increases in task self-efficacy, barrier self-efficacy, intentions, action planning, and strength-training behavior from baseline to 4 weeks after the visit. **Conclusions/Implications:** Study 1 findings provide preliminary evidence that a single counseling session can impact key determinants of LTPA among intenders with SCI. Study 2 findings demonstrate the potential utility of a peer-mediated, home-based strength training session for positively influencing social cognitions and strength-training behavior. Together, these studies provide evidence and resources for intervention strategies to promote LTPA.

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among intenders with SCI, a population for whom LTPA interventions and resources are scarcely available.

Keywords: exercise, social cognition, motivational interviewing, strength training, health action process approach

Impact and Implications

- Study 1 is the first to demonstrate the efficacy of a brief motivational counseling session for strengthening social–cognitive determinants of physical activity in persons with SCI who intend to become active. Study 2 is the first study, in any population, to demonstrate the efficacy of employing peer mentors to deliver a brief intervention in a person’s home to increase strength-training behavior and its social–cognitive determinants.
- Given the dearth of research testing LTPA-enhancing interventions for persons with SCI, these studies provide preliminary evidence that both motivational counseling and peer-mediated strength-training sessions can enhance social–cognitive determinants of LTPA. A peer-mediated session can also increase strength-training behavior.
- These pilot studies have resulted in the creation of evidence-based resources that can now be used by clinicians and service organizations to implement motivational counseling and peer-delivered LTPA-enhancing interventions.

Introduction

The majority of people with spinal cord injury (SCI) are insufficiently active to obtain fitness benefits (Martin Ginis, Latimer et al., 2010). However, as reported in the first paper in this series (Martin Ginis et al., 2013, this issue), many people have good intentions to become more active in the near future. This subset of individuals has been labeled *intenders* (Schwarzer, 2008; Schwarzer, Lippke, & Luszczynska, 2011). Intenders are an ideal target for leisure-time physical activity (LTPA) interventions because they are more ready for change than people who have no intention to change. In this paper, we describe pilot testing of two interventions promoting LTPA in this group.

To date, only four published studies have evaluated the impact of LTPA-enhancing interventions for people with SCI (Arbour-Nicitopoulos, Martin Ginis, & Latimer, 2009; Latimer, Martin Ginis, & Arbour, 2006; Warms, Belza, Whitney, Mitchell, & Stiens, 2004; Zemper et al., 2003). These studies focused primarily on teaching self-regulation strategies such as action planning and goal setting. In contrast, the interventions described herein focus on enhancing theory-based determinants of LTPA—particularly self-efficacy and intentions, as well as planning (Bandura, 1997; Schwarzer, 2008). Because these social cognitions are known to influence LTPA in the SCI population (Arbour-Nicitopoulos, Martin Ginis, Wilson, & The SHAPE-SCI Research Group, 2010; Latimer & Martin Ginis, 2005; Martin Ginis, Latimer, Arbour-Nicitopoulos et al., 2011), and tend to be weaker among intenders versus “actors” who are actively engaged in LTPA (Martin Ginis et al., 2013), they are optimal targets for interventions aimed at transitioning intenders into actors (Schwarzer et al., 2011).

Study 1: LTPA Motivational Counseling

The first pilot study tested the efficacy of a single counseling session that applied motivational interviewing (MI) principles to

strengthen social cognitions associated with LTPA. MI is a client-centered counseling approach that aims to enhance individuals’ motivation and commitment to change (Miller & Rollnick, 2002). It typically consists of a few brief sessions where clients explore their values and motives for change (Hettema, Steele, & Miller, 2005). The counselor’s role is to evoke the client’s own motivation to change, rather than impose change. MI has been used to encourage LTPA participation in several clinical populations (Bennett, Lyons, Winters-Stone, Nail, & Scherer, 2007; Brodie & Inoue, 2005; Silva et al., 2008), but has not yet been utilized among people with SCI. Within the SCI community, MI has the potential to be an effective and efficient intervention technique in a number of contexts such as during a physician’s visit or a telephone counseling session (Rubak, Sandbaek, Lauritzen, & Christensen, 2005). Using a single arm pretest-posttest design with a 1-day follow-up, we tested the hypothesis that a single counseling session that incorporates MI techniques would enhance intenders’ confidence to schedule, to set goals, and to manage barriers for LTPA, as well as increase intentions and encourage implementation of an LTPA action plan.

Method

Participants. Seven LTPA intenders were recruited from our participant database of people with SCI. Refer to Table 1 for study eligibility and Table 2 for participant demographic characteristics. The Institutional Research Ethics Boards approved the protocol. All participants provided informed consent.

Measures. Demographic data were collected along with measures of the social–cognitive variables (see Table 3). For descriptive purposes, minutes/week of moderate to heavy intensity LTPA were assessed using the Leisure Time Physical Activity Questionnaire for People with SCI (LTPAQ-SCI; Martin Ginis & Latimer, 2007). (See Martin Ginis, Phang, Latimer, & Arbour-Nicitopoulos, 2011 for reliability and validity).

Intervention fidelity was assessed using the 6-item health care climate questionnaire (Williams, Grow, Freedman, Ryan, & Deci, 1996). Items gauged the degree to which participants perceived the counselor as supportive versus controlling (e.g., “The physical activity coach provided me with choices and options”). Responses were made on a 7-point Likert-type scale. This tool has been validated to assess caregiver support for health-promoting behaviors such as LTPA, and shown acceptable reliability (Williams, Freedman, & Deci, 1998). Cronbach’s alpha was 0.79 in the present study.

To assess intervention acceptability, participants indicated whether they found the session helpful (yes/no) and responded to a series of open-ended questions regarding specific intervention components (e.g., “what aspects were helpful/ unhelpful”).

Procedure. All participant contact was via telephone. The project coordinator contacted potential participants to screen for eligibility. Eligible volunteers were scheduled to complete a coun-

Table 1
Inclusion Criteria

Eligibility criteria	Study 1	Study 2
Age	18–65 years	18–65 years
Time postinjury	At least 12 months post	At least 6 months post
Injury level	SCI resulting in tetraplegia or paraplegia	SCI resulting in paraplegia only ^a
Cognitive impairment	None	None
Language spoken	English	English
Location of residence	Ontario, Canada	Within a 100 km radius of two Ontario cities ^b
Intender status	Not engaging in regular moderate to heavy intensity LTPA (3 days/wk) as determined using the LTPAQ-SCI and had some intention to engage in LTPA over the next two weeks (i.e., scored > 4 on the intentions to engage in LTPA once a week).	^c Not engaging in a regular (30 min 3 days/wk) strength-training program but intend to over the next 6 months as determined using a staging questionnaire (Marcus & Simkin, 1993).
Medical screening	—	Free of medical concerns that prohibit participation in LTPA (i.e., self-reported doctor approval for participating in LTPA)

^a Only participants with paraplegia were recruited for Study 2. The focus on people with paraplegia allowed us to evaluate the feasibility of the intervention approach while controlling for additional barriers related to limited hand function and the consequent need for additional assistance among some people with tetraplegia. ^b Geographical limits were imposed to reduce travel for our intervention teams. ^c The criterion of strength training 3 days/wk was based on previous research (Latimer, et al., 2006) and was set prior to the release of SCI-specific physical activity guidelines advocating strength-training at least twice a week (Martin Ginis, Hicks, et al., 2011).

selling session. The interventionists were Exercise Psychology graduate students (one MSc, one PhD) who had completed a 1-day motivational coaching course. Each 30-min session began with activities to elicit participants' values, to build rapport between the participant and the interventionist, and to determine participants' willingness for change. The interventionist used strategies tailored to the clients' level of motivation to encourage them to resolve their uncertainty about change (see Table 4). She drew upon insights gained from the initial rapport-building activities and directed discussion toward topics of goal-setting, action planning, and scheduling LTPA. She assisted participants in setting a concrete LTPA goal for the next week and discussed solutions to potential barriers to achieving this goal. One day later, the study coordinator administered the social-cognitive and intervention fidelity measures and offered access to "Get in Motion," a free physical activity telephone counseling service.

Results and Discussion

Cohen's *d* effect sizes were calculated with effects of 0.20, 0.50, and 0.80 indicating small, medium, and large effects, respectively (Cohen, 1992). Paired, one-tailed *t* tests revealed significant medium- to large-sized increases in goal-setting self-efficacy, *d* = 0.72, and intention strength, *d* = 1.01, from pre- to postintervention, *ps* < .032

(refer to Table 5). These positive findings are consistent with extant MI research in the general population (Knight, McGowan, Dickens, & Bundy, 2006; Martins & McNeil, 2009; Rubak et al., 2005); however, many of those trials included multiple contacts lasting longer than 30 min each and incorporated supporting motivational materials. Our intervention used minimal contact and yet had significant positive effects. Demonstrating the impact of a minimal contact intervention has important implications in regard to potential integration of this approach in busy clinical settings.

Small- to medium-sized effects emerged for intentions, *d* = 0.63, and action planning, *d* = 0.42; however, these effects did not reach conventional levels of significance. There were small, nonsignificant decreases in scheduling self-efficacy, *d* = -0.23, and barrier self-efficacy, *d* = -0.13. The lack of statistical significance likely is the results of the small sample size and session content. It seems that the session enhanced participants' confidence in their ability to set realistic goals (goal-setting self-efficacy) and their commitment to these goals (intention strength) but it did not significantly impact their willingness to increase the difficulty of their goals (intentions to increase physical activity participation). Additional session content related to goal progression may be beneficial. The lack of significant effects might also be indicative of the need for greater emphasis on action planning within the intervention. A

Table 2
Participant Demographic Characteristics

	Study 1 (<i>n</i> = 7)	Study 2 (<i>n</i> = 12)
Sex (% male)	57.14% (<i>n</i> =4)	41.67% (<i>n</i> =5)*
Age	51.86 ± 8.55 yrs	42.92 ± 15.61 yrs
Years postinjury	28.76 ± 25.35 yrs	23.31 ± 18.50 yrs
Injury level (% paraplegia)	85.71% (<i>n</i> =6)	100% (<i>n</i> =12)
Injury severity (% complete)	57.14% (<i>n</i> =4)	58.33% (<i>n</i> = 7)
Mode of mobility (% manual chair users)	71.42% (<i>n</i> =5)	75.00% (<i>n</i> = 9)
Education (% completed some postsecondary)	57.14% (<i>n</i> =4)	100% (<i>n</i> =12)

* Two men could not be reached for follow-up in Study 2.

Table 3
Social Cognitive Variables Measured in Study 1 and Study 2

Variable	Brief description of items	Alpha	Reference
Intentions			
Study 1	Three items assessing intentions to engage in ≥ 15 mins of moderate- to heavy-intensity LTPA once, twice, three times per week over the next 3 weeks (1 = <i>strongly disagree</i> ; 7 = <i>strongly agree</i>).	.76-.92	(Arbour-Nicitopoulos, et al., 2009)
Study 2	Same as Study 1, although items related to participating in ≥ 30 mins of strength training.	.83-.95	
Intention strength			
Study 1	Three items where participants indicated the strength of their intentions to engage in ≥ 15 mins of moderate- to heavy-intensity LTPA once, twice, three times per week over the next 2 weeks (1 = <i>definitely will not</i> ; 9 = <i>definitely will</i>)		
Action Planning			
Study 1	Four items evaluating whether participants had a detailed plan regarding when, where, how, and how often to engage in moderate- to heavy-intensity LTPA over the next 2 weeks (1 = <i>completely disagree</i> ; 4 = <i>completely agree</i>).	.60-.90	(Arbour-Nicitopoulos, et al., 2009)
Study 2	Four items evaluating whether participants had a detailed plan regarding when, what, where, and how to engage in strength training over the next 2 weeks (1 = <i>definitely false</i> ; 7 = <i>definitely true</i>).	.83-.99	
Goal-Setting Self-Efficacy			
Study 1	Three items assessing confidence over the next 2 weeks to: a) set realistic goals for engaging in ≥ 15 mins of moderate- to heavy-intensity LTPA, b) set realistic goals for maintaining a regular LTPA routine of ≥ 15 mins of moderate- to hard-intensity LTPA, and c) develop a plan for reaching LTPA goals (1 = <i>not confident at all</i> ; 7 = <i>completely confident</i>).	.78-.88	(Martin Ginis, Latimer, Arbour-Nicitopoulos, et al., 2011)
Study 2	Same as Study 1 with one additional item (4 items in total) assessing confidence to follow through with strength-training goals even though it may be difficult at times. The goal behavior was strength training 3 \times /wk for 30 mins each time.	.73-.94	
Scheduling Self-Efficacy			
Study 1	One item assessing participants' confidence to manage their weekly schedule to include ≥ 15 mins of moderate- to heavy-intensity LTPA over the next 2 weeks" (1 = <i>not confident at all</i> ; 7 = <i>completely confident</i>).	—	(Martin Ginis, Latimer, Arbour-Nicitopoulos, et al., 2011)
Study 2	Four items assessing participants confidence to fit 30 mins of moderate- to heavy-intensity strength training into their weekly schedule once, twice, three times, and > three times per week over the next 2 weeks (1 = <i>not confident at all</i> ; 7 = <i>completely confident</i>).	.75-.91	
Barrier SE			
Study 1	Nine items evaluating participants' confidence to overcome nine barriers commonly faced by individuals with SCI such as fatigue, time constraints, and pain (1 = <i>not confident at all</i> ; 7 = <i>completely confident</i>).	.93-.94	(Latimer, et al., 2006)
Study 2	Five items evaluating participants' confidence to overcome barriers to home-based strength training including: performing strength-training exercises correctly, performing the exercises safely, adapting activities, designing a program, and coordinating resources.		(Wise & Hale, 1999)
Task Self-Efficacy			
Study 2	<i>Duration:</i> Confidence to physically do moderate- and heavy-intensity strength training for 10, 20, 30, 45, and 60 mins without stopping. <i>Frequency:</i> Confidence to physically do 30 mins of moderate- to heavy-intensity strength training: once, twice, three times, > three times per week (1 = <i>not confident at all</i> ; 7 = <i>completely confident</i>).	.82-.95	(Martin Ginis, Latimer, Arbour-Nicitopoulos, et al., 2011)

greater focus on planning daily bouts of LTPA (action planning) and on planning for LTPA barriers (coping planning) may facilitate self-regulatory efficacy. For example, two randomized controlled trials evaluating the effectiveness of a telecounseling intervention for people with SCI that included directed discussion regarding LTPA action and coping planning, prevented decreases in confidence to scheduling LTPA and coping with barriers (Arbour-Nicitopoulos et al., 2009; Latimer et al., 2006).

Overall, the counseling session was well-received. The mean score on the health care climate questionnaire was 5.93 ± 0.72 out

of 7, indicating that participants felt the counselor was supportive during the MI session. A tally of participants' open-ended responses revealed that six out of seven found the counseling session helpful. All participants indicated that the session was a good length of time. One participant liked having the session over the phone whereas two others would have preferred for the session to be in person. The remaining four participants did not indicate any preference.

Taken together, the results of our pilot test indicate that a single telephone-based session that includes MI techniques holds promise as a strategy for increasing intenders' confidence

Table 4
 Motivational Interviewing Techniques Used to Promote Change (Study 1)

Motivation to change	Counseling Strategies
Resistant to change	Ask/discuss what is LTPA Ask/discuss the benefits of LTPA
Unsure about change (ambivalent)	Ask/discuss the benefits of LTPA for people with SCI Explore the status quo vs. change Ask about what they know about LTPA Ask about what activities they enjoy/don't enjoy doing
Ready for change	Ask about any particular health concerns they may have Assist in choosing an activity—ask what they want to do before providing information Assist in goal-setting Address barriers and create coping plans for common barriers Elicit confidence for change (seek support, help develop self-efficacy) Discuss how to incorporate LTPA safely

to set LTPA goals and strengthening their intentions to reach their goals.

Study 2: Peer-Mediated Home-Based Strength Training Intervention

To increase muscular strength, it is recommended that adults with SCI engage in strength-training exercises twice per week (Martin Ginis, Hicks et al., 2011). However, less than 20% of people with SCI do any strength training whatsoever (Martin Ginis, Latimer, et al., 2010). Barriers to strength training include lack of accessible equipment in fitness centers (Arbour-Nicitopoulos & Martin Ginis, 2011), transportation barriers, and lack of strength-training exercise knowledge and confi-

dence (Kasperavicius, Latimer, Hetz, McColl, & Smith, 2010). In the first study in this series (Martin Ginis et al., 2013, this issue), we showed that intenders' confidence to perform strength-training activities was low. Accordingly, this study pilot tested an intervention designed to strategically address barriers and increase self-efficacy and strength-training behavior among intenders with paraplegia.

The intervention entailed a single home visit by a certified personal trainer and a peer with paraplegia. Home visits are known to reduce barriers to accessing care and rehabilitation services (Cranen et al., 2012). Peers are a preferred source of LTPA information among people with SCI (Faulkner et al., 2009; Letts et al., 2011). Among able-bodied older adults, peer mentors have

Table 5
 Social Cognitive Variables Measured in Study 1 and Study 2

	Study 1				Study 2			
	Pre	Post	<i>d</i>	One-tailed <i>t</i> -test	Pre	Post	<i>d</i>	One-tailed <i>t</i> -test
Goal-setting <i>SE</i>	5.69 ± 0.93	6.24 ± 0.54	0.72	<i>t</i> (6) = -2.30, <i>p</i> = .031	5.05 ± 1.34	5.68 ± 1.15	0.51	<i>t</i> (10) = -1.46, <i>p</i> = .087
Scheduling <i>SE</i>	6.14 ± 0.69	5.86 ± 1.21	-0.23	<i>t</i> (6) = 0.80, <i>p</i> = .25	5.18 ± 1.68	5.27 ± 1.01	0.07	<i>t</i> (10) = -.18, <i>p</i> = .86
Barrier <i>SE</i>	5.17 ± 1.76	4.87 ± 1.66	-0.13	<i>t</i> (6) = 1.25, <i>p</i> = .44	5.04 ± 1.34	5.68 ± 1.15	0.87	<i>t</i> (10) = -2.17, <i>p</i> = .027
Task <i>SE</i>								
Frequency					4.85 ± 1.68	5.60 ± 1.15	0.52	<i>t</i> (9) = -2.32, <i>p</i> = .023
Duration					4.78 ± 2.01	5.32 ± 2.30	0.25	<i>t</i> (10) = -0.71, <i>p</i> = .25
Intentions	5.57 ± 1.70	6.38 ± 0.61	0.63	<i>t</i> (6) = -1.43, <i>p</i> = .10	5.10 ± 1.81	6.03 ± 1.24	0.60	<i>t</i> (10) = -3.10, <i>p</i> = .007
Intentions strength ^a	6.62 ± 1.99	8.24 ± 1.08	1.01	<i>t</i> (6) = -2.84, <i>p</i> = .015				
Action planning ^b	2.89 ± 0.99	3.23 ± 0.58	0.42	<i>t</i> (6) = -0.67, <i>p</i> = .26	2.84 ± 1.77	5.14 ± 2.23	1.14	<i>t</i> (10) = -3.55, <i>p</i> = .003
Strength training								
Frequency (bouts/wk)					1.09 ± 1.30	2.91 ± 2.02	1.07	<i>t</i> (10) = -2.71, <i>p</i> = .011
Duration (min)					15.45 ± 20.79	40.68 ± 34.89	0.88	<i>t</i> (10) = -2.30, <i>p</i> = .023
Volume (min/wk)					30.45 ± 37.98	82.50 ± 66.70	0.96	<i>t</i> (10) = -2.66, <i>p</i> = .012

^a Intentions strength in Study 1 ranged from 1–9. ^b Action planning ranged from 1–5 in Study 1 and 1–7 in Study 2.

Table 6
Intervention Activities Included in Study 2

Intervention component	Description	Theoretical basis
Orientation component		
Discuss activity preferences	Completed an Activity Preference and Motivation Worksheet drawing upon participants' previous experience with activities of daily living (ADL) with movement patterns similar to strength training.	Mastery experience
Discuss goals	Trainer set a goal for the participant to work up to performing strength training three times per week. The trainer assured participants that they could reach the goal given their current ability to perform a variety of ADL with similar movement patterns. Participants signed a goal commitment contract.	Verbal persuasion, mastery experience, goal setting
Environmental assessment	The trainer, peer, and participant toured the participant's home to identify materials and locations that could be used for strength-training.	Verbal persuasion
Strength-training component		
	The trainer and the peer guided the participant through short warm-up and a series of seven strength-training exercises. The trainer introduced each exercise relating it to an ADL, had the peer demonstrate the exercises, and then encouraged the participant to perform 10 repetitions of the exercise. Participants rated the intensity of the exercise to provide the training feedback for designing the personalized program. Finally, the peer and the participant performed a cool-down.	Mastery experience, vicarious experience, verbal persuasion, physiological feedback
Planning component		
	The trainer provided the participant with a written copy of a personalized strength-training program. The trainer and the participant developed a plan for implementing the program and discussed how to increase safely the intensity of the strength-training activities.	Verbal persuasion, goal setting

been shown to be effective for increasing LTPA through ongoing telephone counseling (Castro, Pruitt, Buman, & King, 2011). No published study to date—in any population—has examined the efficacy of employing peer mentors to deliver a brief, LTPA-enhancing intervention in a participant's home.

The intervention content, grounded in the self-efficacy aspect of Bandura's *Social Cognitive Theory* (1997), aimed to enhance task self-efficacy to perform strength-training activities by targeting the four sources of self-efficacy: mastery experience, vicarious experience, verbal persuasion, and physiological feedback. Interventions targeting sources of self-efficacy, particularly mastery and vicarious experiences, have been shown to increase confidence for, and participation in, LTPA (for a review, see Ashford, Edmunds, & French, 2010; Williams & French, 2011). The intervention also aimed to increase action planning by teaching this important skill, known to help people with SCI translate good intentions into LTPA (Arbour-Nicitopoulos et al., 2009; Latimer et al., 2006). Accordingly, we hypothesized that our peer-mediated, home-based strength-training intervention would increase self-efficacy, action planning, and strength-training behavior. This hypothesis was tested among intenders with paraplegia using a single arm pretest, posttest design with a 4-week follow-up.

Method

Participants. Study eligibility criteria and participant characteristics are listed in Tables 1 and 2, respectively. Participants were recruited from a database, newsletter and website advertisements, and word-of-mouth. The Institutional Ethics Boards approved the protocol and all participants provided informed consent.

Measures. Refer to Table 3 for a description of the social-cognitive variables assessed. The LTPAQ-SCI was modified to measure only strength-training activity (as opposed to all LTPA).

Participants recalled the frequency (number of bouts) and duration (min per bout) of moderate and heavy intensity strength-training activities over the past 7 days. The LTPAQ has demonstrated validity and reliability for measuring LTPA behavior including strength-training (Martin Ginis, Phang et al., 2011).

Intervention fidelity was monitored using a visit checklist that the trainer completed following each home visit. The trainer recorded (yes/no) whether each of the prescribed intervention activities was completed and the duration of the home visit. Participants completed a 6-item scale assessing perceived benefits of the visit such as increased confidence to strength train (1 = *definitely no*; 7 = *definitely yes*).

Acceptability of the intervention was determined by assessing participants' satisfaction with the personal trainer (yes/no), the peer (yes/no), and the exercises (1 = *very unsatisfied*; 7 = *very satisfied*). Participants also rated (1 = *definitely no*; 7 = *definitely yes*) whether they could relate to the peer, found the peer helpful, and felt the home visit would help them meet their strength-training goals.

Procedure. The project coordinator screened participants via telephone. Those eligible were scheduled for a baseline interview, a home visit (1 week later) and a follow-up interview (5 weeks later). The coordinator administered the social-cognitive and behavioral questionnaires by telephone at both interviews. Participants completed the intervention acceptability questionnaire immediately following the visit (online or paper copy).

Home visits were conducted by a personal trainer (Trainer 1: male, five visits; Trainer 2: female, eight visits) and a peer with paraplegia (Peer 1: male, five visits; Peer 2: female, seven visits, Peer 3: female, one visit). Trainers had 6–7 years experience training people with SCI. Peers were habitual exercisers drawn from a peer support program and an SCI exercise program. They

were trained in intervention delivery by the first author (training manual available online at www.sciactioncanada.ca); each trainer–peer dyad rehearsed before the home visit.

The activities included in the home visit are outlined in Table 6. The session began with an orientation that involved highlighting the benefits of strength training, discussing past mastery experiences, identifying existing resources for strength training within the participant's home, and setting a strength-training goal. Next the peer modeled a set of seven exercises, the participant tried each exercise, and the trainer reinforced the participant's performance using verbally persuasive statements and by drawing upon examples of the participant's past mastery experiences. Finally, the trainer designed a personalized strength-training program. The trainer and participant developed a 1-week action plan for implementing the program. Participants received a copy of their personalized program, their action plan, a manual describing the exercises, and two different strengths of resistance bands.

Results and Discussion

Paired, one-tailed *t* tests revealed significant medium- to large-sized increases for task frequency self-efficacy, $d = 0.52$; barrier self-efficacy, $d = 0.87$; intentions, $d = 0.60$; and action planning, $d = 1.14$, $ps < .28$ (see Table 5). Although not significant, the intervention resulted in small- to medium-sized increases in task duration self-efficacy, $d = 0.25$, and goal-setting self-efficacy, $d = 0.51$. Scheduling self-efficacy effects were negligible, $d = 0.07$. Significant large-sized effects emerged for each behavioral indicator. Number of bouts of strength training, $d = 1.07$, bout duration, $d = 0.88$, and total min per week of strength training, $d = 0.96$, increased significantly, $ps < .024$. At the 4-week follow-up, 9 of 11 participants were strength training at least twice per week.

The magnitude of many of these positive effects is much larger than the magnitude of effects reported in two meta-analyses evaluating intervention techniques for changing self-efficacy and physical activity ($d = .03-.42$; Ashford et al., 2010; Williams & French, 2011). In these reviews, vicarious experience, providing instruction and feedback, and action planning were identified as being among the most effective strategies for enhancing self-efficacy and physical activity behavior. All of these techniques were featured prominently in our intervention and likely enhanced intervention impact.

The small effects for task duration, goal-setting, and scheduling self-efficacy likely are due to the timeline for follow-up and the intervention content. Follow-up was conducted 4 weeks after the home visit. Increases in task duration self-efficacy may only emerge after several weeks of mastery experiences once participants experience noticeable training effects and develop muscular endurance. Furthermore, having the personal trainer determine the participants' goals may have undermined change in goal-setting self-efficacy. Although assigning goals can enhance task self-efficacy (e.g., Ashford et al., 2010; Elston & Martin Ginis, 2004), this may undermine participants' confidence to set and adjust goals on their own. Perhaps an additional session to foster this skill set is necessary. A subsequent session discussing strategies for fitting strength-training into a busy schedule also could be beneficial for enhancing scheduling self-efficacy (Arbour-Nicitopoulos et al., 2009).

Overall, participants evaluated the intervention favorably. Visits lasted 70.00 ± 19.52 min. Deviations from protocol related to shortening the exercise cool down (four cases) and not distributing the end-of-visit survey (five cases) because of time constraints. The seven participants who completed the end-of-visit survey all strongly agreed (all $M_s > 6.60$ out of 7) they had gained confidence to perform the prescribed exercises, increased awareness of the benefits of strength training, knowledge and interest in home exercise options and learned new exercises and how to apply the information from the visit to their everyday routine. All were satisfied with the peer and personal trainer, and were very satisfied with the exercises ($M = 6.50 \pm 0.54$ out of 7). Moreover, they felt strongly ($M_s > 6.49$ out of 7) that they could relate to the peer, that having the peer at the home visit was helpful, and that the visit would help them meet their strength training goals.

General Discussion

Our pilot studies provide evidence for two promising intervention strategies for encouraging LTPA participation among intenders with SCI. These studies also highlight a set of general principles to consider when designing interventions for intenders. First, according to HAPA, intenders have moved from the motivational to volitional phase of behavior change. However, it seems that there may be benefit in designing interventions to boost motivational determinants (e.g., self-efficacy) and motivation (i.e., intentions and intentions strength) in addition to enhancing volition (i.e., action planning). Including both motivational and volitional intervention components in Study 2 led to large increases in strength-training behavior. As suggested from the trend for increased action planning following a motivation intervention in Study 1, and consistent with theory, boosting motivation should serve to enhance volition.

Second, the number of intervention sessions needed to promote change in social cognitions and behavior is another point for consideration. A single intervention contact can have an impact. Single sessions may be highly effective among intenders specifically because they are primed for change and a single session may be enough to “nudge” them into action. Although additional sessions would likely strengthen the effects (Knight et al., 2006; Rubak et al., 2005), there are practical settings where multiple intervention contacts are not feasible. One session may be adequate to elicit some change.

These recommendations must be considered in light of study limitations. Our analyses were underpowered; nonetheless, we demonstrated significant intervention effects. The sample sizes are comparable to those in other published LTPA intervention studies involving persons with SCI (e.g., $n = 12$; Warmes et al., 2004). The lack of a control group prevents us from ruling out spontaneous (albeit unlikely) change in outcomes, socially desirable responding, and nonsystematic interventionist effects. A control group was not used because we felt it unethical to deny access to LTPA interventions in an underserved population where a standard care comparison group would entail no intervention whatsoever (Martin Ginis & Hicks, 2005). Measurement limitations included short follow-up periods, the absence of behavioral measures in Study 1, self-reported LTPA in Study 2 (although direct measures of LTPA do not exist), and the use of measures with emerging evidence of

validity and reliability. Finally, the utility and feasibility of our intervention must be examined among intenders with tetraplegia.

Despite these limitations, our studies show the feasibility and potential impact of two intervention strategies for promoting LTPA among intenders with SCI. Furthermore, the resources developed for these studies have now been translated into evidence-based manuals, videos and guides that are publicly available (www.sciactioncanada.ca; Martin Ginis et al., 2012). Given that LTPA information and services are among the most desired but least available resources for people with SCI (Boyd & Bardak, 2004), these study outcomes are key milestones in addressing the needs of a terribly underserved community.

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