

Gain-Framed Messages and Sport in Middle Aged Adults: Effects on Intentions, Sport Activity,  
and the Activation and Elaboration of Possible Selves

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## **Abstract**

Two studies based on one online randomized controlled trial examined the effects of sport gain-framed messages (Rothman & Salovey, 1997) and a sport possible self (Murru & Martin Ginis, 2010) protocol on indices of possible self activation and elaboration, sport intention, and sport activity. 244 non-sporting adults ( $M = 50.59$ , 40-59 yrs) completed baseline/screening measures (T1), a gain-framed experimental/control intervention one week later (T2), and follow-up measures (T3) four weeks after T2. Study 1 showed gain-framed participants most frequently attended to a health and fitness message, more frequently described a possible self, and elaborated more on their possible selves (especially about delaying aging and developing friendships through sport). Study 2 indicated that gain-framed individuals requested more sport newsletters and registered for more sport programs. From T1 to T2, gain-framed conditions facilitated increased intentions for those with low approach motivation, whereas control conditions improved intentions for individuals with high approach motivation.

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## **Introduction**

Given the overwhelming amount of evidence that physical inactivity leads to many chronic degenerative conditions and premature death, the promotion of a lifestyle that includes regular physical activity is an important public health objective. According to Katzmarzyk, Gledhill, and Shephard (2000), a reduction of 10% in the prevalence of physical inactivity could reduce direct health care costs by \$150 million a year. The potential benefits associated with regular physical activity are especially important in older, aging populations. Although deteriorative aging effects are inevitable, research has shown that physical inactivity can exacerbate age-related decline (Bortz, 1982). Despite the fact that approximately 98% of adults over the age of 50 understand the importance of physical activity (Ory, Hoffman, Hawkins, Sanner, & Mockenhaupt, 2003), only 15.1% of men and 14.1% of women aged 40-59 are meeting the Canadian Physical Activity Guidelines (Colley et al., 2011). Therefore, it is important to develop interventions that help to increase physical activity in order maximize benefits and slow aging effects in older populations.

Sport is one potential vehicle for getting more adults to reach recommendations. It is defined as "a subset of exercise that can be undertaken individually or as part of a team. Participants adhere to a common set of rules or expectations, and a defined goal exists" (Khan et al., 2012, pp. 59-60), and it involves an inherent degree of competition. Sport may provide more than traditional compartmentalized exercise in terms of the amount of opportunities it may offer (e.g., regular competition against others), while still providing many of the same health benefits (Baker, Fraser-Thomas, Dionigi, & Horton, 2010; Rudman, 1986). The heterogeneity of involvement opportunities that sport offers may make it an attractive option for those contemplating engaging in physical activity who are seeking an experience other than typical



exercise (Young & Medic, 2011). However, sport participation is underutilized as a way to age in a healthy manner as data show participation drops at successive cross-sectional age cohorts in our population (Canadian Fitness and Lifestyle Research Institute, 2010). One challenge for promoting lifelong sport is re-engaging people who may have participated in sport earlier in their lives, but do not presently. Middle aged adults who were once involved in sport in youth may be a ripe population to target for behavioural interventions because previous participation has been found to be a reliable determinant of participation in a new physical activity program (Dishman, Sallis, & Orenstein, 1985). Cross-sectional participation pyramids by age based on registrations at masters sport events indicate increases in participation in the late 30s, but this increase becomes particularly pronounced in the 40-44 and 45-49 yr-old age brackets, with participation peaking between ages 50-59 years (Harada, 1994; Young, 2009). In order to persuade more people in these age groups to participate in adult sport, informational approaches may be an attractive strategy. In this investigation, we utilized an informational intervention that promoted sport to encourage adults, who were formerly active in youth sport but whom have since quit, to consider participation in adult sport.

Many organizations rely on health communications as a way to motivate behaviours that promote healthy living. This is why evidence-based strategies that can guide the design of health communication materials can potentially enhance their impact on behaviour (e.g., health promoting behaviors) and, in turn, on health. One approach that has received quite a bit of research attention is the effectiveness of messages that emphasize the benefits of engaging in a health-promoting behaviour (gain-framed messages) and messages that emphasize the costs of not engaging in the behaviour (loss-framed messages; Rothman & Salovey, 1997). For some time now, investigators have sought to specify the factors that influence the impact of gain- and

loss-framed health messages in order to create a set of guidelines that practitioners can use when designing health communication programs (Rothman & Updegraff, 2010). Evidence supports the use of gain-framed messages for promoting general physical activity; however, no messaging research has explored the utility of similar interventions in sport. Although results from this line of research have been promising, effect sizes have at times been small (Gallagher & Updegraff, 2012), thus, researchers have begun to explore potential mediators that may describe more of the variance involved in the relationship between health messages and health behaviours in an effort to optimize messaging interventions. Certain aspects of the self-concept or the way in which people view themselves in the past, present, and future could certainly mediate or influence the above relationship.

In its broadest sense, the self has been described as a "psychological apparatus that allows organisms to think consciously about themselves" (Leary & Price Tangney, 2003, p. 8). As conscious beings, we are able to conceptualize ourselves not just in the past and present, but we can also imagine ourselves in the future. The current investigation is interested in exploring whether gain-framed messaging works to activate and cause more elaborate aspects of these future-oriented selves, also known as possible selves (Markus & Nurius, 1986). According to Markus and Nurius, this type of self-knowledge concerns how people think about their potential and about their future. Possible selves are the selves that we want to become (hoped-for possible selves) and they are also the selves we are afraid of becoming (feared possible selves). Under the correct conditions, it is believed that these selves can further provide us with the motivation to modify our behaviour. In particular, people are motivated to approach hoped-for possible selves, and this motivational function of possible selves make them an intriguing option as a potential mediator for understanding the efficacy of gain-framed messages.

However, at this point, it is unclear as to whether gain-framed messages actually activate hoped-for possible selves; therefore, the current investigation does not examine mediation per se. Rather, this investigation is designed to only investigate the initial potential causal relationship between sport gain-framed messages and sport hoped-for possible selves. If this relationship is shown to exist, examination of mediation in future research would be defensible.

## **Review of Literature**

### **Message Framing**

In order to increase the frequency with which people engage in health behaviours, such as physical activity, researchers have developed persuasive health communication strategies (Rothman, Bartels, Wlaschin, & Salovey, 2006; Rothman & Salovey, 1997; Rothman & Updegraff, 2010; Rothman, Wlaschin, Bartels, Latimer, & Salovey, 2008). One communication strategy that has shown promise with regard to its ability to positively affect health behaviour is message framing. Message framing is the process of manipulating how information in a message is strategically presented in order to affect people's behavioural decisions. These messages can be framed to emphasize the benefits that may result from performing an advocated behaviour (gain-framed messages) or the costs that may result from failing to engage in an advocated behaviour (loss-framed messages; Rothman & Salovey, 1997). For example, using a wide variety of media (e.g., print, video), messages have been framed to promote behaviours such as sunscreen use (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999), dental flossing (Sherman, Mann, & Updegraff, 2006), and physical activity (Latimer et al., 2008), as well as numerous other health behaviours.

Message framing is founded in prospect theory (Tversky & Kahneman, 1981), which proposes that when potential gains of a situation are emphasized and behavioural choices pose minimal risk or minimal uncertainty, people are likely to choose a non-risky behaviour. When potential losses of a situation are highlighted and behavioural choices involve risk or uncertainty, people are likely to choose a risky behaviour. Rothman and Salovey (1997) applied this logic to how people might react to framed health messages, suggesting that gain-framed messages should be more effective in promoting illness prevention behaviours (e.g., physical activity) because

they may not be perceived as risky (i.e., it is more risky to not engage in them) whereas loss-framed messages should be more effective in promoting illness detection behaviours (e.g., mammography screening) because they may be perceived as risky (i.e., involve a higher degree of risk because of the possibility that a serious illness might be discovered). To date, the hypotheses put forth by Rothman and Salovey have been the dominant predictions in health message framing research.

Consistent with Rothman and Salovey's predictions, a recent meta-analysis by Gallagher and Updegraff (2012) showed that gain-framed messages produced significantly more physical activity change than loss-framed messages. However, that same meta-analysis demonstrated a non-significant effect of framing on intentions among studies in the physical activity domain. People's intentions are often precursors to behaviour (Webb & Sheeran, 2006), yet changes in one's intentions may involve different psychological processes than those responsible for changing a person's behaviour (Gallagher & Updegraff). Still, examination of intentions with respect to message framing is important because intentions are a proximal and direct predictor of behaviour change (Ajzen, 1991). In fact, some studies have promisingly found people express stronger intentions to exercise after reading gain-framed messages. For example, among inactive female college students, gain-framed messages that targeted self-esteem elicited stronger intentions to participate in physical activity than loss-framed messages that targeted self-esteem (Robberson & Rogers, 1988). Furthermore, although some non-significant findings influenced the results of Gallagher and Updegraff's meta-analysis (e.g., Jones, Sinclair, Rhodes, & Courneya, 2004), there have been no instances in which loss-framed messages produced significantly greater change in intentions than gain-framed messages. Moreover, Latimer, Brawley, and Bassett (2010) also reviewed the literature and concluded that the pattern of main

and moderated effects on physical activity intentions (and behaviours) is sufficiently consistent to cautiously recommend the use of gain-framed messages for creating messages to accompany physical activity guidelines.

In summary, it is apparent that gain-framed messages are an effective tool for positively affecting physical activity outcomes. However, the effects of gain-framed messages on different outcomes relating to sport have not yet been investigated. Therefore, in this investigation, we employed gain-framed messages that described involvement opportunities that adults may experience through sport re-engagement. In order to systematically test the effects of sport gain-framed messages in adults, as a first step, we decided to recruit people who participated in sport when they were younger because, as outlined earlier, these individuals may be more likely to engage in adult sport (Dishman et al., 1985). If fruitful results are obtained with this specific sample, it would be warranted to use more general samples in future investigations. With regard to the messages used in this investigation, all messages were developed based on research regarding involvement opportunities currently active masters athletes value in their sport experiences (Medic, Starkes, Young, Weir, & Giajnorio, 2005; Young & Medic, 2011; Young, Starkes, & Medic, 2011).

Another objective of this investigation was to find out which messages were the most salient to participants. Generally, messaging studies only report whether certain formats or frames are more effective than others at influencing certain variables, yet most offer no guidance in terms of specific information or content that should be included in messages to a specific target population (Rothman et al., 2006). Thus, we were interested in measuring message salience so that we could make recommendations regarding which messages should and should not be included in sport gain-framed messages to 40-59 year old adults. Also, as mentioned,

psychological mechanisms that aid in the reception of gain-framed messages are not well known (Gallagher & Updegraff, 2012; Rothman & Updegraff, 2010). One mechanism that may affect how gain-framed messages are received and translated into behaviour change is hoped-for possible selves (Markus & Nurius, 1986). Therefore, another objective of this investigation was find out if sport gain-framed messages activated hoped-for possible selves relating to future adult sport activity.

### **Possible Selves**

Possible selves are future-oriented self-conceptions representing individuals' ideas of who they want to become (hoped-for possible selves; e.g., the athletic self), and who they are afraid of becoming (feared possible selves; e.g., the sedentary self). Possible selves can provide motivation for behaviour change by acting as self-images to be approached or avoided (Markus & Nurius, 1986). Possible selves also include an actual experience in a future situation, and their personal meaning or value is derived from the self-concept, as well as from social and societal norms (Erikson, 2007). It is possible for people to possess multiple possible selves and some can be much more meaningful than others (Markus & Nurius). Meaningful possible selves may be more likely to produce behaviour change than possible selves that are not important to people (Hooker & Kaus, 1992).

Hoped-for possible selves represent the personal embodiment of one's life goals (Hooker, 1999). The way in which these particular selves may affect behaviour change can be explained by control theory (Carver & Scheier, 1982). According to this model, when individuals have future goals, these future goals are compared with their present state. When discrepancies are detected between future goals and current states, people may experience motivation to narrow these discrepancies by altering their behaviour. Hoped-for possible selves work similarly: when

discrepancies exist between a hoped-for possible self and a current self, discrepancies may be narrowed through behaviour change (Hoyle & Sherrill, 2006).

A greater degree of possible self activation and elaboration has been associated with positive cognitive and behavioural health outcomes. With regard to the measurement of possible self activation and elaboration, this has traditionally been done through qualitative coding (e.g., Cross & Markus, 1991; King & Raspin, 2004). A few studies have shown a relationship between health-related possible self activation and health outcomes. Typically, when a person holds a health-related possible self (especially if the possible self is important to them), that person will have more positive thoughts about health (e.g., Hooker, 1992), and they will also take part in more healthy behaviours (e.g., mammography screening; Black, Stein, & Loveland-Cherry, 2001). With regard to elaboration, several studies have shown that increases in elaboration (e.g., amount of vivid detail or amount of self-regulatory strategies included in possible self descriptions) have been positively correlated with cognitive health variables (e.g., subjective well-being; King & Raspin) and actual behaviour (e.g., time spent completing homework; Oyserman, Bybee, Terry, & Hart-Johnson, 2004). Thus, both possible self activation and elaboration appear to be important determinants of cognitive and behavioural outcomes.

In the physical activity context, there have been two studies that have employed possible self interventions, and both demonstrated that possible selves can increase physical activity behaviour (Murru & Martin Ginis, 2010; Ouellette, Hessling, Gibbons, Reisbergan, & Gerrard, 2005). First, Ouellette et al., examined the effects of exercise-related possible selves (regular exerciser and non-exerciser) and prototypes (regular exerciser and non-exerciser) on exercise behaviour. Those in the 'regular exerciser' possible self condition were asked to imagine themselves in the future regularly engaging in exercise, whereas individuals in the 'non-exerciser'



possible self group were asked to imagine themselves as being sedentary. Those in the prototype conditions were instructed to imagine other people exercising regularly or being inactive. In analyses, the possible self conditions were collapsed, and those who scored highly on the personality trait of consideration of future consequences (Strathman, Gleicher, Boninger, & Edwards, 1994) participated in more exercise than participants in the prototype groups. In the second investigation, Murru and Martin Ginis looked at the effects hoped-for and feared-possible self conditions on physical activity behaviour in young adults. Just as in Ouellette et al., both conditions were collapsed. Those who were in the collapsed possible selves condition engaged in more physical activity than control group participants over 4 and 8 weeks.

In summary, possible self protocols whereby participants are asked to explicitly generate hoped-for self images have been shown to lead to physical activity behaviour. Of interest in the current investigation, however, is whether the presentation of sport gain-framed messages may elicit new aspects of sport hoped-for possible selves. Therefore, unlike in the possible self approaches discussed above, possible selves protocol in this investigation are retrospective rather than generative in nature (the possible self protocol is presented immediately after condition exposure), in order to capture the causal relationship between gain-framed messages and possible selves elicitation without possible selves being presented as an intervention per se. We propose that a successful sport gain-framed messaging intervention may be one that activates sport hoped-for possible selves, especially because hoped-for possible selves are conceptually aligned with a gain-framed approach.

### **Activation of Hoped-for Possible Selves**

We believe gain-framed messages that are received successfully may cause hoped-for possible selves to be elicited because of a commonality between the gain-framed processes and

possible self processes: approach motivation. Gray (1990) showed that there are two general motivational systems that underlie behaviour and affect: a behavioural activation or approach system (BAS) and a behavioural inhibition or avoidance system (BIS). With regard to the BAS, when this system is highly active, people tend to be sensitive to cues of reward and nonpunishment. Mann, Sherman, and Updegraff (2004) applied Gray's model to message framing, creating what they called the 'congruency hypothesis'. This hypothesis states that approach-oriented individuals are better persuaded to engage in health behaviours by gain-framed messages, whereas avoidance-oriented individuals are better persuaded by loss-framed messages. Generally, studies that have examined this issue have found that gain-framed messages have been better than loss-framed messages in terms of influencing behaviour change among approach-oriented individuals (e.g., Gerend & Shepherd, 2012; Mann et al.; Sherman et al., 2006). This shows that gain-framed messages act on the approach motivational system, perhaps because these messages highlight potential rewards. With regard to hoped-for possible selves, they may work in a similar fashion. As mentioned, a hoped-for possible self is a type of goal (Hooker, 1999), and when someone possesses a hoped-for possible self, that person may experience approach motivation to move toward that self in order to narrow the discrepancy between their present self and the hoped-for possible self (Hoyle & Sherrill, 2006). Due to this common element of approach motivation, it is possible that the consideration of gain-framed messaging causes people to think about related hoped-for possible selves.

### **Possible Self Self-Regulatory Submechanisms**

Self-regulatory submechanisms associated with hoped-for possible selves may influence behaviour change (Hooker, 1999). Self-regulation is the process of modifying behaviour, cognition, and affect while in the pursuit of goals (Barone, Maddux, & Snyder, 1997). Hoped-for

possible selves are goals (Hooker); therefore, it is likely that affecting the submechanisms that serve a hoped-for possible self will subsequently influence the efficacy of that self for regulating subsequent behaviour change. Therefore, a goal of this investigation was to examine the effects of sport gain-framed messages on select submechanisms connected to sport hoped-for possible selves. The submechanisms examined in this investigation were the perceived importance of the possible self, the perceived capability of achieving the possible self, and the perceived discrepancy between the current self and the possible self.

Regarding the perceived importance of possible selves, evidence shows that more important possible selves are more predictive of behaviour than possible selves that are not important to people. For instance, Hooker and Kaus (1992) demonstrated that individuals who indicated that a health-related possible self was their most important self were more involved in different health behaviours (e.g., exercising, sleeping) than people who indicated having a health-related possible self that was not their most important self. The perceived capability associated with possible selves is also an important submechanism to consider. Hooker and Kaus (1994) showed that the degree of self-efficacy young and middle-aged adults had with regard to their ability to achieve a health-related possible self was predictive of several health behaviours. Finally, although perceived discrepancies are necessary to create behaviour change (Hoyle & Sherrill, 2006), there is a lack of research investigating what discrepancy sizes are best for producing behaviour change. Oyserman and James (2009) have proposed that possible selves that feel psychologically close may be more vivid and may contain more self-regulatory strategies than possible selves that are perceived to be distal. Therefore, hoped-for possible selves that are judged to be psychologically close may be ideal because they may make it easier to self-regulate in order to reduce the discrepancy between the present self and possible self. In

summary, it is likely that the degree of discrepancy between the current self and a hoped-for possible self, stronger beliefs regarding one's capability of attaining a hoped-for possible self, and greater importance of a hoped-for possible self, all influence whether these selves can produce behaviour change. In this investigation, we were interested in examining the efficacy of a sport gain-framed message intervention, based on how it immediately influenced these three submechanisms associated with sport hoped-for possible selves.

## **Overview of Investigation**

### **Objectives and Hypotheses**

The present investigation was a prospective randomized controlled trial that was divided into two studies. In Study 1, the establishment of a causal link between gain-framed messaging and possible self processes was the focus—to this end, analyses centred upon gain-framed message reception and more-immediate effects on possible self activation and elaboration. In Study 2, we were interested in the longitudinal effects of an expanded gain-framed messaging intervention (i.e., gain-framed messaging paired with a possible sport self protocol) on indices of sport intention and sport activity.

**Study 1.** With regard to Study 1, the first objective was to examine sport gain-framed message reception. Specifically, we were interested in finding out which message themes were most saliently attended to by experimental group participants (gain-framed group). The second objective of this study was to compare the experimental and control conditions (sport and physical activity quiz group) in terms of sport hoped-for possible self activation. The third objective was to compare the two conditions regarding the degree to which participants elaborated upon their sport hoped-for possible selves. The fourth objective was explore the nature of the sport-related elaboration in the activated sport hoped-for possible selves by comparing the frequency with which themes presented in the messages appeared in participant sport hoped-for possible self descriptions. The fifth and final objective of this study was to compare the effects of the conditions on sport hoped-for possible self submechanisms such as the importance of the possible selves, the perceived capability of achieving the possible selves, and the discrepancy between the possible selves and the present self.

Due to the existing evidence, we posit that a causal relationship between gain-framed messages and hoped-for possible selves may exist. For this reason, we hypothesized that participants who were presented with sport gain-framed messaging would be (a) more likely to subsequently describe information indicative of an activated sport hoped-for possible self, and (b) more likely to elaborately describe information about a sport hoped-for possible self than individuals who completed a control task. Due to the exploratory nature of this study, no other predictions were made in terms of message reception, the activation of possible self themes, or the possible self submechanisms.

**Study 2.** For Study 2, there were four main objectives. First, we sought to compare the effects of an expanded gain framed messaging intervention (i.e., the pairing of sport gain-framed messages with a possible sport self protocol) with an expanded control condition (i.e., the pairing of a physical activity and sport quiz with a possible sport self protocol) on the subsequent sport activity levels (4 weeks post-intervention) of the participants. Second, we were interested in finding out if there were any between-group differences in terms of registration in sport programs four weeks post-intervention. Third, we sought to compare the effects of the two conditions on sport intention levels (immediately post-intervention and 4 weeks post-intervention). Lastly, we were interested in knowing if the conditions differentially affected a proxy measure of intentions—participant requests for an adult sport newsletter (immediately post-intervention).

In terms of predictions, we hypothesized that, (a) participants presented with an expanded gain-framed messaging intervention would report greater sport activity levels than participants who completed an expanded control task, and (b) participants in the expanded gain-framed condition would report greater intentions to participate in sport than participants in the expanded

control group. Furthermore, (c) participants in the gain-framed intervention would be more likely to seek out information about adult sport programming (newsletters), and (d) they would also register for more sport programs than participants in the control condition.

### **Expected Contribution**

It is essential that informational interventions are developed to ensure that people in this age cohort who may be inclined to re-engage in adult sport are provided with the types of messages that facilitate their return to sport activity. Gain-framed messages have been shown to positively affect both intentions to engage in physical activity and actual physical activity (e.g., Latimer et al., 2008). However, the effects of gain-framed messages have never been tested in the sport domain. Gallagher and Updegraff (2012) have also stated that variables that mediate framed health messages and influence behaviour are relatively unknown. Thus, more research is needed to better explain processes involved in this phenomenon. To our knowledge, no research has yet demonstrated how possible selves mediate any relationship with message framing in the physical activity domain. Although mediation is not addressed in the current study, our analyses will explore the initial causal relationship between gain-framed messages and hoped-for possible selves. If sport gain-framed messages activate elaborate sport hoped-for possible selves, and in particular certain self-regulatory submechanisms of those possible selves, future research examining mediation may be warranted. Additionally, if certain messages prove to be more salient than others and if certain themes become more frequently elaborated in future sport possible selves (themes that are also related to the themes presented in the gain-framed messages), this will inform researchers and sport programmers about which messages should be included in sport gain-framed advertisements. In summary, the present investigation may unveil findings that will provide practitioners with an informational intervention approach to help

middle aged adults (specifically those who were once involved in sport) become active in sport again in later life stages, helping people in this demographic to participate in enough physical activity in order to remain healthy.



### **Methodology**

It is important to note that this investigation, although divided into two studies, is based on one experimental procedure described herein that applied equally to both studies. Also, with the exception of slight variations due to statistical treatment of outliers, listwise analyses, and attrition in some longitudinal measures, the same sample of participants was employed for both studies.

### **Participants**

There were 600 individuals who initiated the investigation. Of this initial sample, 103 male and 141 female participants, between the ages of 40 and 59 ( $M = 50.59$ ,  $SD = 5.39$ ), met inclusion criteria. Eligible participants were recruited from youth sporting events (adult spectators were recruited) and via web-based advertisements. Participants voluntarily participated knowing that six people would be selected to win \$50 cash prizes from a draw for their participation in the investigation. All participants provided informed consent (see Appendix A for consent form) and the entire protocol was approved by the host institution's research ethics board (see Appendix B for ethics certificate). Individuals who met the following inclusion criteria were invited to participate in the study: (i) between the ages of 40 and 59 (see Appendix C for demographics questionnaire), (ii) currently healthy enough to regularly participate in physical activity, (iii) in one of the first three stages of motivational readiness for change (Prochaska, DiClemente, & Norcross, 1992) in sport activity, (iv) at least somewhat regularly active in sport before the age of 20, and (v) did not personally perceive regular sport activity to be risky. Those who met inclusion criteria also answered questions pertaining to possible covariates in the present investigation, including age-related cognitions, attitude toward sport

participation, and levels of approach motivation. Measures pertaining to these inclusion criteria and possible covariates are presented next.

### **Screening Measures**

**Current health.** Participants responded to the question: "Are you currently healthy enough to regularly participate in physical activity?" Participants choose either "yes" or "no" (see Appendix D). Participants who chose "no" were excluded.

**Stages of motivational readiness for change.** A modified version of the stages-of-change questionnaire (Marcus, Rossi, Selby, Niaura, & Abrams, 1992) measured current sport stage of change (see Appendix E). This instrument has demonstrated good two-week test-retest reliability (Marcus, Selby, Niaura, & Rossi, 1992), and it has also been related with measures of physical activity (Marcus & Simkin, 1993). We included participants in the first three stages (i.e., precontemplation, contemplation, preparation; Prochaska et al., 1992) because individuals in these stages are not involved in sport, or are irregularly involved in sport.

**Sport activity in youth.** Participants answered the following question: "At any point before you reached 20 years old, did you regularly participate in sport (outside of gym class)?" Participants had the option of choosing "no", "somewhat", or "yes" (see Appendix F). We included participants who indicated either "somewhat" or "yes" for prior participation.

**Perceived risk of participating in sport.** Participants responded to the question (similar to Rothman, Martino, Bedell, Detweiler, & Salovey, 1999): "Do you believe that regularly participating in sport is risky?" on a 7-point Likert scale item ranging from 1 (not at all) to 7 (extremely; see Appendix G). Participants who indicated either 6 or 7 (i.e., thought regular sport activity was highly risky) were excluded because some messaging studies have shown that

individuals who believe a health behaviour is risky are less receptive to gain-framed messages (e.g., Bartels, Kelly, & Rothman, 2010).

### **Potential Covariate Measures**

**Sport attitude.** We assessed baseline attitudes toward sport because evidence shows that people with positive beliefs about an issue (e.g., the importance of sport behaviour) respond differently to persuasive messages pertaining to the issue than do people with negative beliefs (Zimbardo & Leippe, 1991). Participants responded to four Likert scale statements on a 9-point Likert scale ranging from 1 (not at all) to 9 (extremely; modified from Rothman et al., 1999; see Appendix H). An example of an item was: "Regular participation in sport is important". The Cronbach alpha value for sport attitude for this study was .90.

**Approach motivation.** Level of approach motivation was measured because, as mentioned, past messaging studies have demonstrated that a relationship between approach-orientation and gain-framed messaging exists (e.g., Mann et al., 2004). Approach motivation was measured using the 13 items from the BAS portion of the BIS/BAS scale (Carver & White, 1994). Five items addressed Reward Responsiveness (measures positive responses to the occurrences or anticipation of reward), including items such as "When I'm doing well at something I love to keep at it". Four items assessed Drive (measures the persistent pursuit of desired goals), including "I go out of my way to get things I want". Four items pertained to Fun Seeking (measures both a desire for new rewards and a willingness to approach a potentially rewarding event on the spur of the moment), exemplified by "I'm always willing to try something new if I think it will be fun". Participant responses were on a 4-point Likert scale ranging from 1 (very true for me) to 4 (very false for me; see Appendix I). Each subscale of the BAS has previously demonstrated acceptable test-retest reliability, and also convergent and discriminant

validity (Carver & White). Cronbach alpha values for the Reward Responsiveness, Drive, and Fun Seeking subscales for the current study were .78, .88, and .79, respectively.

**Aging-related cognitions.** We evaluated baseline measures for age-related cognitions because research has shown that individuals with more negative self-perceptions of aging (e.g., thinking things keep getting worse as they get older) tend to engage in less health behaviours over the long-term than those with more positive self-perceptions (Levy & Myers, 2004). Furthermore, with regard to physical activity, Sarkisian, Prohaska, Wong, Hirsch, and Mangione (2005) demonstrated that low expectations regarding aging are independently correlated with low physical activity levels. Thus, due to the potentially constraining influence of aging self-perceptions on the effects of sport gain-framed messages, this investigation included measures of aging-related cognitions that were investigated as potential covariates in analyses. Participant responses to the Aging Cognitive Physical Losses and the Aging Cognitive Ongoing Development subscales of the *AgeCog* (Wurm, Tesch-Romer, & Tomasik, 2007) were used to measure views on aging. The AgeCog Physical Losses scale examines views regarding the physical losses one incurs as he/she ages and consists of four items (4-point Likert scale ranging from 1 [definitely true] to 4 [definitely false]; 1 item was removed due to an error on the questionnaire, thus 3 items were used in analyses. The four item AgeCog Ongoing Development scale (4-point Likert scale ranging from 1 [definitely true] to 4 [definitely false]; see Appendix J for both subscales) measures the degree to which participants believe aging is a time of ongoing personal development. The two subscales have been shown to be significant predictors for the health of middle-aged as well as older adults, even after controlling for demographic, socioeconomic, and psychological indicators (Wurm, 2006; as cited by Wurm et al., 2007).

Cronbach alpha values for the AgeCog Physical Losses and AgeCog Ongoing Development subscales for the present investigation were .76 and .51, respectively.

## **Procedure**

This portion of the paper describes the procedure across three time points. Outcome measures have been italicized, and several of these outcomes are discussed in further detail in a later section.

**Time 1.** First, individuals who were interested in participating in the study accessed the first online questionnaire and completed the screening and potential covariate measures described earlier. All participants who met inclusion criteria also completed baseline questions pertaining to two outcome measures: *intentions to participate in sport* and *current weekly sport activity*. Next, they were randomly assigned to either an experimental or control group.

**Time 2.** One week later, participants were sent an e-mail containing one of two links to access a second online questionnaire pertaining to their condition. Those in the experimental group were presented with a narrated Microsoft Office PowerPoint (Microsoft Inc., U.S.A) video of approximately three minutes which showed nine sport gain-framed messages. The messages presented to participants in the experimental group were based on nine highly rated involvement opportunities that adults have identified for participating in masters sport (Medic, Starkes, Young, Weir, & Giajnorio, 2005; Young & Medic, 2011; Young et al., 2011; see Appendix K for message web page; see Appendix L for messages). The message format was developed in accordance with the standard guidelines for creating gain-framed health messages (Detweiler et al., 1999). As a manipulation check (similar to McCall & Martin Ginis, 2004) to examine participants' attentiveness, immediately after viewing the video, experimental group participants described (by typing) the main theme of two of the messages that appeared in the video (see

Appendix M for manipulation check instructions). Participants in the control group filled out a 13-item physical activity and sport quiz that contained multiple choice and true/false questions regarding population physical activity rates, obesity rates, and determinants of sport and physical activity (similar to Murru & Martin Ginis, 2010; see Appendix N for quiz web page and answers). Control group participants did not perform a manipulation check.

Next, participants in both groups indicated the degree to which their respective tasks caused them to think about a sport hoped-for possible self. Specifically, the possible self protocol began with the following script:

Sometimes when people consider (*messages about sport/questions about physical activity and sport*), they are able to think about or see themselves in the future. In particular, people might think about the type of adult sport participant that they would one day like to become. Sometimes, after considering (*messages about sport/questions about physical activity and sport*), people are able to envision themselves in the future as an adult sportsperson and the kinds of experiences that might be in store for them.

To measure the degree of *activation* of a sport hoped-for possible self, experimental group participants were asked: "Did you find that the messages about adult sport got you thinking about a future sport self that you would like to become?" We asked control group participants: "Did you find that the questions about physical activity and sport got you thinking about a future sport self that you would like to become?" Participants responded on a 7-point Likert scale ranging from 1 (not at all) to 7 (very much; see Appendix O for self-reported possible self activation web pages for both groups).

The participants who acknowledged that a sport hoped-for possible self was activated (participants who indicated between 3 and 7 on the self-reported sport hoped-for possible self

activation scale) were then prompted to describe this self in writing (see Appendix P for possible self description instructions for both groups). Participants who chose 1 or 2 on the scale were excluded from this part of the study because we wanted to ensure that the possible self descriptions were retrospective rather than generative in nature, allowing us to capture possible selves that were activated as a result of exposure to the study conditions (i.e., experimental and control). This was critical because asking participants to imagine and describe a possible self that has not already been previously activated has been a technique used by some researchers as a form of behavioural intervention (e.g., Murru & Martin Ginis, 2010).

Next, participants who had just described a future sport self then completed three Likert scale items which measured three possible self *self-regulatory submechanisms*: the perceived importance of the possible self, the perceived capability of achieving the possible self, and the perceived discrepancy of the present self from the possible self (modified from Hooker, 1999). The experimental group were presented with the following three items. Item 1 was: "How important is it to you to achieve the future self that the messages about adult sport got you thinking about?" (*importance*; scale ranged from 1 [not at all] to 7 [very important]). Item 2 was: "How capable do you feel of achieving the future self that the messages about adult sport prompted you to think about?" (*capability*; scale ranged from 1 [not at all capable] to 7 [very capable]). Lastly, item 3 was: "To what extent does this future self describe you now?" (*discrepancy*; scale ranged from 1 [not at all] to 7 [very much]). Similarly, participants in the control group answered questions that measured submechanisms associated with their possible self activated as a result of exposure to the questions in the physical activity and sport quiz (see Appendix Q for self-regulatory submechanism web pages for both groups).

Finally, participants indicated their *intentions to participate in sport* for a second time and participants were asked if they would like to *receive an e-mail newsletter* describing local adult sport opportunities.

**Time 3.** Four weeks later, participants were e-mailed a link to access a third online questionnaire. Participants then completed the *sport intention* measure for a third time and they also reported their *current weekly sport activity* for a second time. Participants were also asked to report whether they had *registered in a sport program* in the past four weeks. Lastly, all participants were debriefed.

### **Outcome Measures**

**Sport intention.** Five Likert-scale items measured intentions to perform sport activity. Three items (7-point scale ranging from 1 [not at all] to 7 [extremely]; modified from Rothman et al., 1999) asked: "How likely is it that you will participate in sport activity sometime soon?"; "If you were faced with the decision to begin regular participation in sport today, how likely is it that you would do so?"; and "How tempted would you be to put off starting regular sport activity?", with scores on the latter item being reversed. A fourth item (modified from Prins et al., 2010) asked: "Do you plan to be regularly involved in sport in the next half year?" (scale ranged from 1 [certainly not] to 7 [yes certainly]). The fifth item, developed by the investigators, was: "How likely is it that you will regularly participate in sport in the next 6 months?" (scale ranged from 1 [not at all] to 7 [extremely likely]; see Appendix R for sport intention web page). Cronbach alpha values for the five items ranged from .88 to .91 over the three time points.

**Request for newsletter.** As a real-world proxy measure of sport intention, participants were asked if they would like to receive an e-mail newsletter that describes a wide variety of adult sport opportunities that are currently offered in Ottawa, Ontario, Canada (where the study



was based). Participants had the option of choosing one of four responses: (i) yes (ii) no (iii) yes I would, but I do not live in or near Ottawa, or (iv) no I would not, and I do not live in or near Ottawa (see Appendix S for newsletter web page). For analyses, responses for answers one and three were summed to form one category of participants who indicated interest in receiving the newsletter. Similarly, responses for answers two and four were summed to form one category of participants who indicated no interest in receiving the newsletter.

**Current weekly sport activity.** The Godin Leisure Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985) was utilized to calculate current weekly sport activity. Validity for this measure has been shown in adults aged 18-65 (Godin & Shephard) and reliability has been demonstrated with adults aged 20-59 (Jacobs, Ainsworth, Hartman, & Leon, 1993). At Time 1, participants were asked to complete the GLTEQ, which asked respondents to indicate the number of times in an *average* week that they take part in strenuous, moderate, and mild forms of exercise for more than 15 minutes at a time. At Time 3, participants were asked to indicate the number of times *in the past 7 days* that they engaged in strenuous, moderate, and mild forms of exercise (see Appendix T for Time 1 and Time 3 versions of questionnaire). Because no better alternative measure of sport activity exists, and because the vast majority of the activities listed as examples in the moderate (e.g., tennis, volleyball) and strenuous (e.g., hockey, soccer) sections of the GLTEQ are sports, we elected to combine the moderate and strenuous activity scores to determine weekly sport activity. Therefore, the formula used for calculating weekly sport activity for this study was: weekly sport activity = (9 x strenuous exercise frequency) + (5 x moderate exercise frequency).

**Sport registration.** Participants chose either yes or no, when asked: "In the past 4 weeks, have you formally enrolled in a sport club, league, or program, or registered for a sport event? (see Appendix U for sport registration web page)"

### **Planned Data Analyses**

**Study 1.** For Study 1, to examine reception of the sport gain-framed messages, manipulation check data were analyzed. Our dependent measure for message reception was the number of times each message was stated by experimental group participants. Message reception was investigated in two stages: (i) the first message each participant stated, and (ii) the first and second messages stated combined. To do this, we first established interrater reliability for the number of messages each participant stated. Next, we established interrater reliability for thematic content in the first message stated. All remaining coding was done by the principal investigator. Lastly, chi-square goodness-of-fit tests analyzed the number of times each message was stated according to nine different sport gain-framed message themes, to determine which ones were mentioned at levels greater than, or less than, what would be expected by chance.

Sport hoped-for possible self activation was analyzed in two stages. First, participant responses to the Likert-scale question which measured self-reported activation were analyzed using an independent *t*-test, comparing the two groups on this variable. Second, participant sport hoped-for possible self descriptions were analyzed qualitatively to compare the experimental and control group in terms of describing a sport hoped-for possible self. To carry out this comparison, we first had to establish interrater reliability for classifying descriptions as either a 'sport hoped-for possible self' or 'not a sport hoped-for possible self'. After this, the principal investigator blindly labelled all of the descriptions. A chi-square test of independence was

conducted to examine differences between the groups for identification of an activated of a sport hoped for self.

In terms of examining the elaboration of sport hoped-for possible selves, we qualitatively coded meaning units that made up the sport hoped-for possible self descriptions (that had been verified as activated hoped-for sport selves in the preceding analysis). Tesch (1990) states that a meaning unit is a segment of text that conveys the same idea. Therefore, we counted the number of meaning units in each description to determine how much each participant had elaborated. We examined this in two stages, according to (i) the total number of meaning units, and (ii) the number of relevant meaning units. For the purposes of this study, a relevant meaning unit was one that related to one of the nine involvement opportunity themes described in the sport gain-framed messages. To do this, it was necessary to establish interrater reliability for the coding and categorization of relevant meaning units. Finally, independent *t*-tests were conducted to compare the groups on total number of elaborated meaning units, and total number of relevant meaning units. To explore the specific themes appearing in the sport hoped-for possible self descriptions, nine separate chi-square tests were conducted to contrast the frequency with which the two groups elaborated upon each of the nine gain-framed themes. Lastly, to compare the two groups in terms of possible self self-regulatory submechanisms, three one-way analyses of variance (ANOVAs) were conducted—one for each of the perceived importance, capability, and discrepancy submechanisms.

**Study 2.** For Study 2, a two-way mixed analysis of covariance (ANCOVA) with the non-repeated factor of 'group' (2 levels: experimental and control) and the repeated factor of 'time' (3 levels: Time 1, Time 2, and Time 3) was used to analyze sport intention. A two-way mixed ANCOVA with the non-repeated factor of 'group' (2 levels: experimental and control) and the

repeated factor of 'time' (2 levels: Time 1 and Time 3) was used to analyze weekly sport activity. Separate ordinal regression analyses were used to analyze between-group differences for requests to receive a sport newsletter, and for number of sport registrations while controlling for appropriate covariates. In all cases, covariates were established following a series of screening analyses in accordance with guidelines for treating multiple covariates (Tabachnick & Fidell, 2012).

### **Presentation of Journal Articles**

The following articles entitled *Examining the Effects of Gain-Framed Messages on the Activation and Elaboration of Sport Possible Selves in Middle Aged Adults* (Study 1) and *The Effects of an Expanded Gain-Framed Message Intervention on Sport Intention and Activity Levels in Middle Aged Adults* (Study 2) presented in this chapter have been prepared for submission for publication.

Examining the Effects of Gain-Framed Messages on the Activation and Elaboration of Sport  
Possible Selves in Middle Aged Adults

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### Abstract

Variables involved in the reception of gain-framed messages (Rothman & Salovey, 1997) are not well known (Gallagher & Updegraff, 2012). One psychological concept possibly influencing how messages are received is a hoped-for possible self (Markus & Nurius, 1986). This randomized controlled trial examined the possibility that an online gain-framed message video emphasizing certain benefits of adult sport participation (Young & Medic, 2011) would elicit hoped-for possible selves related to sport. 182 participants ( $M\ Age = 50.90$  yrs,  $rge = 40-59$ ,  $SD = 5.38$ ) who had participated in sport during youth but whom were presently not involved in sport, were randomly assigned to watch either the video (experimental) or complete a physical activity quiz (control). Afterwards, participants responded to questions about possible future sport self activation (Hooker, 1999), and were asked to describe aspects of this sport self in writing. Descriptive responses were analyzed qualitatively to determine whether participants identified a possible self, and to enumerate meaning units (Tesch, 1990). Results showed that the experimental group stated a health and fitness message most frequently ( $p < .001$ ). The experimental group more frequently activated a sport self in their descriptions than the control group ( $p = .003$ ). The experimental group elaborated more on their possible selves ( $p = .003$ ), specifically describing more units relating to the delay of aging ( $p = .03$ ) and social factors ( $p = .03$ ).

*Keywords:* middle aged adults, sport, message framing, possible selves, approach motivation

## Examining the Effects of Gain-Framed Messages on the Activation and Elaboration of Sport Possible Selves in Middle Aged Adults

There is a great amount of research indicating that physical inactivity among adults leads to chronic degenerative conditions and co-morbidities (Katzmarzyk, Gledhill, & Shephard, 2000). Alternatively, maintained physical activity provides many benefits that have been associated with successful aging (Chodzko-Zajko, Schwingel, & Park, 2009). However, only approximately 15% of adults aged 40-59 meet the Canadian Physical Activity Guidelines (Colley et al., 2011). Therefore, it is essential that various interventions are developed to increase physical activity in this population, including informational approaches that attempt to recruit more people to physical activity through persuasive messaging strategies.

Sport is one way for more adults to reach physical activity recommendations. It is defined as "a subset of exercise that can be undertaken individually or as part of a team. Participants adhere to a common set of rules or expectations, and a defined goal exists" (Khan et al., 2012, pp. 59-60), and it involves an inherent degree of competition. Sport may be a good option for adults because it offers great heterogeneity in terms of its involvement opportunities (e.g., the opportunity to travel to different destinations to play sport; Young & Medic, 2011), while also providing many health benefits (Baker, Fraser-Thomas, Dionigi, & Horton, 2010; Rudman, 1986). Considering the merits of having more people engaged in adult sport, the current investigation explored whether an informational intervention may be an effective method of persuading adults (who were once active in sport during youth, but who are currently non-sporting) to re-contemplate participation in regular adult sport activity.

### **Message Framing**

One informational approach that has shown promise with regard to its ability to persuade



people to engage in more health behaviours is message framing. Founded in prospect theory (Tversky & Kahneman, 1981), message framing is the process of manipulating how information in messages are presented with the goal of affecting people's behavioural decisions (Rothman & Salovey, 1997). There are two different types of message frames: gain-framed messages emphasize benefits that result from performing a behaviour and loss-framed messages emphasize costs that result from not performing a behaviour. Gain-framed messages are hypothesized to be effective in promoting illness prevention behaviours (i.e., engaging in these behaviours should prevent illnesses from developing), whereas loss-framed messages are hypothesized to promote illness detection behaviours (i.e., going to get screened for illnesses; Rothman & Salovey).

Research has shown that gain-framed messages have been more effective than loss-framed messages in promoting certain illness prevention behaviours. Specifically, in the physical activity context, a recent meta-analysis demonstrated that gain-framed messages were significantly more effective than loss-framed messages at encouraging physical activity behaviour (Gallagher & Updegraff, 2012). However, the effects of gain-framed messages on outcomes relating to sport have not been tested, which is a void that the current investigation explored. Thus, in the present study, we utilized a gain-framed message protocol that described the beneficial involvement opportunities that presently non-sporting adults may experience by re-engaging in sport. The gain-framed messages used in this study were derived from research relating to the involvement opportunities that presently active sportspersons valued in their adult sport experiences (Medic, Starkes, Young, Weir, & Giajnorio, 2005; Young & Medic, 2011; Young, Starkes, & Medic, 2011).

Furthermore, although the message framing research conducted thus far has been useful in demonstrating when a particular message format or frame will be most effective, studies have

offered little guidance regarding specific information that should be included in messages (Rothman, Bartels, Wlaschin, & Salovey, 2006). Thus, one main goal of this investigation was to measure which messages were most salient to 40-59 year-old participants in order to provide some insight into which messages should be and should not be included in sport gain-framed messages. To this end, the current study aimed to identify the particular gain-framed messages, or special sport involvement opportunities, that should be accommodated in adult sport messaging interventions. Furthermore, the psychological mechanisms that aid in the reception of gain-framed messages as they relate to illness prevention behaviours such as physical activity are still relatively unknown (Gallagher & Updegraff, 2012; Rothman & Updegraff, 2010). One mechanism that may influence how gain-framed messages are received and translated into individual behaviour change is hoped-for possible selves (Markus & Nurius, 1986). Consequently, another main objective of the present study was to explore the possibility that sport gain-framed messages serve to activate or elicit hoped-for possible selves with respect to future adult sport behaviours.

### **Possible Selves**

Possible selves are future-oriented self-conceptions representing individuals' ideas of who they want to become (hoped-for possible selves; e.g., the active self), and who they are afraid of becoming (feared possible selves; e.g., the sedentary self). Possible selves provide a conceptual link between cognition and motivation for behaviour by acting as self-images to be approached or avoided (Erikson, 2007; Markus & Nurius, 1986). They embody personal agency in a future situation and are derived from the self-concept, as well as from the social and cultural context (Erikson). People can hold multiple possible selves and some are more personally

meaningful than others. Meaningful possible selves may be more likely to drive behaviour change than possible selves that are not important to people (Hooker & Kaus, 1992).

Hoped-for possible selves represent one's life goals (Hooker, 1999), and the process by which these goals influence health behaviours may be explained by control theory (Carver & Scheier, 1982). According to control theory models, individuals have future goals or internal standards that are compared with their current state. If discrepancies exist between future goals and current views of the self, people are motivated to engage in behaviours aimed at narrowing these discrepancies. Similarly, if discrepancies exist between a hoped-for possible self and one's current view of the self, discrepancies between these two views may be rectified through behaviour change (Hoyle & Sherrill, 2006).

The activation and degree of elaboration of possible selves can influence both psychological and behavioural outcomes. In many studies, the convention has been to evaluate activation and degree of elaboration through qualitative coding of peoples' responses regarding a particular possible self-concept (e.g., Cross & Markus, 1991; King & Raspin, 2004). Several studies have demonstrated a relationship between health-related possible self activation and health outcomes—generally, if one holds a possible self relating to their health (especially if the possible self is important to them), they will have more positive health values (e.g., Hooker, 1992), and they will also engage in more healthy behaviours (e.g., Black, Stein, & Loveland-Cherry, 2001). Other studies have also shown increases in possible self elaboration (e.g., amount of vivid detail or amount of self-regulatory strategies included in possible self descriptions) to be positively related to cognitive health variables (e.g., subjective well-being; King & Raspin) and actual behaviour (e.g., time spent doing homework; Oyserman, Bybee, Terry, & Hart-Johnson, 2004).

With regard to the physical activity domain, there have been two published possible self interventions, and both have shown evidence that activation of possible selves can cause increases in physical activity levels (Murru & Martin Ginis, 2010; Ouellette, Hessling, Gibbons, Reisbergan, & Gerrard, 2005). In the first of these two studies, Ouellette and colleagues tested the impact of exercise-related possible selves (regular exerciser and non-exerciser conditions) and prototypes (regular exerciser and non-exerciser conditions) on exercise in undergraduate students. Participants in the 'regular exerciser' possible self condition were instructed to imagine themselves in the future as a regular exerciser, whereas those in the 'non-exerciser' condition were instructed to imagine themselves as a nonexerciser. Individuals in the prototypes conditions were asked to imagine other regular exercisers and nonexercisers. In a collapsed possible selves condition, those who received a high score on the personality trait of consideration of future consequences (Strathman, Gleicher, Boninger, & Edwards, 1994) reported a larger increase in exercise over the study period (4 weeks) than individuals in the prototype conditions. In the second study, Murru and Martin Ginis examined the effects of hoped-for and feared possible self interventions on exercise behaviour among a sample of inactive young adults. Consistent with Ouellette et al., both the hoped-for and feared possible selves conditions were collapsed, and participants who received a possible selves intervention reported greater increases in minutes of exercise than control group participants over 4 and 8 weeks. These two studies demonstrated that the activation of a physical activity possible self is related with increases in prospective physical activity. Therefore, in the current study, we propose that a successful sport gain-framed messaging intervention was one that successfully activated a sport hoped-for possible self, especially because hoped-for possible selves (but not feared possible selves) are conceptually aligned with a gain-framed approach.

### **Activation of Hoped-for Possible Selves**

The current study was interested in assessing a gain-framed messaging intervention based on its immediate consequent effects on the activation and elaboration of hoped-for possible selves. To our knowledge, no study has yet measured the degree of hoped-for possible self activation and elaboration in response to a gain-framed intervention, and this was a main goal of the current investigation. There is reason to believe that successful gain-framed messages should activate and facilitate the elaboration of hoped-for possible selves (i.e., they should act as an antecedent influence on hoped-for possible selves). Conceptually, gain-framed messaging for health promotion reasons, and processes related to hoped-for possible selves may both rely on features of approach motivation. According to Gray (1990), there are two general motivational systems that underlie behaviour and affect: a behavioural activation or approach system (BAS) and a behavioural inhibition or avoidance system (BIS). When the BAS is highly active, people are sensitive to signals of reward and nonpunishment. In the messaging domain, researchers have recently begun testing what is known as the 'congruency hypothesis' (Mann, Sherman, & Updegraff, 2004), which states that approach-oriented individuals are better persuaded to engage in health behaviours by gain-framed messages, whereas avoidance-oriented individuals are better persuaded by loss-framed messages. Several studies have demonstrated support for this hypothesis—generally, gain-framed messages have been more effective than loss-framed messages at producing health behaviour change among those who are approach-oriented (e.g., Gerend & Shepherd, 2012; Mann et al.; Sherman, Mann, & Updegraff, 2006). This suggests that gain-framed messages likely exert persuasive effects by activating features of an approach motivational system, perhaps because gain-framed messages emphasize potential rewards. As stated earlier, hoped-for possible selves may work similarly: a hoped-for possible self is a type of

goal (Hooker, 1999), and when a hoped-for possible self is possessed, a person experiences approach motivation to move toward that potential self in order to reduce the discrepancy between their current self and the hoped-for possible self (Hoyle & Sherrill, 2006). Based on these parallels in approach motivation, it is plausible that the consideration of gain-framed messaging primes people to think about related hoped-for possible selves.

### **Possible Self Self-Regulatory Submechanisms**

The possible self literature suggests that certain self-regulatory submechanisms associated with hoped-for possible selves may be important in terms of producing behaviour change (Hooker, 1999). Barone, Maddux, and Snyder (1997) state that self-regulation is the process of regulating one's own behaviour, cognition, and affect in the pursuit of goals. Because hoped-for possible selves are goals (Hooker), it is logical to assume that change in any of the submechanisms that operate in service of a hoped-for possible self will directly affect the capability of that self to create behaviour change. Therefore, a final objective of this study was to examine the effects of sport gain-framed messages on certain submechanisms associated with activated sport hoped-for possible selves. The submechanisms examined in the current study were the perceived importance of the possible self, the perceived capability of achieving the possible self, and the perceived discrepancy between the current self and the possible self.

In terms of the perceived importance of possible selves, some research shows that possible selves that are important to people are more predictive of behaviour than possible selves that are not important to people. For example, Hooker and Kaus (1992) found that people who labelled a health-related possible self as their most important self engaged in more health behaviour (e.g., exercising, sleeping) than people who held a health-related possible self that was not their most important self. Perceived capability has also been shown to be an important

variable. Hooker and Kaus (1994) found that the self-efficacy levels that young and middle aged adults had in terms of their ability to achieve a health-related possible self predicted scores on several health behaviours. Lastly, with regard to perceived discrepancy, although some research has shown that discrepancies are necessary to drive behaviour change (Hoyle & Sherrill, 2006), there is a paucity of research examining what discrepancy sizes are ideal for creating change. Oyserman and James (2009) have proposed that possible selves that are estimated to be psychologically close are likely to be more vivid and likely contain more self-regulatory strategies than possible selves that are judged to be more distal. Therefore, the closer a hoped-for possible self feels, the easier it may be to self-regulate in order to reduce the discrepancy between the current self and the possible self. In sum, it appears that the degree of discrepancy between the current self and a hoped-for possible self, stronger beliefs regarding one's capability of attaining a hoped-for possible self, and greater importance of a hoped-for possible self all influence whether these selves can produce behaviour change. In the current study, we were interested in examining the efficacy of a sport gain-framed message intervention, based on how it affected these three submechanisms associated with sport hoped-for possible selves.

### **Study Overview and Hypotheses**

This study was part of a larger, randomized controlled trial designed to examine the effects of sport gain-framed messages on sport hoped-for possible selves and adult sport activity outcomes. This particular article, however, focuses only on the reception of the gain-framed messages after their presentation in a brief online video and the more-immediate effects of those messages on the activation and elaboration of possible selves—both the gain-framed messages and possible selves protocol were paired together and delivered online.

The first goal of this study was to examine how sport gain-framed messages are received. More specifically, we were interested in knowing if certain message themes were more salient than others. The second goal of this study was to investigate the possibility of sport gain-framed messages activating or eliciting sport hoped-for possible selves to a greater extent than a control condition. The third goal of this study was to inspect the degree to which participants elaborated upon their possible selves following exposure to either sport gain-framed messages or a control condition. The fourth goal of this study was to explore the nature of sport-themed elaboration by comparing gain-framed and control groups for the frequency with which gain-framed content appeared in their sport hoped-for possible self descriptions. The final goal of this investigation was to examine the effects of the messages and a control task on sport hoped-for possible self submechanisms such as the importance of the possible selves, the perceived capability of achieving the possible selves, and the discrepancy between the possible selves and the present self.

Although the effects of gain-framed messages on hoped-for possible selves have yet to be examined, the existent literature base indicates that a potential relationship may exist between these two variables. Therefore, we hypothesized that participants exposed to sport gain-framed messaging would be (a) more likely to subsequently describe information indicative of an activated sport hoped-for possible self, and (b) more likely to elaborately describe information about a sport hoped-for possible self than individuals who completed a control task. No other predictions were made regarding message reception, the activation of possible self themes, or the possible self submechanisms due to the exploratory nature of this study.



## Methodology

### Participants

Participants were 73 males and 109 females between the ages of 40 and 59 ( $M = 50.90$ ,  $SD = 5.38$ ) who were recruited from youth sporting events (adult spectators were recruited) and also from web-based advertisements. Participants volunteered to participate knowing that six people would win \$50 cash prizes from a draw for their participation in the study. All participants provided informed consent and the entire protocol was approved by the host institution's research ethics board. People who met the following inclusion criteria were invited to participate in the study: (i) currently healthy enough to regularly participate in physical activity, (ii) in one of the first three stages of motivational readiness for change (Prochaska, DiClemente, & Norcross, 1992), in sport activity, (iii) at least somewhat regularly active in sport before the age of 20, and (iv) did not personally perceive regular sport activity to be risky.

### Screening Measures

**Current health.** Participants responded to: "Are you currently healthy enough to regularly participate in physical activity?" Participants choose either "yes" or "no". Participants who chose "no" were not included in the study.

**Stages of motivational readiness for change.** An adaptation of the stages-of-change questionnaire (Marcus, Rossi, Selby, Niaura, & Abrams, 1992) measured current sport stage of change and baseline levels of sport activity. This instrument has shown good test-retest reliability over a two-week period (Marcus, Selby, Niaura, & Rossi, 1992), and it has also been related to other measures of physical activity (Marcus & Simkin, 1993). We retained participants in the first three stages (i.e., precontemplation, contemplation, preparation; Prochaska et al., 1992)

because individuals in these stages are currently not involved in any sport or they are irregularly involved in sport.

**Sport activity in youth.** Participants answered: "At any point before you reached 20 years old, did you regularly participate in sport (outside of gym class)?" Participants had the option of choosing "no", "somewhat", or "yes". Participants were retained if they indicated either "somewhat" or "yes" for prior participation in sport because past participation has been shown to be a reliable correlate of current participation in a new physical activity program (Dishman, Sallis, & Orenstein, 1985).

**Perceived risk.** Participants responded to (modified from Rothman, Martino, Bedell, Detweiler, & Salovey, 1999): "Do you believe that regularly participating in sport is risky?" on a 7-point Likert scale item ranging from 1 (not at all) to 7 (extremely). Participants were excluded if they indicated either 6 or 7 (i.e., thought regular sport activity was highly risky) because some studies have demonstrated that individuals who believe a health behaviour is risky are less receptive to gain-framed messages (e.g., Bartels, Kelly, & Rothman, 2010).

## **Procedure**

After an initial screening phase during which participants completed instruments measuring sport stage of change, sport activity in youth, and perceived risk, participants were randomly assigned to either an experimental ( $n = 95$ ) or a control group ( $n = 87$ ). One week after the screening, individuals in both groups were sent an e-mail containing a link to access the online study. Those in the experimental group viewed a narrated Microsoft Office PowerPoint video (Microsoft Inc., U.S.A) which presented nine sport gain-framed messages (the video was approximately 3 minutes in length). The sport gain-framed messages presented to participants in the experimental group were based on nine highly rated involvement opportunities adults have

identified for participating in masters sport (Medic et al., 2005; Young & Medic, 2011; Young et al., 2011). Also, the content of these messages was developed in accordance with the standard guidelines for creating gain-framed health messages (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999). As a manipulation check (similar to McCall & Martin Ginis, 2004) to verify participants' attentiveness, immediately after viewing the video, experimental group participants were asked to describe (by typing) the main theme of two of the messages that appeared in the video. Participants in the control group completed a 13-item physical activity and sport quiz which contained multiple choice and true/false questions about sport and physical activity rates, obesity rates, and determinants of physical activity (similar to Murru & Martin Ginis, 2010). The control group participants did not perform a manipulation check.

Next, individuals in both groups were asked to indicate the degree to which their respective tasks caused them to think about a sport hoped-for possible self. Specifically, the possible self protocol began with the following preface:

Sometimes when people consider (*messages about sport/questions about physical activity and sport*), they are able to think about or see themselves in the future. In particular, people might think about the type of adult sport participant that they would one day like to become. Sometimes, after considering (*messages about sport/questions about physical activity and sport*), people are able to envision themselves in the future as an adult sportsperson and the kinds of experiences that might be in store for them.

In order to measure the degree to which participants believed a sport hoped-for possible self was activated, we asked experimental group participants: "Did you find that the messages about adult sport got you thinking about a future sport self that you would like to become?" We asked control group participants: "Did you find that the questions about physical activity and sport got

you thinking about a future sport self that you would like to become?" Participants responded on a 7-point Likert scale ranging from 1 (not at all) to 7 (very much).

All participants who acknowledged that a sport hoped-for possible self was activated (participants who indicated between 3 and 7 on the scale) were asked to describe this self in writing. Participants who chose 1 or 2 on the scale were excluded from this part of the study because we wanted to ensure that the possible self descriptions were mainly retrospective rather than generative in nature, allowing for the detection of possible selves that were truly activated as a result of exposure to the conditions (i.e., experimental and control). In this section of the study, experimental group participants were given the following instructions:

You have indicated that the messages about adult sport did prompt you to think about a future sport self that you would like to become. Please take a few minutes to reflect upon and describe this future self in the space below. Try to provide a detailed description of this future self that you have envisioned.

Control group participants received the same instructions; however, these individuals were asked instead to describe aspects of their future sport self that had been prompted by the *questions about physical activity and sport*.

Lastly, participants who had just described a future sport self then completed three Likert scale items designed to measure three possible self *self-regulatory submechanisms*—perceived importance of the possible self, perceived capability of achieving the possible self, and perceived discrepancy of the current self from the possible self (modified from Hooker, 1999). The experimental group responded to the following three items. Item 1 was: "How important is it to you to achieve the future self that the messages about adult sport got you thinking about?" (*importance*; scale ranged from 1 [not at all] to 7 [very important]). Item 2 was: "How capable

do you feel of achieving the future self that the messages about adult sport prompted you to think about?" (*capability*; scale ranged from 1 [not at all capable] to 7 [very capable]). Lastly, item 3 was: "To what extent does this future self describe you now?" (*discrepancy*; scale ranged from 1 [not at all] to 7 [very much]). Similarly, the control group answered questions that aimed to measure submechanisms associated with their possible self activated as a result of exposure to the questions in the physical activity and sport quiz.

## Results

### Preliminary Analyses

We conducted descriptive statistics for the experimental and control group for those who received their respective task following screening, and also for those individuals who remained after judging their own future possible self activation. Descriptive statistics were similar in both cases, so we only present data for those participants who acknowledged sufficient activation of a sport hoped-for possible self (i.e., indicated between 3-7 on the self-report scale) to proceed to the elaboration of possible selves protocol. It should be noted that six experimental group participants failed the manipulation check (i.e., they did not state at least one message that had been presented in the video) and were, therefore, excluded from these analyses. This resulted in an experimental group that was comprised of 29 males and 39 females with a mean age of 51.12 years ( $SD = 5.22$ ) representing each of the three sport stages of change (precontemplation: 34; contemplation: 13; preparation: 21). 26.5% and 73.5% of experimental group participants reported being 'somewhat' and 'yes' for whether they were active in sport during youth. On average, gain-framed group participants judged adult sport to be low-risk ( $M = 2.25$ ,  $SD = 1.33$ ). The control group consisted of 27 males and 38 females with a mean age of 50.29 ( $SD = 5.62$ ) representing each of the three sport stages of change (precontemplation: 30; contemplation: 23;

preparation: 12). 21.5% and 78.5% of control group participants reported being 'somewhat' and 'yes' for whether they were active in sport during youth. On average, control group participants judged adult sport to be low-risk ( $M = 2.05$ ,  $SD = 1.32$ ). Preliminary tests showed that both groups were equal on screening (sport stage of change, sport in youth, and perceived risk) and demographic (age and sex) variables, all  $ps \geq .07$ .

### **Sport Gain-framed Message Reception**

In order to examine reception of the messages that were presented in the sport gain-framed message video, data from the manipulation check were analyzed. As the dependent measure for message reception, we specifically examined the number of times each message was stated by experimental group participants. First, two raters independently examined 25 randomly selected participant responses (approximately 26% of the experimental group responses) to determine interrater reliability for the *number of messages* each participant stated (recall that participants were asked to state 2 of the messages that were presented in the video; however, many participants stated less or more than 2). Interrater reliability was also verified for the designated *theme/content in the first message* stated by each participant. Interrater reliability values for the number of messages each participant stated from the video (intraclass correlation coefficient = .89) and for the content of the first message stated by each participant (Cohen's kappa = .90) were good. All remaining coding was performed by the principal investigator.

The number of messages stated per person ranged from 0 to 6 ( $M = 2.62$ ,  $SD = 1.30$ ). Message reception was investigated in two stages: (i) the first message each participant stated, and (ii) the first and second messages stated combined. For the first message stated, a single chi-square goodness-of-fit test analyzed the number of times each message was stated according to the nine various themes. This test,  $\chi^2(8, N = 95) = 84.63$ ,  $p < .001$ , revealed that there was a

significant difference between expected and observed values in terms of the number of times each message was stated. Post-hoc tests (calculation of standardized residuals) were conducted for each message in order to establish which messages deviated from anticipated values. Standardized residuals (SRs) are similar to  $z$ -scores (the mean equals 0.00 and each standard deviation is  $\pm 1.00$ ) that signify deviations from an anticipated distribution. Positive SRs are indicative of overrepresentation and negative SRs indicate underrepresentation (Allen, Titsworth, & Hunt, 2009). As a guide, SRs were equivalent to  $p < .05$  when  $SR = \pm 1.96$ , were equivalent to  $p < .01$  when  $SR = \pm 2.58$ , and were equivalent to  $p < .001$  when  $SR = \pm 3.29$ . These tests showed that the *health and fitness* message ( $SR = 7.34$ ) was stated significantly more than what would be expected by chance. In contrast, the *physical skills* ( $SR = -2.83$ ), *excitement* ( $SR = -2.19$ ), and *travel* ( $SR = -2.83$ ) messages were all underrepresented.

A separate chi-square goodness-of-fit test was used to analyze the number of times each message was stated by participants with frequencies reflecting first and second messages stated combined. This test,  $\chi^2(8, N = 95) = 107.48$ ,  $p < .001$ , indicated that the *health and fitness* message was, again, overrepresented ( $SR = 7.07$ ). The *physical skills* ( $SR = -2.77$ ), *excitement* ( $SR = -2.54$ ), and *travel* ( $SR = -3.23$ ) messages were also underrepresented again. Lastly, the *achievement of competitive goals* ( $SR = -2.54$ ) message was also not stated at a level that would be expected by chance (see Figure 1 for frequency distributions and SRs for both chi-square tests).

*Insert Figure 1 here*

### **Self-Reported Sport Hoped-for Possible Self Activation**

As mentioned, six participants in the experimental group failed the manipulation check and were excluded from all additional analyses. Participant responses to the Likert-scale question

which measured self-reported sport hoped-for possible self activation were then analyzed using an independent *t*-test. This test,  $t(174) = .22, p = .83, \eta^2 < .001$ , showed that there were no differences between the experimental ( $M = 4.00, SD = 1.77$ ) and control ( $M = 3.94, SD = 1.75$ ) groups in terms of the level of self-reported activation.

### **Coded Sport Hoped-for Possible Self Activation**

Only participants who indicated between 3 and 7 on the self-reported sport hoped-for possible self activation scale were asked to further describe their sport hoped-for possible self. As a result, 68 individuals in the experimental group and 65 individuals in the control group further elaborated on the sport hoped-for possible self they acknowledged had been activated.

In order to verify that participants had described sport hoped-for possible selves, we qualitatively analyzed the descriptions. To ensure confidence in the content of our coded themes, two raters first independently labelled 25 randomly selected descriptions (approximately 19% of participant descriptions) as either a 'sport hoped-for possible self' or 'not a sport hoped-for possible self'. This interrater reliability analysis resulted in a Cohen's kappa = 1.00. The principal investigator then blindly labelled (i.e., the rater did not know the group to which each description belonged) all of the descriptions. A chi-square test of independence examining the between-group differences for sport hoped-for possible self activation was significant,  $\chi^2(1, N = 176) = 9.09, p = .003, \phi = .24$ . More specifically, 66.3% of individuals in the experimental group had described an activated sport hoped-for possible self, whereas only 42.5% of participants in the control group did so.<sup>1</sup>

### **Sport Hoped-for Possible Self Elaboration**

In order to investigate the degree to which participants elaborated on the sport hoped-for possible selves they had described, we examined the typed open-ended responses and coded



meaning units that made up the descriptions. According to Tesch (1990), a meaning unit is a segment of text composed of words, sentences, or entire paragraphs that convey the same idea and relate to the same topic. Therefore, by counting the number of meaning units present in each description, it was possible to determine how much each participant had elaborated. This was completed in two stages: (i) the number of meaning units per description was examined, and (ii) the number of *relevant* meaning units per description was also examined. A relevant meaning unit, for the purposes of this study, was defined as a meaning unit that related to one of the nine themes in the sport gain-framed messages.

Only descriptions that contained sport hoped-for possible selves, determined through the blind labelling of descriptions that had been completed in the preceding analysis, were included in these analyses. This resulted in sample sizes of 59 (experimental group) and 37 (control group). In order to carry out the analyses, two raters first independently examined 25 randomly selected descriptions (approximately 26% of participant descriptions) to verify interrater reliability for the number of meaning units in each description (intraclass correlation coefficient = .95). The principal investigator then coded all descriptions for number of meaning units. Next, two raters then independently categorized 89 randomly selected meaning units (approximately 22% of all meaning units) into the nine themes to establish interrater reliability for the categorization of relevant meaning units (Cohen's kappa = .81). Lastly, the principal investigator coded and categorized all of the meaning units.

An independent *t*-test was used to determine potential differences for the number of meaning units per description between groups. This test showed no differences between the experimental ( $M = 4.30$ ,  $SD = 2.69$ ) and control ( $M = 4.11$ ,  $SD = 2.47$ ) groups in terms of the number of meaning units per description,  $t(94) = .36$ ,  $p = .72$ ,  $\eta^2 = .001$ . Next, the number of

relevant meaning units per description was examined using an independent  $t$ -test. This test did demonstrate that the experimental group ( $M = 2.25$ ,  $SD = 1.98$ ) had significantly more relevant meaning units per description in comparison with the control group ( $M = 1.14$ ,  $SD = 1.53$ ),  $t(94) = 3.11$ ,  $p = .003$ ,  $\eta^2 = .09$ .

### **Sport Hoped-for Possible Self Themes**

In order to gain more insight with regard to the specific themes that had appeared in participants' sport hoped-for possible self descriptions, we compared the two groups in terms of whether the descriptions in each group contained relevant meaning units pertaining to each theme. Accordingly, nine separate chi-square tests of independence were conducted (one for each theme). Two of these nine tests resulted in significant group differences. Individuals in the experimental group (15.3%) were significantly more likely than control group individuals (0%) to list at least one meaning unit related to the *delay the effects of aging* theme,  $\chi^2(1, N = 96) = 4.56$ ,  $p = .03$ ,  $\phi = .26$ . Experimental group participants (39%) were also more likely than control group participants (16.2%) to list at least one meaning unit relating to the *to be with friends* theme,  $\chi^2(1, N = 96) = 4.56$ ,  $p = .03$ ,  $\phi = .24$  (see Table 1 for results for all nine comparisons).

*Insert Table 1 here*

### **Possible Self Submechanisms**

To compare the two groups in terms of possible self self-regulatory submechanisms, three one-way analyses of variance (ANOVAs) were conducted—one for each submechanism. The experimental group ( $M = 5.00$ ,  $SD = 1.35$ ) and control group ( $M = 5.35$ ,  $SD = 1.36$ ) did not differ in terms of how *important* they rated their sport hoped-for possible selves,  $F(1, 93) = 1.52$ ,  $p = .22$ ,  $\eta_p^2 = .02$ . For *capability*, there was no difference between the experimental ( $M = 4.98$ ,

$SD = 1.70$ ) and control group ( $M = 4.84$ ,  $SD = 1.56$ ),  $F(1, 94) = .18$ ,  $p = .68$ ,  $\eta_p^2 = .002$ . Lastly, experimental group participants ( $M = 4.25$ ,  $SD = 1.69$ ) did not find their sport-hoped for possible selves to be any more *discrepant* from their current selves than those in the control group ( $M = 4.51$ ,  $SD = 1.24$ ),  $F(1, 94) = .65$ ,  $p = .42$ ,  $\eta_p^2 = .007$ .<sup>2</sup>

## Discussion

### Message Reception

A main objective of this study was to investigate reception of sport gain-framed messages by the experimental group. This was achieved in two stages. First, we examined the number of times each message was initially stated first by participants. These results revealed that the second message presented in the video, the *health and fitness* message, was the only message stated more than what would be expected by chance. Also, the *physical skills*, *excitement*, and *travel* messages were all underrepresented. We also examined message reception by combining the data for the first and second messages stated by participants. Here we saw a similar trend; the *health and fitness* message was, once again, the most popularly recited message and the *physical skills*, *excitement*, and *travel* messages were also stated significantly less frequently by participants, as was the *achievement of competitive goals* message.

The fact that the *health and fitness* message was the only message stated at a very high frequency across the two stages of analyses is interesting. Briñol and Petty (2006) have argued that people may attend to messages that match important and enduring concerns. Therefore, middle aged adults, who participated in sport during youth but not currently in adulthood, may be preoccupied with health and fitness concerns at this stage of their lives. This is unsurprising as researchers investigating general physical activity participatory motives for older adults have consistently found that health and fitness concerns are a main reason why these individuals

participate in physical activity (e.g., Kolt, Driver, & Giles, 2004). It is also notable that individuals who were not currently involved in regular sport chose to state the *health and fitness* message more than the *enjoyment* message. The messages that were presented in the video were based on nine highly rated involvement opportunities that already active adults have indicated for participating in masters sport. The most important of those involvement opportunities, as indicated by masters athletes, is enjoyment (Medic et al., 2005; Young & Medic, 2011; Young et al., 2011). Our findings suggest that individuals who do not yet engage in sport on a regular basis may have different motivations for approaching sport than people who regularly participate in it (i.e., masters athletes). This is consistent with self-determination theory (Ryan & Deci, 2000), which asserts that people are more likely to sustain a behaviour over time (e.g., regular masters sport activity) when it is based on intrinsic motivation (autonomous and enjoyable) rather than extrinsic motivation or forms of controlled motivation such as the desire to please others. The participants in the current study were not engaged in regular sport activity; therefore, they may have been more attentive to the health and fitness message due to an introjected motivational regulation (i.e., feelings of guilt driving their motivation; Ryan & Deci), arising from prevailing perceived external pressures (e.g., pressure from a spouse to get in shape and be more healthy). Our sample can be considered a cohort of potential adult sport initiates, and Rothman (2000) has suggested that the decision to initiate a new behaviour is predicated on obtaining desirable future outcomes. Therefore, the outcomes emphasized in our health and fitness message (e.g., expecting increases in strength due to regular sport participation) may have been attractive to this particular sample, especially if they were extrinsically motivated to engage in sport. Messages that emphasize expected outcomes may be less effective for people who have already made a habit of

performing a behaviour because they are less sensitive to fluctuations in the outcomes afforded by the behaviour, and their behaviour tends to sustain itself (Rothman, Baldwin, & Hertel, 2004).

With regard to the messages that were underrepresented (i.e., physical skills, excitement, travel, and achievement of competitive goals), it is possible that the cohort tested was simply uninterested in these potential adult sport involvement opportunities. Although some research on participatory motives shows that current adult sportspersons engage in sport to achievement competitive goals (e.g., Gill, Williams, Dowd, Beaudoin, & Martin, 2006), for example, it is possible that adults contemplating sport involvement do not yet find these aspects of sport to be attractive. If this is the case, then these results intimate that organizations choosing to use messaging interventions to recruit people to adult sport need not emphasize these themes, because they are not salient and may be unimportant. Another possibility is that the *health and fitness* message may have been so salient that it may have eclipsed the other messages in the minds of participants. This potential issue could be addressed in future research by simply adding a second experimental group that would also receive gain-framed messages; however, this group would be exposed to all of the messages *except* the health and fitness message. Using this method, it may be possible to see if the results change when health and fitness is not emphasized.

### **Possible Self Activation**

Another goal of this study was to investigate the effects of sport gain-framed messages on sport hoped-for possible selves. More specifically, we were interested in whether exposure to messages that emphasized potential benefits of adult sport participation would cause individuals to imagine themselves as future sportspersons they would like to one day become. This was examined in two phases. First, self-reported activation was inspected. Self-reported responses

demonstrated that there were no differences between the experimental and control groups. Second, in order to assess whether participants had described sport hoped-for possible selves, possible self descriptions were coded qualitatively by investigators. This analysis showed that, consistent with our prediction, more individuals in the experimental group had described a sport hoped-for possible self in comparison to those in the control group. The fact that this study was the first to show that gain-framed messages can activate aspects of hoped-for possible selves is significant. Because it is believed that people experience approach motivation when in possession of a hoped-for possible self (i.e., motivation to approach and attain the self; Hoyle & Sherrill, 2006), this means that the cognitive processes that occur when people consider gain-framed messages are also very likely a result of activation of the approach motivational system (Gray, 1990), providing indirect support for the congruency hypothesis (i.e., gain-framed messages being more persuasive for approach-oriented individuals; Mann et al., 2004).

The discrepancy in results between our self-reported and qualitative activation analyses is noteworthy. Past studies have traditionally used qualitative methods (see Cross & Markus, 1991) to assess activation. In many studies, investigators used an open-ended format whereby participants were asked to list one or more of their most important hoped-for (and feared) possible selves and investigators subsequently qualitatively coded and labelled these descriptions according to content categories (e.g., occupation oriented self) that had been decided upon before the study. Other researcher, however, (e.g., Murru & Martin Ginis, 2010; Ouellette et al., 2005) have prompted participants to generate and consider possible selves in a specific domain (e.g., exercise) and then qualitatively coded participants' responses to follow-up image generation questions (e.g., asking about the energy level of the image) for valence (i.e., positive or negative) as a manipulation check for hoped-for (and feared) possible self condition exposure. In the

current study, we used both measures of quantitative self-reported activation and questions prompting possible self description in order to capture retrospective (i.e., did the gain-framed messages cause you to consider a future possible self, what aspects of your possible self did the gain-framed messages encourage you to consider?) rather than generative activation—using this approach, the results from this study offer further support for the use of qualitative (and not quantitative) methods for assessing possible self content.

### **Possible Self Elaboration**

The next objective of the present study was to examine the degree to which participants elaborated on the sport hoped-for possible selves they had described. There was no difference between the experimental and control group in terms of the number of meaning units per participant description. Further analysis, however, did reveal a significant difference between conditions, with the experimental group reporting more meaning units relating to at least one of the nine themes featured in the video. These results suggest that participants in both groups had provided similar amounts of volume in their possible self descriptions. However, individuals in the experimental group, on average, offered approximately twice the amount of relevant meaning units (i.e., meaning units relevant to established adult sport involvement opportunities) in their possible self descriptions than did participants in the control group. This suggests that the video may have caused experimental group participants to have much more elaborate and complex hoped-for possible selves related to adult sport than the sport hoped-for possible selves people would typically experience without having being exposed to sport gain-framed messages. This evidence of elaboration, especially with respect to relevant involvement opportunities that can be affiliated with a future sport self, is very important because other studies have shown elaboration to be positively related to cognitive and behavioural health outcomes (e.g., King & Raspin, 2004;

Oyserman et al., 2004). Therefore, the more elaborated possible selves that the experimental group described may prove to be more motivating than the selves described by participants in the control group.

### **Possible Self Themes**

The next goal of this study was to explore the thematic content that had emerged in the sport hoped-for possible self descriptions. The purpose of these analyses was to explore the sport-themed nature of the elaboration present in the possible self descriptions. Results revealed two main differences between the groups. First, more individuals in the experimental group listed at least one meaning unit that was related to the *delay the effects of aging* theme. Also, more experimental group participants mentioned at least one meaning unit relating to the *to be with friends* theme. These results suggest that exposure to the sport gain-framed message video may have caused experimental group participants to imagine themselves in the future participating in sport appearing youthful, mentally and/or physically. The video also may have caused these participants to see themselves participating in sport with other likeminded individuals. This provides some insight into the most frequent goals that the sport gain-framed messages may have caused experimental group participants to incorporate into their self-concepts. It is also noteworthy that these two themes were the seventh and ninth themes presented to participants in the video, suggesting that a recency effect (Kaufman & Deese, 1957) may have occurred. That is, participants may have included these themes in their possible self descriptions because these themes were presented last, making them easier to remember. However, this possibility seems unlikely because one would expect to have seen a similar pattern of results from the manipulation check, yet this was not the case. Regardless, future research



might examine the potential for primacy (i.e., remembering the first stimuli) and recency effects in messaging interventions.

It is also interesting that the *health and fitness* message was the only message from the video that was stated by the experimental group at a level greater than what would be expected by chance in the manipulation check, yet there was no significant difference between the experimental and control group in terms of elaborated meaning units relating to the *health and fitness* theme. Although there were trends showing that individuals in the experimental group were more likely to articulate health and fitness, there are possible explanations for this non-significant group difference ( $p = .15$ ). First, experimental group participants may not have described more possible selves associated with health and fitness because they had already articulated this theme in the manipulation check portion of the study, which may have inadvertently reduced the frequency of health and fitness mentions in possible self descriptions. Another potential reason might have been that health and fitness is simply a highly salient issue for adults in this demographic in general. This may explain why high percentages of people in both groups ended up including at least one meaning unit relating to this theme. Finally, although the health and fitness theme may have been initially perceived as being attractive to those who viewed the gain-framed video, further contemplation of the emphasized themes may have caused experimental group participants to incorporate different themes in their future goals. Future research would be needed to find out whether messages stated after message exposure or themes articulated in elicited possible selves are more predictive in terms of causing cognitive or behavioural change as a result of exposure to a messaging intervention.

### **Possible Self Submechanisms**

The final objective of this investigation was to examine the *importance*, *capability*, and

*discrepancy* self-regulatory submechanisms associated with participants' sport hoped-for possible selves. The results revealed no significant differences between the groups in terms of how important they felt their possible selves were and how capable they felt they were in terms of their ability to achieve their possible selves. There were also no differences in terms of how discrepant participants thought their possible selves were from their current selves. This suggests that although the sport gain-framed messages elicited more sport hoped-for possible selves (and caused participants to elaborate more on those selves) than a physical activity and sport quiz, the messages may not have caused participants to rate their possible selves to be more important, think they were more capable of achieving their possible selves, or believe their possible self was any more or less discrepant from their current self. Alternatively, our single-item measures for each of the submechanisms may not have been an adequate approach to capturing true effects, or un-assessed individual differences may have resulted in the null effects. For example, how people are able to imagine into the future (Eccles & Wigfield, 2002), and 'future time perspective' (Oyserman & James, 2009) can influence the way in which possible selves motivate action.

### **Future Directions and Limitations**

In terms of the activation of possible selves, the fact that this study was the first to show that gain-framed messages can activate aspects of hoped-for possible selves is significant. This suggests that the cognitive processes that occur when people consider gain-framed messages (e.g., elicitation of related hoped-for possible selves) are likely a result of activation of the approach motivational system (Gray, 1990). At the very least, this study tells us that indices of possible self activation and elaboration can be used to judge the efficacy and fidelity with which gain-framed messages are received.

The evidence of possible self activation and elaboration demonstrated in this study as a result of exposure to gain-framed messaging are important findings because it is possible that these aspects of hoped-for possible selves may mediate the relationship between gain-framed messages and health behaviours. Several researchers (e.g., Gallagher & Updegraff, 2012; Rothman & Updegraff, 2010) have specifically emphasized the need to examine potential causal variables that may be influenced by framed health messages. Future research should build on the results of this study and examine the potential mediational influence of hoped-for possible selves in the relationship between gain-framed messages and different outcomes, such as intentions, attitudes, and actual behaviour. Furthermore, activation of feared possible selves as a result of exposure to loss-framed messaging could also be investigated as both concepts have been linked to the avoidance motivational system (e.g., Hoyle & Sherrill, 2006; Mann et al., 2004).

In terms of methodology, prior research has employed qualitative coding as a manipulation check (i.e., counting the number of stated messages, irrespective of which message) to compare gain- and loss-framed conditions to verify equal attentiveness and message processing equivalency (e.g., McCall & Martin Ginis, 2004). The current approach was novel because qualitative analyses were used in a manipulation check to verify experimental participants' attention to *individual* messages. The examination of message salience is an important objective because knowing what content is most important or personally relevant to specific samples of individuals for specific health behaviours may allow researchers and practitioners to better tailor messages in order to maximize the effects of those messages (Rothman et al., 2006). Therefore, we encourage messaging researchers to also include measures of message salience focused on domain-specific message themes in future studies whenever practical.

To the best of our knowledge, our use of relevant meaning units was a novel way of measuring possible self elaboration. This method is possibly one of the most rigorous to date because our technique involved two layers of qualitative coding, in addition to the final quantitative analysis used to ultimately compare the groups. That is, coders were first required to establish reliability for the number of meaning units in each description before they were permitted to establish reliability for the categorization of relevant meaning units. The use of relevant meaning units also allowed us to learn more about the themes that had emerged in participants' possible selves. Furthermore, our analyses of relevant meaning units allowed us to demonstrate greater elaboration by the experimental group for two of the specific themes that had been conveyed in the brief gain-framed online video intervention—this attests to the fidelity of our sport gain-framed messages in activating and elaborating these two aspects of a future sport hoped-for self. For these reasons, we recommend that researchers consider using relevant meaning units (when the a priori coding categories are grounded in empirical research) in future possible self studies in cases where the study of elaboration and thematic content is of interest.

Although the present study was fruitful, some limitations do exist. First, the sample used in this study was very specific. The sample homogeneity limits the generalizability of the findings to the broader population. Second, future time perspective was not assessed. Researchers have suggested that this variable may influence the way in which possible selves are viewed (Oyserman & James, 2009). Thus, future time perspective may be an important moderator and should be considered in future studies. Third, the messages that appeared in the gain-framed message video were not randomized. That is, all participants saw the messages in exactly the same order. This may have increased the risk for primacy and recency effects. Future messaging researchers may want to consider randomizing their messages (i.e., each participant

sees the messages in a different order) in order to protect against this potential issue. Or, alternatively, message order may be manipulated as an independent variable to see if primacy and recency effects effect the efficacy of messaging interventions. Lastly, we could not rule out the possibility in the current investigation that aspects of feared possible selves were in play, especially with respect to content pertaining to delaying the effects of aging. Nowadays, middle aged and older adults ascribe to social norms that strongly encourage them to remain active, healthy, and 'young' more than ever before (e.g., Biggs, Phillipson, Money, & Leach, 2006). These norms may be a sort of external pressure that causes adults between the ages of 40 and 59 years to develop a fear of losing youthfulness and to be particularly sensitive to messages that activate such fears. Due to the potency of such a fear for this age-cohort, i.e., of losing youthfulness, it is plausible that messages designed to be gain-framed may be interpreted in a fearful loss-framed manner, perhaps prompting people in the Baby Boomer demographic to experience feared possible selves in addition to hoped-for possible selves. Although messages about age and youthfulness in the current investigation were based on guidelines for constructing gain-framed messages (Detweiler et al., 1999), we cannot rule out the possibility that aspects of feared-selves were activated and had influence; future research should investigate this possibility.

## **Conclusion**

This randomized controlled trial showed that a one-time exposure to a short online gain-framed video intervention that highlighted potential opportunities or benefits associated with adult sport participation can promote greater levels of activation and elaboration of related hoped-for possible selves compared to a control group. These effects on activation and elaboration were evident based on participants' responses to questions about hoped-for possible

selves immediately following the gain-framed messages or a control task. This study also demonstrated that certain involvement opportunities related to adult sport (i.e., health and fitness, delaying the effects of aging, and social opportunities) are particularly important to include in sport gain-framed messages. In particular, from a practical perspective, this preliminary evidence from our targeted cohort suggests that it may be wise for sport organizers, interested in attracting 40-59 year-old adults who were active in sport in youth and who have since quit and not returned on a regular basis, to highlight these three select involvement opportunities in gain-framed advertisements to potentially attract the maximal amount of participants to their programs.

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## Footnotes

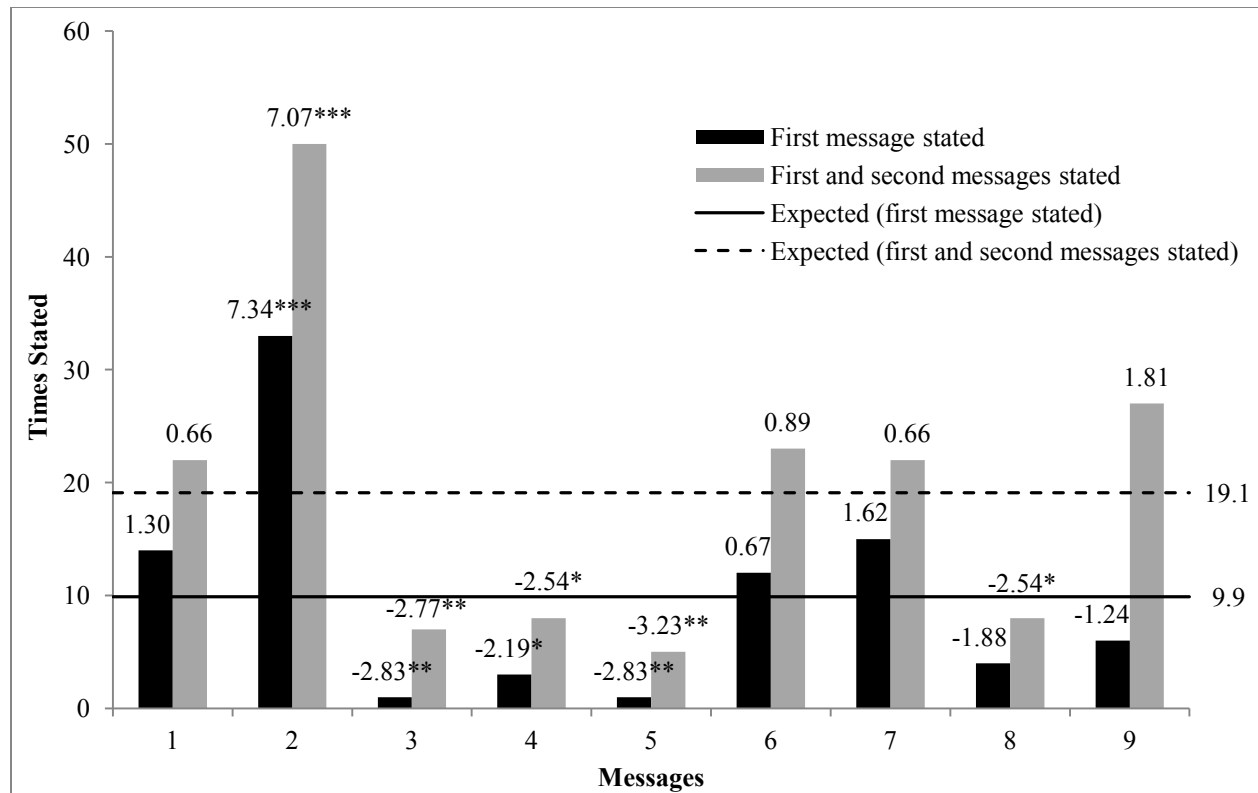
<sup>1</sup>Participants who answered 1 or 2 on the prior Likert-scale regarding activation were scored as 'not a sport hoped-for possible self' category in the coded activation analysis.

<sup>2</sup> Similar results were obtained when self-reported activation scores were included as a covariate in three separate analyses of covariance (ANCOVAs) for importance, capability, and discrepancy.

Table 1.

*Results for Between-group Analyses of Relevant Meaning Units*

| Message Themes                   | $\chi^2$ | $p$  | Experimental     | Control          |
|----------------------------------|----------|------|------------------|------------------|
|                                  |          |      | Participants     | Participants     |
|                                  |          |      | Listing Relevant | Listing Relevant |
|                                  |          |      | Meaning Unit (%) | Meaning Unit (%) |
| Enjoyment                        | .39      | .53  | 23.7             | 16.2             |
| To improve health<br>and fitness | 2.12     | .15  | 52.5             | 35.1             |
| To improve<br>physical skills    | .00      | 1.00 | 1.7              | 0.0              |
| To do something<br>exciting      | .63      | .43  | 5.1              | 0.0              |
| To travel                        | .63      | .43  | 5.1              | 0.0              |
| To relieve stress                | .00      | 1.00 | 11.9             | 10.8             |
| To delay the<br>effects of aging | 4.56     | .03  | 15.3             | 0.0              |
| To achieve<br>competitive goals  | .14      | .71  | 18.6             | 13.5             |
| To be with friends               | 4.56     | .03  | 39.0             | 16.2             |



*Figure 1.* Observed values for the number of times each gain-framed message was stated by experimental group participants in the manipulation check protocol. Standardized residuals are above bars. Gain-framed messages are in chronological order in the order that they appeared in the video: 1 = enjoyment; 2 = health and fitness; 3 = physical skills; 4 = excitement; 5 = travel; 6 = relieve stress; 7 = delay aging; 8 = competitive goals; 9 = be with friends.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



The Effects of an Expanded Gain-Framed Message Intervention on Sport Intention and Activity  
Levels in Middle Aged Adults

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### Abstract

Gain-framed messages (Rothman & Salovey, 1997) emphasizing potential benefits of adult sport represent one possible means to get adults physically active. This randomized controlled trial investigated the effects of an online sport gain-framed message video and sport possible self protocol (e.g., Murru & Martin Ginis, 2010) on indices of sport intention and activity. 244 adults ( $M\ Age = 50.59$ ,  $rge = 40-59\ yrs$ ,  $SD = 5.39$ ) completed baseline measures (T1) before delivery of an experimental/control intervention one week later (T2), and follow-up measures four weeks post-intervention (T3). Participants watched either a gain-framed video describing beneficial involvement opportunities in adult sport (experimental) or completed a physical activity and sport quiz (control), before completing a sport possible self protocol. Dependent measures related to sport intentions and weekly sport activity. Results showed that the experimental group requested more newsletters informing them of adult sport ( $p = .03$ ) immediately after T2, and were more likely to have registered for sport programs at T3 ( $p = .03$ ). Although results failed to show a group by time interaction for weekly sport activity, there was a three-way interaction ( $p = .06$ ) between group and time for change in sport intentions, that depended on whether participants were high/low on the BAS Drive measure for approach motivation (Carver & White, 1994). Specifically, the gain-framed condition facilitated higher intentions for persons with low BAS Drive, whereas control condition exposure caused improved intentions for persons with high BAS Drive,  $ps \leq .001$ .

*Keywords:* middle aged adults, sport, message framing, intention, approach motivation

## The Effects of a Gain-Framed Message Intervention on Sport Intention and Activity in Middle Aged Adults

Given the overwhelming amount of evidence that physical inactivity leads to many chronic degenerative conditions and co-morbidities, the promotion of a lifestyle that includes regular physical activity is an important public health objective (Katzmarzyk, Gledhill, & Shephard, 2000). The potential benefits associated with regular physical activity are especially important in older, aging populations because, although deteriorative aging effects are inevitable, research has shown that physical inactivity exacerbates age-related decline (Bortz, 1982); alternatively, maintained physical activity is viewed as a conduit to assure benefits associated with successful aging (Chodzko-Zajko, Schwingel, & Park, 2009). However, only 15.1% of men and 14.1% of women aged 40-59 are meeting the Canadian Physical Activity Guidelines (Colley et al., 2011). Therefore, it is important to develop interventions that help to increase physical activity in order maximize benefits and slow aging effects in older populations.

Sport is one potential vehicle for getting more adults to reach physical activity recommendations. It is defined as "a subset of exercise that can be undertaken individually or as part of a team. Participants adhere to a common set of rules or expectations, and a defined goal exists" (Khan et al., 2012, pp. 59-60), and it involves an inherent degree of competition. Organized sport is a veritable alternative to traditional compartmentalized exercise in terms of the amount of opportunities it may offer (e.g., regular competition against others), while still providing many of the same health benefits (Baker, Fraser-Thomas, Dionigi, & Horton, 2010; Rudman, 1986). The heterogeneity of involvement opportunities that sport offers may make it an attractive option for those contemplating engaging in physical activity who are seeking an experience other than typical exercise (Young & Medic, 2011). Yet, sport participation remains

underutilized as a conduit toward healthy aging as data show participation drops at successive cross-sectional age cohorts in the general population (Canadian Fitness and Lifestyle Research Institute, 2010). One challenge for promoting lifelong sport is re-engaging people who may have participated in sport earlier in their lives, but do not presently. Middle aged adults who were once involved in sport in youth may be a ripe population to target for intervention because past participation has been shown to be a reliable correlate of current participation in a new physical activity program (Dishman, Sallis, & Orenstein, 1985). Cross-sectional surveys of participation by age of registrations at masters sport events indicate increasing rates of participation in the late 30s, but this increase becomes particularly pronounced in the 40-44 and 45-49 yr-old age brackets, with participation peaking between ages 50-59 years (Harada, 1994; Young, 2009). To increase the critical mass of participants in age groups leading up to peak participation in adult sport (i.e., 40-59 years old), informational approaches may be an attractive strategy. In the present study, we examine whether an informational intervention promoting sport encourages the re-engagement of adults (who were formerly active in youth sport but whom have since quit) in adult sport.

### **Message Framing**

Motivated by the goal to increase the frequency with which people engage in health behaviours, such as physical activity, researchers have worked to develop persuasive communication strategies (Rothman, Bartels, Wlaschin, & Salovey, 2006; Rothman & Salovey, 1997; Rothman & Updegraff, 2010; Rothman, Wlaschin, Bartels, Latimer, & Salovey, 2008). One communication strategy that has received considerable research attention as a plausible intervention approach is message framing. Message framing is the process of manipulating how information in a message is strategically presented in order to affect people's behavioural

decisions (Rothman & Salovey). These messages can be framed to emphasize benefits that may result from performing a behaviour (gain-framed messages) or costs that may result from failing to engage in a behaviour (loss-framed messages). Message framing is founded in prospect theory (Tversky & Kahneman, 1981), which proposes that when potential gains of performing a behaviour are emphasized and the behaviour is perceived to be non-risky, people are likely to engage in the behaviour. When potential losses of not performing a behaviour are highlighted and the behaviour is perceived to be risky, people are likely to take part in the behaviour.

Rothman and Salovey applied this logic to how people might react to framed health messages, suggesting that gain-framed messages should be more effective in promoting illness prevention behaviours (e.g., physical activity) because they may not be perceived as risky (i.e., it is actually more risky to not engage in these behaviours) whereas loss-framed messages should be more effective in promoting illness detection behaviours (e.g., mammography screening) because they may be perceived as risky (i.e., involve a higher degree of risk because of the possibility that a serious illness might be discovered). The current investigation was specifically interested in examining how gain-framed messaging might promote, or encourage more adults to approach, regular sport activity.

### **Message Framing and Physical Activity**

Although not yet tested, extant literature suggests that a prospective gain-framed messaging intervention relating to sport may have great value. A recent meta-analysis performed by Gallagher and Updegraff (2012) showed that gain-framed messages have been significantly more effective than loss-framed messages at increasing general physical activity levels, thus, confirming Rothman and Salovey's (1997) original predictions regarding the effects of gain-framed messages on illness prevention behaviours. In the physical activity context, gain-framed

messages have had positive effects on both intentions to do physical activity (Gray & Harrington, 2011; Robberson & Rogers, 1988; van't Riet, Ruiter, Werrij, & de Vries, 2010) and measures of physical activity. Latimer, Rench, et al (2008) and Parrott, Tennant, Olejnik, and Poudevigne (2008) found gain-framed messages to produce significantly higher intentions and greater amounts of physical activity than loss-framed messages. McCall and Martin Ginis (2004) found gain-framed messages to generate significantly more physical activity than a no-message control condition. Kozak, Nguyen, Yanos, and Fought (2013) also found gain-framed messages to cause overweight/obese individuals to engage in significantly more fitness centre use, cardiovascular activity, and strength training exercises at post-testing. Jones, Sinclair, and Courneya (2003) showed that gain-framed messages elicited more physical activity intentions and physical activity than loss-framed messages, especially when messages originated from a credible source (e.g., a doctor). Lastly, Latimer, Rivers et al. (2008) found a significant interaction between message type and regulatory focus. Specifically, the interaction revealed that physical activity was significantly increased when promotion-focused individuals (i.e., those motivated to ensure the presence of positive outcomes) received messages that were also promotion-focused, or gain-framed.

Overall, although some studies have found no significant differences between gain- and loss-framed messages in terms of effects on physical activity and physical activity intentions (e.g., Jones, Sinclair, Rhodes, & Courneya, 2004), to the best of our knowledge, no study has demonstrated a significant loss-framed advantage over gain-framed messages on any comparison in which physical activity or physical intentions were assessed. For this reason, in the present study, we elected to present only gain-framed messages to the experimental condition. This notion regarding the superiority of gain-framed messages in the physical activity domain is

consistent with conclusions drawn by Latimer, Brawley, and Bassett (2010), who also reviewed the literature and cautiously recommended the use of gain-framed messages in physical activity guidelines. That said, the effects of gain-framed messages on sport activity and sport intentions remains to be tested. Therefore, in the present study, we employed an intervention that positively framed the beneficial involvement opportunities that adults may experience if they were to re-engage in sport. These gain-framed messages were informed from research on the involvement opportunities that presently active sportspersons value in their adult sport experiences (Medic, Starkes, Young, Weir, & Giajnorio, 2005; Young & Medic, 2011; Young, Starkes, & Medic, 2011).

### **Gain-Framed Messages and Possible Selves**

The current study was conducted to assess the efficacy of an expanded gain-framed messaging intervention based on its effects on intentions to do adult sport and sport behavior over time. It is important to note that the messaging intervention was expanded in that it was accompanied by a possible self protocol, which was presented immediately following the presentation of gain-framed information.

Possible selves are representations that people hold of the self in the future. People can see themselves as individuals they would like to one day become (hoped-for possible selves) or as individuals they are afraid of becoming (feared possible selves). Possible selves can motivate behaviour change by acting as self-images to be approached or avoided (Erikson, 2007; Markus & Nurius, 1986). When individuals who hold future self-concepts of whom they would like to become that are discrepant from current views of the self, they become motivated to resolve this discrepancy by engaging in behaviours oriented toward the desired future state (Carver & Scheier, 1982; Hoyle & Sherrill, 2006). In this research, we paired a protocol that asked

participants to consider gain-framed messages and how the gain-framed messages related to future hoped-for possible sport selves. The pairing of gain-framed messaging with a possible self protocol is conceptually sound because processes associated with both gain-framed messaging (for health promotion reasons) and with hoped-for possible selves may rely on features of approach motivation.

According to Gray (1990), two motivational systems guide behaviour and affect: a behavioural activation or approach system (BAS) and a behavioural inhibition or avoidance system (BIS). A highly active BAS can cause people to be receptive to signals of reward and nonpunishment. In the messaging field, Mann, Sherman, and Updegraff (2004) proposed a theory known as the 'congruency hypothesis', which states that approach-oriented individuals should be better persuaded to engage in health behaviours by gain-framed messages; empirical findings have proven this hypothesis to be accurate in generating health behaviour change (e.g., Gerend & Shepherd, 2012; Mann et al.; Sherman, Mann, & Updegraff, 2006). This suggests that gain-framed appeals somehow tap into the approach motivational system. Hoped-for possible selves may work in a similar fashion: hoped for possible selves are goals (Hooker, 1999), and when discrepancies exist between a hoped-for possible self and one's present self, people may experience motivation to approach these selves in order to narrow these discrepancies (Hoyle & Sherrill, 2006). In sum, the expansion of the gain-framed intervention to include a possible self protocol is conceptually sound because of these parallels in approach motivation. Elsewhere (see Study 1, this thesis), preliminary analyses indicated that sport gain-framed messages indeed serve to activate and elaborate aspects of future sport selves (also see Murru & Martin Ginis, 2010). In light of this, we proposed that a gain-framed messaging intervention expanded to



include a possible self protocol would cause increases in intentions and actual sport behavior in the adult sport context.

Moreover, it is reasonable to assume that different levels of approach motivation may affect the way in which gain-framed messages are received and translated into behaviour change. Emerging research suggests that individual differences in how people appraise framed stimuli should be examined as potential moderators (Rothman & Updegraff, 2010), especially for understanding why gain-framed messages do or do not perform as expected (Latimer, Salovey, & Rothman, 2007). One possible individual difference variable, advocated by messaging researchers to explain variability in the way in which gain-framed messages are received is approach motivation.

### **Study Overview and Hypotheses**

This was a randomized controlled trial that investigated the effects of an expanded online sport gain-framed message intervention on indices of sport activity and intention over time. We hypothesized that (a) participants exposed to the expanded gain-framed message intervention would report greater sport activity levels than participants who completed an expanded control task (wherein the control task was also accompanied by a possible self protocol), and (b) participants in the gain-framed intervention would report greater intentions to participate in sport than participants in the control condition. Furthermore, we posited that c) participants in the gain-framed intervention would be more likely to seek out information about adult sport programming (newsletters), and (d) would also register for sport programs than participants in the control condition. Although procedures relating to the possible self protocol are disclosed in this article, readers interested in specific results pertaining to the degree of activation and elaboration of future possible selves are invited to read Study 1, this thesis.

## Methodology

### Participants

600 prospective participants between the ages of 40 and 59 were initially recruited from youth sporting events (adult spectators were recruited) and via web-based advertisements to begin the initial phase of an online screening survey. Participants voluntarily completed the study with the knowledge that six people would be chosen to win \$50 cash prizes from a draw for their participation in the study. All participants provided informed consent and the entire protocol was approved by the host institution's research ethics board. Of the initial 600 people who began the screening survey, 244 (103 male, 141 female;  $M$  age = 50.59,  $SD$  = 5.39 yrs) of these individuals met the following inclusion criteria and were invited to subsequently continue in the study: (i) between the ages of 40 and 59, (ii) currently healthy enough to regularly participate in physical activity, (iii) in one of the first three stages of motivational readiness for change (Prochaska, DiClemente, & Norcross, 1992) in sport activity, (iv) at least somewhat regularly active in sport before the age of 20, and (v) did not personally perceive regular sport activity to be risky. Participants who met inclusion criteria also answered subsequent questions pertaining to possible covariates in the present experiment, including age-related cognitions, attitude toward sport participation, and levels of approach motivation. Measures pertaining to these inclusion criteria and possible covariates are presented next.

### Screening Measures

**Current health.** Participants answered the question: "Are you currently healthy enough to regularly participate in physical activity?" Participants choose either "yes" or "no". Participants who chose "no" were excluded from the study.

**Stages of motivational readiness for change.** A modified version of the stages-of-change questionnaire (Marcus, Rossi, Selby, Niaura, & Abrams, 1992) measured current sport stage of change. This measure has shown good test-retest reliability over a two-week period (Marcus, Selby, Niaura, & Rossi, 1992), and it has also been related to measures of actual physical activity (Marcus & Simkin, 1993). We retained participants in the first three stages (i.e., precontemplation, contemplation, preparation; Prochaska et al., 1992) because individuals in these stages are not involved in sport, or are irregularly involved in sport at best.

**Sport activity in youth.** Participants answered the following question: "At any point before you reached 20 years old, did you regularly participate in sport (outside of gym class)?" Participants had the option of choosing "no", "somewhat", or "yes". We retained participants in our sample who indicated either "somewhat" or "yes" for prior participation in sport.

**Perceived risk of participating in sport.** Participants responded to the question (similar to Rothman, Martino, Bedell, Detweiler, & Salovey, 1999): "Do you believe that regularly participating in sport is risky?" on a 7-point Likert scale item ranging from 1 (not at all) to 7 (extremely). We excluded participants who indicated either 6 or 7 (i.e., thought regular sport activity was highly risky) because past messaging research indicates that individuals who believe a health behaviour is risky are less receptive to gain-framed messages (e.g., Bartels, Kelly, & Rothman, 2010).

### **Potential Covariate Measures**

**Aging-related cognitions.** We assessed baseline measures for age-related cognitions because the literature has shown that individuals with more negative self-perceptions of aging (e.g., thinking things keep getting worse as they get older) tend to practice less preventive health behaviors over the long-term than those with more positive self-perceptions (Levy & Myers,

2004). Furthermore, with regard to physical activity, Sarkisian, Prohaska, Wong, Hirsch, and Mangione (2005) demonstrated that low expectations regarding aging are independently associated with low physical activity levels. Therefore, in consideration of the potentially constraining influence of aging self-perceptions on the effects of sport gain-framed messages, the current study included measures of aging-related cognitions that were investigated as potential covariates in analyses. Participant responses to the Aging Cognitive Physical Losses and the Aging Cognitive Ongoing Development subscales of the *AgeCog* (Wurm, Tesch-Romer, & Tomasik, 2007) were used to measure views on aging. The AgeCog Physical Losses scale examined views regarding the physical losses one incurs as he/she ages and consists of four items (4-point Likert scale ranging from 1 [definitely true] to 4 [definitely false]; 1 item was removed due to an error in the questionnaire, thus 3 items were used in analyses). The four item AgeCog Ongoing Development scale (4-point Likert scale ranging from 1 [definitely true] to 4 [definitely false]) assessed the degree to which participants believe aging is a time of ongoing personal development. Both subscales have been shown to be significant predictors for the health of middle-aged as well as older adults, even after controlling for established demographic, socioeconomic, and psychological indicators (Wurm, 2006; as cited by Wurm et al., 2007). Cronbach alpha values for the AgeCog Physical Losses and AgeCog Ongoing Development subscales for the current study were .76 and .51, respectively.

**Sport attitude.** We assessed baseline attitudes toward sport because research shows that individuals with positive beliefs about an issue (e.g., the importance of sport activity) respond differently to persuasive messages pertaining to the issue than do people with negative beliefs (Zimbardo & Leippe, 1991). Participants responded to four Likert scale statements on a 9-point Likert scale ranging from 1 (not at all) to 9 (extremely; modified from Rothman et al., 1999). An

example of an item is: "Regular participation in sport is important". The Cronbach alpha value for sport attitude for this study was .90.

**Approach motivation.** Level of approach motivation was measured because, as stated earlier, past messaging studies have found a relationship between approach-orientation and gain-framed messaging (e.g., Mann et al., 2004). Approach motivation was measured using the 13 items from the BAS portion of the BIS/BAS scale (Carver & White, 1994). Five items specifically addressed Reward Responsiveness (measures positive responses to the occurrences or anticipation of reward), including items such as "When I'm doing well at something I love to keep at it". Four items pertained to Drive (measures the persistent pursuit of desired goals), including "I go out of my way to get things I want". Four items related to Fun Seeking (measures both a desire for new rewards and a willingness to approach a potentially rewarding event on the spur of the moment), exemplified by "I'm always willing to try something new if I think it will be fun". Responses were on a 4-point Likert scale ranging from 1 (very true for me) to 4 (very false for me). The subscales of the BAS have previously shown acceptable test-retest reliability, and also convergent and discriminant validity (Carver & White). Cronbach alpha values for the Reward Responsiveness, Drive, and Fun Seeking subscales for the current study were .78, .88, and .79, respectively.

## **Procedure**

This section describes the experimental procedure across three time points. Outcome measures have been italicized, and several of these outcomes are discussed in further detail in a later section.

**Time 1.** Interested participants accessed the first online questionnaire and completed the screening and potential covariate measures outlined earlier. All participants who met inclusion

criteria also completed baseline questions at the same time pertaining to two outcome measures: *intentions to participate in sport* and *current weekly sport activity*. Next, they were randomly assigned to either an experimental or control group.

**Time 2.** One week later, participants were sent an e-mail containing one of two links to access a second online questionnaire pertaining to their condition. Those in the experimental group viewed a narrated Microsoft Office PowerPoint (Microsoft Inc., U.S.A) video of approximately three minutes which presented nine sport gain-framed messages. The sport gain-framed messages presented to participants in the experimental group were based on nine highly rated involvement opportunities that adults have identified for participating in masters sport (Medic, Starkes, Young, Weir, & Giajnorio, 2005; Young & Medic, 2011; Young et al., 2011). The content of these messages was developed in accordance with the standard guidelines for creating gain-framed health messages (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999). As a manipulation check (similar to McCall & Martin Ginis, 2004) to verify participants' attentiveness, immediately after viewing the video, experimental group participants described (by typing) the main theme of two of the messages that appeared in the video. Participants in the control group completed a 13-item physical activity and sport quiz containing multiple choice and true/false questions about physical activity rates, obesity rates, and determinants of sport and physical activity (similar to Murru & Martin Ginis, 2010). Control group participants did not perform a manipulation check.

Next, individuals in both groups were asked to indicate the degree to which their respective tasks caused them to think about a sport hoped-for possible self. Specifically, the possible self protocol began with the following script:

Sometimes when people consider (*messages about sport/questions about physical activity and sport*), they are able to think about or see themselves in the future. In particular, people might think about the type of adult sport participant that they would one day like to become. Sometimes, after considering (*messages about sport/questions about physical activity and sport*), people are able to envision themselves in the future as an adult sportsperson and the kinds of experiences that might be in store for them.

In order to measure the degree of *activation* of a sport hoped-for possible self, we asked experimental group participants: "Did you find that the messages about adult sport got you thinking about a future sport self that you would like to become?" We asked control group participants: "Did you find that the questions about physical activity and sport got you thinking about a future sport self that you would like to become?" Participants responded on a 7-point Likert scale ranging from 1 (not at all) to 7 (very much).

All participants who acknowledged that a sport hoped-for possible self was activated (participants who indicated between 3 and 7 on the self-reported sport hoped-for possible self activation scale) were then asked to describe this self in writing. Participants who chose 1 or 2 on the scale were not invited to elaborate upon this self because we wanted to ensure that the possible self descriptions were primarily retrospective (i.e., affiliated with the gain-framed messages or the control task) rather than generative in nature; it is important to note, that these participants otherwise continued in the trial, and were instructed to complete all remaining procedural steps. Next, all participants indicated their *intentions to participate in sport* for a second time and participants were asked if they would like to *receive an e-mail newsletter* describing local adult sport opportunities.

**Time 3.** Four weeks later, participants were e-mailed a link to access a third online questionnaire. At this point, participants completed the *sport intention* measure for a third time and they also reported their *current weekly sport activity* for a second time. Participants were also asked to report whether they had *registered in a sport program* in the past four weeks. Lastly, all participants were debriefed.

### **Outcome Measures**

**Sport intention.** Five Likert-scale items were employed to measure participants' intentions to perform sport activity. Three items (7-point scale ranging from 1 [not at all] to 7 [extremely]; modified from Rothman et al., 1999) asked: "How likely is it that you will participate in sport activity sometime soon?"; "If you were faced with the decision to begin regular participation in sport today, how likely is it that you would do so?"; and "How tempted would you be to put off starting regular sport activity?", with scores on the latter item being reversed. A fourth item (modified from Prins et al., 2010) asked: "Do you plan to be regularly involved in sport in the next half year?" (scale ranged from 1 [certainly not] to 7 [yes certainly]). The fifth item, developed by the investigators, was: "How likely is it that you will regularly participate in sport in the next 6 months?" (scale ranged from 1 [not at all] to 7 [extremely likely]). Internal consistency for the five items ranged from .88 to .91 over the three parts of this study.

**Request for newsletter.** As a proxy measure of sport intention, participants were asked if they would like to receive an e-mail newsletter describing a wide variety of adult sport opportunities that are currently offered in Ottawa, Ontario, Canada (where the study was based). Participants had the option of selecting one of four answers: (i) yes (ii) no (iii) yes I would, but I do not live in or near Ottawa, or (iv) no I would not, and I do not live in or near Ottawa. For



analyses, responses for answers one and three were summed to form one category of participants who indicated interest in receiving the newsletter. Similarly, responses for answers two and four were summed to form one category of participants who indicated no interest in receiving the newsletter.

**Current weekly sport activity.** Participant responses to the Godin Leisure Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985) were used to calculate current weekly sport activity. Validity for this measure has been demonstrated with adults aged 18-65 (Godin & Shephard) and reliability has been shown in adults aged 20-59 (Jacobs, Ainsworth, Hartman, & Leon, 1993). At Time 1, participants were instructed to complete the GLTEQ, which asked respondents to indicate the number of times in an *average* week that they engage in strenuous, moderate, and mild forms of exercise for more than 15 minutes at a time. At Time 3, participants were asked to indicate the number of times *in the past 7 days* that they engaged in strenuous, moderate, and mild forms of exercise. In the absence of no better alternative measure of sport activity, and because the vast majority of the activities listed as examples in the moderate (e.g., tennis, volleyball) and strenuous (e.g., hockey, soccer) sections of the GLTEQ are sports, we elected to combine the moderate and strenuous activity scores to determine weekly sport activity. Therefore, the formula used for calculating weekly sport activity for this study was: weekly sport activity = (9 x strenuous exercise frequency) + (5 x moderate exercise frequency).

**Sport registration.** Participants selected either yes or no, when asked: "In the past 4 weeks, have you formally enrolled in a sport club, league, or program, or registered for a sport event?"

### Summary of Participation

Participants first completed baseline/screening measures on November 2, 2012 and recruitment finished on April 16, 2013. 244 participants met the aforementioned inclusion criteria at Time 1 and were invited by e-mail to participate at Time 2 a week later. Due to attrition, 73 male and 109 female participants ( $M = 50.90$ ,  $SD = 5.38$ ; experimental group:  $n = 95$ , control group:  $n = 87$ ) actually completed the expanded experimental intervention/control condition at Time 2. Finally, 65 male and 88 female participants ( $M = 50.81$ ,  $SD = 5.53$ ; experimental group:  $n = 77$ , control group:  $n = 76$ ) completed measures at Time 3.

Descriptive statistics were conducted for all participants who completed their respective conditions at Time 2. It should be noted that six individuals in the experimental group were excluded because they failed the manipulation check (i.e., did not state any messages from the video). Of the remaining participants, the experimental group comprised 35 males and 54 females with a mean age of 51.37 years ( $SD = 5.27$ ) representing each of the three sport stages of change (precontemplation: 48; contemplation: 14; preparation: 27). 25.8% and 74.2% of experimental participants reported being 'somewhat' and 'yes' for whether they were active in sport during youth. On average, gain-framed participants judged adult sport to be low-risk ( $M = 2.18$ ,  $SD = 1.30$ ). The control group consisted of 36 males and 51 females with a mean age of 50.48 ( $SD = 5.52$ ) representing each of the three sport stages of change (precontemplation: 37; contemplation: 26; preparation: 24). 21.8% and 78.2% of control participants reported being 'somewhat' and 'yes' for whether they were active in sport during youth. On average, control participants judged adult sport to be low-risk ( $M = 1.97$ ,  $SD = 1.34$ ). Preliminary tests showed that both groups were equal on screening (sport stage of change, sport in youth, and perceived risk) and demographic (age and sex) variables, all  $ps \geq .08$ .

### Planned Data Analyses

A two-way mixed analysis of covariance (ANCOVA) with the non-repeated factor of 'group' (2 levels: experimental and control) and the repeated factor of 'time' (3 levels: Time 1, Time 2, and Time 3) was used to analyze *sport intention*. A two-way mixed ANCOVA with the non-repeated factor of 'group' (2 levels: experimental and control) and the repeated factor of 'time' (2 levels: Time 1 and Time 3) was used to analyze *weekly sport activity*. Separate ordinal regression analyses were used to analyze between-group differences for *requests to receive a sport newsletter*, and for number of *sport registrations* while controlling for appropriate covariates. In all cases, covariates were established following a series of screening analyses in accordance with guidelines for treating multiple covariates (Tabachnick & Fidell, 2012); these preliminary analyses, as well as removal of outliers and attrition analyses are described next.

## Results

### Manipulation Check

As stated earlier, in order to ensure experimental group attentiveness while viewing the video, participants were asked to state two messages after watching. The number of messages stated ranged from 0 to 6 ( $M = 2.62$ ,  $SD = 1.30$ ). As mentioned, six participants did not state any messages and were, thus, eliminated from further analyses. Overall, manipulation check analyses indicated that the experimental group attended to the involvement opportunity messages well (see Study 1, this thesis).

### Preliminary Analyses

**Outliers.** Potential covariate and outcome variables were examined for outliers at each time point (for the entire sample and on a within-group basis). Two outliers (greater than  $\pm 3.29$  standard deviations; Tabachnick & Fidell, 2012) were identified in the Time 1 *weekly sport*

*activity* distribution for participants completing the entire study, and data for these two participants were subsequently removed from analyses of *weekly sport activity*. No other outlying cases were found.

**Attrition analyses.** Attrition analyses (for the entire sample and on a within-group basis) were performed to compare participants who completed the entire study with those who dropped-out at some point, for measures at baseline screening and for potential covariate measures. On a global level (i.e., entire sample), drop-outs ( $n = 85$ ) were significantly less likely (8.2%) than study completers (24.8%) to choose 'somewhat' in response to the question that measured level of sport participation in youth (i.e., drop-outs were somewhat more active in sport than study completers when they were younger),  $\chi^2(1, N = 238) = 8.77, p = .003, \phi = .20$ . Drop-outs ( $M = 2.82, SD = .62$ ) also had significantly higher BAS Drive levels compared to study completers ( $M = 2.63, SD = .71$ ),  $t(186.29) = -2.10, p = .04, \eta^2 = .02$ .

At the within-group level, experimental group drop-outs ( $n = 51; M = 2.86, SD = .61$ ) had significantly higher BAS Drive levels than experimental group completers ( $n = 77; M = 2.59, SD = .75$ ),  $t(121.05) = -2.25, p = .03, \eta^2 = .04$ . Experimental group drop-outs ( $M = 7.78, SD = 1.37$ ) also had significantly higher sport attitude scores than experimental group completers ( $M = 7.26, SD = 1.48$ ),  $t(126) = -1.99, p < .05, \eta^2 = .03$ . In terms of the control group, drop-outs ( $n = 34$ ; only 2.9% chose 'somewhat') were significantly more likely to indicate greater sport participation in youth than control group participants who completed the protocol ( $n = 76$ ; 23.7% chose 'somewhat'),  $\chi^2(1, N = 110) = 5.70, p = .02, \phi = .25$ .

**Analyses to inform choice of covariates.** We selected covariates for each analysis in accordance with three guidelines from Tabachnick and Fidell (2012). First, it is possible to choose covariates on theoretical grounds or based on knowledge regarding important sources of

variability that should be controlled. Second, covariates can be determined by choosing variables on which groups differ significantly at baseline. Third, variables can be selected as covariates if they are correlated with the dependent variable of interest, without being strongly correlated with other covariates.

Tests for all screening measures and possible covariates at baseline revealed only one significant difference between the two groups. The control group ( $M = 7.72$ ,  $SD = 1.27$ ) had significantly higher sport attitude levels compared to the experimental group ( $M = 7.26$ ,  $SD = 1.48$ ),  $t(151) = -2.03$ ,  $p = .04$ ,  $\eta^2 = .03$ . The two groups were similar for AgeCog Physical Losses ( $M$  experimental = 2.51,  $SD = .80$ ;  $M$  control = 2.55,  $SD = .69$ ), AgeCog Ongoing Development ( $M$  experimental = 3.26,  $SD = .47$ ;  $M$  control = 3.35,  $SD = .40$ ), and had similar levels for BAS Drive ( $M$  experimental = 2.59,  $SD = .75$ ;  $M$  control = 2.67,  $SD = .66$ ), BAS Reward Responsiveness ( $M$  experimental = 3.29,  $SD = .46$ ;  $M$  control = 3.32,  $SD = .53$ ), and BAS Fun Seeking ( $M$  experimental = 2.79,  $SD = .64$ ;  $M$  control = 2.79,  $SD = .66$ ), suggesting that participants were successfully randomly assigned to the two conditions. Relationships between each of the baseline measures for *sport intention* and *weekly sport activity* and all screening and potential covariate measures were examined using a series of bivariate correlations. Sport stage of change,  $r(152) = .64$ ,  $p < .001$ , sport attitude,  $r(152) = .43$ ,  $p < .001$ , BAS Drive,  $r(151) = .29$ ,  $p < .001$ , BAS Reward Responsiveness,  $r(151) = .25$ ,  $p = .002$ , BAS Fun Seeking,  $r(152) = .19$ ,  $p = .02$ , age,  $r(152) = -.18$ ,  $p = .03$ , and AgeCog Ongoing Development,  $r(152) = .16$ ,  $p < .05$ , were each significantly correlated with *sport intention*. AgeCog Physical Losses,  $r(123) = -.34$ ,  $p < .001$ , and BAS Reward Responsiveness,  $r(123) = .22$ ,  $p = .02$ , were each significantly correlated with *weekly sport activity*.

Based on these tests, we chose sport attitude as a covariate for analyses pertaining to *sport intention* because the experimental group and the control group differed at baseline on this variable, and sport attitude was also moderately correlated with *sport intention*. Although sport stage of change was also strongly correlated with *sport intention*, the lack of variability associated with the sport stage of change measure (i.e., all eligible participants were in one of three stages) made it a less than ideal covariate candidate; moreover, there was a moderate correlation between stage of change and sport attitude,  $r(153) = .34, p < .001$ , thus we employed attitude instead. With regard to *requests for a newsletter*, sport attitude was also selected as a covariate.

For *weekly sport activity analyses*, we selected AgeCog Physical Losses as a covariate because it was moderately correlated and most strongly correlated with this dependent variable in comparison to the other possible covariates. For *sport registration*, sport stage of change was selected as a covariate because of its hypothesized relationship with the dependent variable. That is, we would expect that people who are at intermittently active in sport (i.e., those in stage 3) would be more likely to register for sport programs than individuals who have not contemplated any engagement in sport (i.e., those in stage 1).

***Controlling for season.*** An additional factor we controlled for was the season of the year in which the participants completed various measures in the investigation. We did this because recruitment and data collection spanned over three seasons, and people tend to vary their physical activity in geographical areas in which the weather varies widely from season to season (e.g., Canada; Ma et al., 2006). Therefore, we ran further analyses to verify that results remained unchanged after controlling for the potential influence of season. Season of the year was defined categorically using the common season definition (as was used in Ma et al., 2006): Fall:

September 21-December 20; Winter: December 21-March 20; and Spring: March 21-June 20. A suitable covariate for season was chosen according to the analyses for the outcome variable in question.<sup>1</sup> Note that when analyses were performed with these covariates, results remained unchanged (in both pattern and magnitude) in relation to the main analyses we report below.

### Main Analyses

**Sport intention.** First, a two-way mixed ANCOVA with the non-repeated factor of 'group' and the repeated factor of 'time' (3 levels: Time 1, Time 2, and Time 3) was used to analyze *sport intention*, with sport attitude as a sole covariate. There was no significant interaction between time and group, Wilks' Lambda = .99,  $F(2, 142) = .32$ ,  $p = .72$ ,  $\eta_p^2 = .005$ . There was also no main effect for group,  $F(1, 143) = .04$ ,  $p = .85$ ,  $\eta_p^2 < .001$ , however, there was a significant main effect for time, Wilks' Lambda = .91,  $F(2, 142) = 6.89$ ,  $p = .001$ ,  $\eta_p^2 = .09$ . Post-hoc pairwise comparisons using a Bonferroni adjustment revealed that *sport intention* at each of Time 2 ( $M = 4.39$ ,  $SE = .14$ ) and Time 3 ( $M = 4.46$ ,  $SE = .14$ ) were significantly higher than at Time 1 ( $M = 3.70$ ,  $SE = .13$ ),  $ps < .001$ .

Because our planned analyses failed to demonstrate the expected result (i.e., an interaction), we further explored whether level of approach motivation (indexed using each of the three BAS Drive subscales—Drive, Reward Responsiveness, and Fun Seeking) might have had an interactive influence on reception of our gain-framed messages. Noteworthy results were found, but only in relation to BAS Drive. A three-way mixed ANCOVA with the non-repeated factors of 'group' and BAS Drive level (2 levels: high BAS Drive and low BAS Drive established using a median split of the scores), and the repeated factor of 'time' (3 levels: Time 1, Time 2, and Time 3) was conducted for *sport intention*, with sport attitude as the only covariate. Results showed a marginally significant three-way interaction between group, time, and BAS Drive

level, Wilks' Lambda = .95,  $F(2, 120) = 2.86$ ,  $p = .06$ ,  $\eta_p^2 = .05$ . Specifically, multiple comparisons using a Sidak adjustment found that experimental group participants who had low levels of approach motivation experienced a significant increase in *sport intention* from Time 1 to Time 2 ( $p < .001$ ), and this effect was sustained from Time 2 to Time 3, as levels at Time 3 remained significantly higher than at Time 1 ( $p < .001$ ). Furthermore, control group participants who had high levels of approach motivation also experienced an increase in *sport intention* from Time 1 to Time 2 ( $p = .001$ ), and this effect was also maintained from Time 2 to Time 3, with levels at Time 3 remaining significantly higher than at Time 1 ( $p = .001$ ; see Figures 1A and 1B).

*Insert Figures 1A and 1B here*

**Newsletter.** *Requests for a sport newsletter* was analyzed in an ordinal regression model. Using a probit link function, when controlling for sport attitude only, the overall model was significant,  $p = .02$ . The predictor of group was significant, Wald  $\chi^2 = 4.76$ ,  $p = .03$ , Nagelkerke's  $R^2 = .06$ . On a within-group basis, 68.5% of participants in the experimental group requested a sport newsletter, which was significantly greater than the 55.2% of individuals in the control group requesting a newsletter.

**Sport activity.** A two-way mixed ANCOVA with the non-repeated factor of 'group' and the repeated factor of 'time' (2 levels: Time 1 and Time 3) was used to analyze *weekly sport activity*, with AgeCog Physical Losses as a sole covariate. The interaction between time and group was not significant, Wilks' Lambda = .99,  $F(1, 99) = .11$ ,  $p = .74$ ,  $\eta_p^2 = .001$ . However, the main effect for time was significant, Wilks' Lambda = .94,  $F(1, 99) = 6.15$ ,  $p = .02$ ,  $\eta_p^2 = .06$ , with *weekly sport activity* levels being higher at Time 1 ( $M = 26.79$ ,  $SE = 1.94$ ) than at Time 3 ( $M = 22.22$ ,  $SE = 1.78$ ). Lastly, the main effect of group was marginally significant,  $F(1, 99) =$



3.95,  $p = .05$ ,  $\eta_p^2 = .04$ , with the experimental group ( $M = 27.73$ ,  $SE = 2.24$ ) having higher activity levels than the control group ( $M = 21.29$ ,  $SE = 2.33$ ).

As with *sport intention*, in the absence of a group by time interaction, we further explored whether BAS Drive level would influence sport activity outcomes if it were added as an independent variable. Therefore, a three-way mixed ANCOVA with the non-repeated factors of 'group' and BAS Drive level, and the repeated factor of 'time' (2 levels: Time 1 and Time 3) was conducted for *weekly sport activity*, with AgeCog Physical Losses as a covariate. However, the test revealed that there was no significant three-way interaction between time, group, and BAS Drive level, Wilks' Lambda = .99,  $F(1, 80) = .63$ ,  $p = .43$ ,  $\eta_p^2 = .008$ .<sup>2</sup>

**Registration.** *Sport registration* was also analyzed in an ordinal regression model. Using a negative log-log link function, when controlling for sport stage of change only, the overall model was significant,  $p = .02$ . Group significantly predicted the number of people who registered, Wald  $\chi^2 = 4.48$ ,  $p = .03$ , Nagelkerke's  $R^2 = .10$ . At the within-group level, 19.5% of participants in the experimental group indicated that they had registered for adult sport in the past 4 weeks, which was significantly greater than the 9.2% of individuals in the control group who indicated recent registration.

## Discussion

The aim of the current longitudinal investigation was to examine the efficacy of an expanded gain-framed messaging intervention on adults' intentions to do sport activity, their information seeking behaviour related to sport programming (newsletters), their sport sign-up behaviour, and their actual weekly sport activity. In the following discussion, we first consider the main findings benefitting the experimental group compared to the control group, then discuss

aspects where expected results were not obtained, followed by a discussion of future research and limitations.

### **Registration and Sport Activity**

The ultimate goal of most behavioural interventions is to increase peoples' engagement in a targeted health behaviour, either by encouraging them to act to sign-up for a program, or by actually motivating them to participate more frequently. Importantly, one month after the delivery of the expanded gain framed intervention, significantly more participants in the experimental group indicated that they had registered in some form of sport program since receiving the gain-framed messages than the control group. This finding suggests that the experimental condition was more effective than the control condition in influencing sign-up behaviour change, which may be considered a precursor to eventual sport behavior activity. This finding is significant, and suggests that practitioners may attract more adults in this demographic to their sport programs by using brief online gain-framed advertisements that are paired with a protocol that asks people to reflect on a possible future sport self.

However, the hypothesized interaction between group and time was not observed with respect to weekly sport activity. That is, the gain-framed message condition was no more effective in producing sport behaviour change over the course of the study than the control condition. According to Rothman and Salovey (1997), exposure to messages describing the benefits of an illness prevention behaviour should lead to behaviour change, especially when the targeted behaviour is perceived to be non-risky (Bartels et al., 2010; Tversky & Kahneman, 1981). Risk perceptions were controlled in this study by screening out participants who believed sport activity was highly risky, thus, the failure to achieve significant results pertaining to sport activity requires further consideration and explanation. An increase in sport activity may not

have been detected because it may have been measured too early in our prospective design. That is, the sport programs that participants reported having registered in at Time 3 may not have yet begun when the last measurement for sport activity took place at Time 3 (i.e., participants may not have had an opportunity to begin participating in the sport programs for which they had registered). Had we scheduled more measurements of sport activity, such as monthly follow-ups for 6 months post-intervention, the hypothesized interaction between group and time may have been discovered. In the absence of increases in self-reported weekly sport activity, the finding of increased registration associated with gain-framed message exposure is cause for optimism.

### **Newsletters and Sport Intentions**

Another objective of this study was to investigate the effects of a gain-framed messaging intervention on participants' intentions to participate in sport, measured in proxy by their requests for newsletters, and also by dedicated sport intention questions. We were interested in comparing participant requests to receive an e-mail newsletter describing local adult sport opportunities because this form of information-seeking behaviour may be considered a real-world measure of intention. The results revealed that, as expected, participants in the experimental condition requested more newsletters than participants in the control condition, at Time 2, immediately after delivery of the intervention, suggesting that an expanded gain-framed messaging intervention can raise interest in adult sport opportunities at the local level.

According to Ajzen (1991), intentions are assumed to lead to behaviour, and this assumption has been consistently demonstrated empirically (see Webb & Sheeran, 2006). Results, from our planned analyses on sport intentions showed that the hypothesized interaction between group and time was not present, however, a significant main effect of time did exist. When we further explored whether an individual difference variable measuring approach

motivation had an influence on the effects for each condition, we found a three-way interaction between group, time, and BAS Drive. Specifically, experimental group participants who had low levels of approach motivation reported increases in sport intentions immediately after delivery of the intervention (from Time 1 to Time 2), and these levels were sustained across the subsequent four weeks (from Time 2 to Time 3). Conversely, control group participants who had high levels of approach motivation also reported increases in intention immediately after completing the physical activity and sport quiz, and these levels were also sustained across 4 weeks, suggesting that the effects of exposure to either condition depended on the moderating function of BAS Drive level.

These results are interesting and somewhat surprising. Generally, studies that have tested the congruency hypothesis have found that individuals who had higher levels of approach motivation compared to avoidance motivation were more influenced by gain-framed messages than loss-framed messages (e.g., Mann et al., 2004). Therefore, one may expect to see higher levels of approach motivation and not lower levels of approach motivation facilitating the effects of gain-framed appeals, yet this was not observed in the current study. A comparison between our study and other studies that have examined the congruency hypothesis (they have used very similar methodologies), such as the one conducted by Mann and colleagues, shows a methodological difference that may explain the apparent inconsistency in results—we may have measured slightly different constructs. Mann et al. combined all three BAS subscales (Drive, Reward Responsiveness, and Fun Seeking) to create a measure reflecting overall BAS. Collapsing across different BAS subscales may result in a less sensitive variable because each subscale focuses on different aspects of incentive sensitivity (Ross, Millis, Bonebright, & Bailey, 2002). In our case, we found a significant three-way interaction only when the Drive

subscale was added as an independent variable, which is interesting considering Carver and White (1994) have demonstrated that this subscale has the best construct and predictive validity of the three subscales. Although our results indicate the level of BAS Drive to be influential, it remains unclear as to whether predominant orientation or level of approach orientation is more important in predicting effects of gain-framed messaging. Both level of approach orientation and predominant orientation (e.g., approach or avoidance) should be examined simultaneously in future research to clarify this issue.

Still, this does not explain why gain-framed messages caused participants with low levels of approach motivation to increase their sport intentions, and why a control task (completing a physical activity and sport quiz) caused participants with high levels of approach motivation to experience an increase in intentions. According to Cesario, Grant, and Higgins (2004), framed appeals that create a sense of regulatory fit (when a message frame matches a motivational orientation; e.g., gain-framed messages and approach motivation) can positively affect outcomes when people have favourable views toward the targeted health behaviour, whereas messages that create a sense of regulatory fit in people who do not have favourable views toward a health behaviour can have null effects, or can even negatively affect outcomes. Baseline analyses showed that experimental group participants had significantly lower sport attitude levels than those in the control group. Thus, working under the assumption that higher levels of approach motivation should create greater levels of regulatory fit when gain-framed messages have been presented, it is plausible that experimental group participants who had high levels of approach motivation did not experience any change in sport intentions because of less favourable evaluations toward adult sport, relative to those in the control group. Moreover, attrition analyses showed that experimental group drop-outs had significantly higher BAS Drive levels than

experimental group participants who completed the entire study. The possibility that drop-out represented an aversive reaction to gain-framed message exposure offers further support for the notion that the high BAS Drive-experimental group did not experience as significant an increase in sport intentions as the high BAS Drive-control group because their higher levels of regulatory fit were coupled with less favourable views toward sport activity.

Messages that serve to inform people about an issue should be most effective at positively affecting health outcomes in people who are presently uninformed because there is more room for attitude change due to elaboration on the issue (Rothman & Updegraff, 2010). Given that individuals with high levels of BAS Drive tend to pursue goals and seek out rewarding personal opportunities very persistently (Carver & White, 1994), experimental group participants who had high levels for this characteristic before exposure to the gain-framed messages (at baseline) were perhaps already better educated regarding adult sport opportunities than participants with low levels of BAS Drive. Conversely, experimental group participants with low BAS Drive levels may have been less informed about the involvement opportunities that adult sport can provide prior to message exposure—the messages may have then caused these participants to elaborate more on the issue, thereby creating a more significant positive change in intentions than those with high BAS Drive levels. Finally, the high BAS Drive-control group may have experienced a more significant increase in sport intentions because they were highly motivated to pursue goals (e.g., being a more physically active adult) and they had more favourable attitudes toward sport (at least compared to the experimental group), making them more receptive to the information contained in the quiz. These results suggest that both conditions (i.e., gain-framed messages and a quiz about physical activity and sport) when paired with a future sport self protocol may have some practical value with regard to positively

changing intentions toward adult sport activity depending on certain personal (e.g., level of BAS Drive approach motivation) and contextual (e.g., regulatory fit) factors.

With respect to the discussion of the three-way interaction, one final note is necessary. It is interesting that this effect was detected between the experimental and control group and the effects discovered when self-reported intention was examined were present only when BAS Drive level was added to the model. This suggests that different methods of measuring behavioural intentions can yield very different results. More research is needed to compare the validity (i.e., the relationship between the measure of intention and behaviour) of self-report and proxy measures of intention in the sport domain.

### **Future Directions and Limitations**

Several studies have demonstrated that gain-framed messages can positively influence general physical activity health outcomes (e.g., Jones et al., 2003; Kozak et al., 2013; Latimer, Rench, et al., 2008; Latimer, Rivers, et al., 2008; McCall & Martin Ginis, 2004; Parrott et al., 2008). However, this is the first investigation to show that gain-framed messages are more effective than a control condition in influencing certain outcomes relating to sport. It is noteworthy, however, that our expanded gain-framed intervention included a possible self protocol, with the same protocol being similarly paired with our control condition. In prior analyses pertaining to this same experimental trial (see Study 1, this thesis), exposure to the gain-framed messages resulted in the activation of more sport hoped-for possible selves, and greater elaboration of these selves, than did exposure to the control condition. Therefore, variability in possible self activation and elaboration may have influenced the outcomes measured in the current study in a causal fashion. That is, those who had a more highly activated or elaborated possible self may have been the same individuals who registered for more sport programs,

requested more newsletters, and who indicated increases in intentions. Several researchers (e.g., Gallagher & Updegraff, 2012; Rothman & Updegraff, 2010) have called for the investigation of more mediating mechanisms to explain the effects of message framing. Therefore, one area of future research would be to examine the mediatory role of hoped-for sport/exercise possible selves in the relationship between sport/exercise gain-framed messages and various intention and activity outcomes.

Although the nature of the methodology allowed for retrospective measurement of possible self activation (i.e., did the gain-framed messages/quiz task cause you to consider a future sport self?) and elaboration (i.e., what aspects of your sport self did the gain-framed messages/quiz encourage you to consider?), it is unclear as to whether possible self measurement independently influenced the results. Asking people to generate, contemplate, and describe a possible self that has not been previously activated has been a technique used by some researchers as a form of behavioural intervention (e.g., Murru & Martin Ginis, 2010). Although this was controlled by ensuring the description of possible selves was retrospective rather than generative in nature, it is difficult to know the degree to which the act of describing a possible self subsequently influenced the results. Therefore, to verify that describing a possible self does not independently affect health outcomes in a messaging intervention, future research should consider including four conditions—a gain-framed message only group, a standard control group (i.e., groups that do not complete the possible self protocol), a gain-framed and possible self group, and a control condition and possible self group. This approach would isolate the effects of the messaging intervention so that the groups with and without possible self protocols can be compared.



There are several limitations to this research that also need to be considered. The sample tested in this study was very specific (i.e., middle aged adults who participated in sport in youth, but who currently did not regularly participate). It is important that future researchers attempt to replicate our findings with other cohorts to see if the results obtained in the current study generalize to other demographics. Furthermore, we combined moderate and strenuous activity scores as indexed by the GLTEQ to measure sport activity, primarily because no better validated measures of sport activity exist. Although we were confident that this strategy would allow us to capture the majority of participant sport activity (because the majority of the many examples listed in the moderate and strenuous sections of the GLTEQ are sports), it is possible that some non-sport physical activity was also captured. Therefore, we encourage researchers to employ a reliable and valid sport instrument to allow for sport activity to be more accurately measured in the future. Lastly, it is possible that an increase in sport activity was not detected at Time 3 because participants had registered in sport programs that had yet to begin. It may take longer for people to initiate sport activity than it does traditional exercise (e.g., lifting weights in a gym), likely because sport requires more of a wait after registration has been completed (e.g., for the next season to begin). Thus, it is necessary for future researchers intending to measure sport activity to schedule multiple follow-ups over an extended period of time so as to detect any potential changes in sport behaviour.

## **Conclusion**

This is the first randomized controlled trial to show that a gain-framed messaging intervention (paired with a possible self protocol) is more effective than a control condition (also paired with a possible self protocol) in influencing certain outcomes relating to adult sport. Specifically, this study demonstrated that a single exposure to a short online video describing

involvement opportunities relating to adult sport activity, paired with a possible self protocol, can cause both behavioural (e.g., more registration in sport programs at 4 weeks post-intervention) and cognitive changes (e.g., more requests for adult sport newsletters immediately post-intervention, increased sport intentions immediately post-intervention, and sustained increases in sport intentions 4 weeks post-intervention). This study provides preliminary evidence suggesting that the inclusion of gain-framed messages that outline opportunities in sport that currently active adult sportspersons have described may be a viable approach for sport programmers to increase sport activity levels in 40-59 year-olds who engaged in sport during youth, but whom are not presently participating in adult sport.

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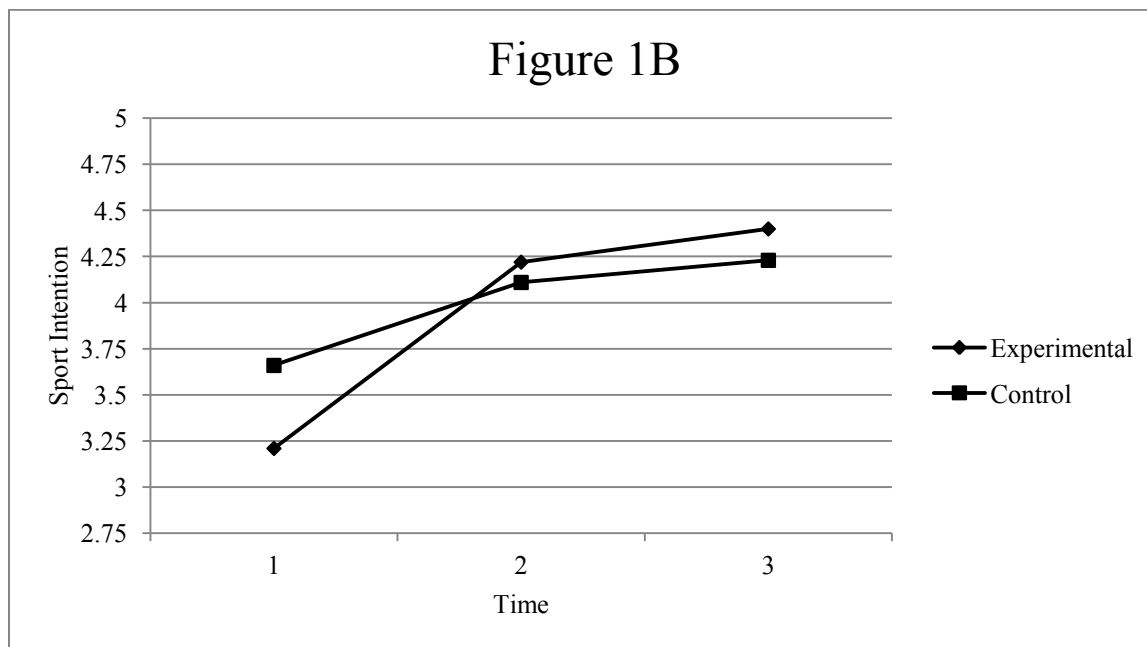
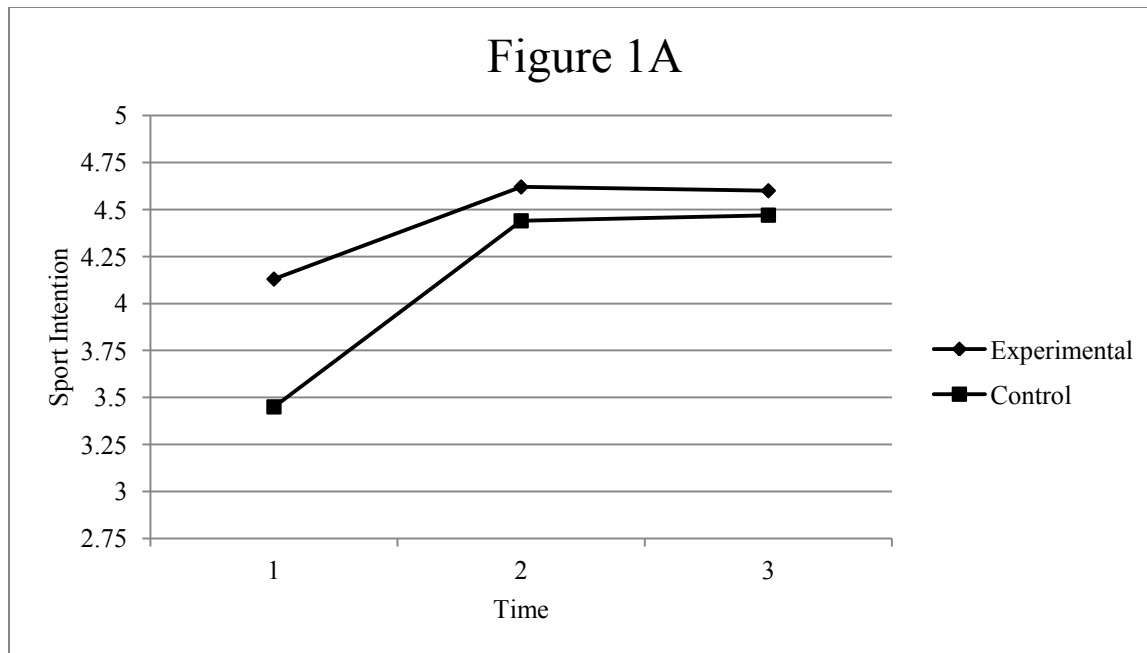
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## Footnotes

<sup>1</sup>For *weekly sport activity*, the season in which participants completed Time 1 was chosen as a covariate because a one-way ANCOVA with season in which *weekly sport activity* was reported at Time 1 as an independent variable (AgeCog Physical Losses was the covariate) showed that *weekly sport activity* scores differed significantly between seasons,  $F(1, 118) = 7.61$ ,  $p = .007$ ,  $\eta_p^2 = .06$  (Fall:  $M = 29.91$ ,  $SE = 2.41$ ; Winter:  $M = 20.14$ ,  $SE = 2.60$ ). For *sport intention* and *requests for a newsletter*, the season in which participants completed Time 2 was chosen as a covariate because that was the point in the study in which participants were exposed to their respective conditions. Lastly, the season in which Time 3 was completed was chosen as a covariate for *sport registration* because that was the point in the study in which participants were asked to report recent registrations in sport programs.

<sup>2</sup>Similar non-significant results were obtained when the other two BAS subscales were separately considered as interactive variables in the analyses.



*Figure 1.* Levels of sport intention for experimental and control participants with high BAS Drive (Figure 1A) and low BAS Drive (Figure 1B) at baseline (Time 1), immediately following the intervention (Time 2), and one-month post-intervention (Time 3). Sport intention scores have been adjusted for sport attitude levels.

### **General Discussion**

The current investigation was comprised of two studies that were derived from the same procedure. With the exception of some variation due to treatment of outliers, listwise analyses, and attrition, the same sample was utilized in both studies. In Study 1, the main purpose was to establish the causal link between sport gain-framed messaging and possible self processes. Therefore, analyses were focused on message reception and the immediate effects of the messages on possible self activation and elaboration in comparison to a control condition that involved the completion of a physical activity and sport quiz. In Study 2, the main purpose was to examine the longitudinal effects an expanded gain-framed messaging intervention (i.e., paired with a possible self protocol) and an expanded control condition (i.e., the physical activity and sport quiz also paired with a possible self protocol) on different measures of sport intention and sport activity. This final section provides a conclusion for the entire investigation. First, a discussion regarding the results for each study is provided. Next, the links between the two studies are examined. Lastly, limitations, future directions, and practical implications are considered.

### **Summary of Studies**

With regard to Study 1, the first goal was to examine how well the sport gain-framed messages were received by those in the experimental group. Our operational definition of message reception was the frequency with which each message was stated in the manipulation check by experimental participants who had received the series of nine different gain-framed sport messages. We made the inference that the messages stated most frequently may have been the most the salient to participants, and the messages stated least frequently may have been the least salient. This was an important objective as most studies have offered little guidance

regarding specific information that should be included in message frames (Rothman et al., 2006). In this study, we found that the message describing the potential health and fitness benefits of adult sport participation was stated at a much higher rate by experimental participants in the manipulation check than what would be expected by chance, meaning that this may have been attended to most by persons receiving the gain-framed messages. We also found that messages outlining the development of physical skills through sport, the excitement of sport, the opportunity to travel in order to participate in sport events, and the achievement of competitive goals through sport were stated at lower rate than what would be expected by chance, meaning that these messages may have been the least attended or the least salient to participants.

The second goal of this study was to examine whether exposure to sport gain-framed messages were more likely to activate sport hoped-for possible selves than exposure to a control condition involving the completion of a physical activity and sport quiz. Researchers (e.g., Gallagher & Updegraff, 2012; Rothman & Updegraff, 2010) have pointed out that the mechanisms that mediate the relationship between messages and health behaviour outcomes are not well known and have been notoriously difficult to establish. Prior to performing mediational analyses, it is important to first establish that a causal pathway exists between the messages and this specific type of possible self. With this goal in mind, analysis of written possible self descriptions confirmed that more individuals in the experimental group had described sport hoped-for possible selves, providing the first evidence that gain-framed messages can activate hoped-for possible selves.

The third goal of this study was to examine whether experimental group participants elaborated upon their possible selves to a greater extent than participants in the control group. We felt this needed to be examined because evidence of increases in possible self elaboration

(e.g., more vivid possible self descriptions) have been shown to be associated with gains in cognitive (subjective well-being; King & Raspin, 2004) and behavioural (e.g., time spent working on homework; Oyserman et al., 2004) outcomes. Therefore, one could make the argument that more elaborate possible selves more effectively influence important outcomes related to targeted health behaviours such as sport activity. According to the results, although participants in both groups provided approximately the same amount of volume in their possible self descriptions (i.e., wrote an equal amount of meaning units), participants in the experimental group included more meaning units that were related to the themes presented in the gain-framed message video (i.e., they were more relevant to established adult sport opportunities) than did participants in the control group. We concluded that the hoped-for possible selves that the experimental group described may be more efficacious for potentially causing positive change in sport outcomes than the selves described by the control group.

The fourth goal of this study was to conduct between-group comparisons in order to compare the frequency with which content relating to themes presented in the video appeared in participant sport hoped-for possible self descriptions. The purpose of these analyses was to explore the sport-themed nature of the elaboration present in the possible self descriptions. These results revealed that individuals in the experimental group were more likely than control group participants to incorporate meaning units relating to the delay of the effects of aging by participating in adult sport and they were also more likely to report meaning units associated with being with friends while engaging in adult sport. This provides some insight into the most frequent goals, benefits, or expected outcomes that the sport gain-framed messages may have caused experimental group participants to incorporate into their self-concepts, that were not incorporated by the control group.



The final goal of this investigation was to examine between-group differences in terms of the effects of the experimental and control conditions on certain self-regulatory submechanisms associated with activated sport hoped-for possible selves. The three submechanisms examined were the perceived importance of the possible self, the perceived capability of achieving the possible self, and the perceived discrepancy between the current self and the possible self. Each of these submechanisms have been shown or have been hypothesized to affect the efficacy with which possible selves create behaviour change (Hooker & Kaus, 1992; Hooker & Kaus, 1994; Oyserman & James, 2009). Therefore, it was important to explore these variables to find out which condition would influence these variables to a greater degree. Interestingly, however, the results revealed that there were no between-group differences regarding any of the submechanisms, suggesting that each of the three submechanisms had been equally influenced by the gain-framed and control conditions.

In terms of Study 2, the main purpose of this investigation was to examine the effects of an expanded sport gain-framed messaging intervention on different indices of sport intention and sport activity using a longitudinal randomized controlled design. To our knowledge, this was the first study of its kind to look at the effects of gain-framed messages on sport. Although we posited that gain-framed messages would likely produce more positive effects than a control condition, we felt that this study was necessary in order to provide empirical support for this hypothesis due to the promise that sport holds for increasing physical activity levels in adults. In this study, we examined four dependent variables: sport intention, a real-world proxy of sport intention (i.e., requests to receive an e-mail newsletter describing local adult sport opportunities), recent registrations in sport programs, and actual sport activity. The results showed that individuals in the experimental group registered for more sport programs four weeks after the

intervention and requested more newsletters than those in the control group immediately post-intervention. This is the first evidence showing that an expanded sport gain-framed messaging intervention can persuade people to engage in sport-related information seeking (i.e., requesting a sport newsletter) and sport-related registration behaviour. With regard to sport activity levels, there were no differences between the groups from Time 1 to Time 3 (5 weeks). However, we felt that if we had scheduled more follow-up assessments, these additional measurements likely would have detected the increase in sport activity the experimental group would have incurred as a result of their new sport programming beginning.

With regard to scores from the designated measure of sport intention, interestingly, a three-way interaction was observed between group, time, and BAS Drive approach motivation (high/low). Specifically, experimental group participants experienced the most significant increase in intentions from Time 1 to Time 2 (one week apart) if they had low levels of BAS Drive approach motivation (these effects were sustained from Time 2 to Time 3, which were 4 weeks apart), and control group participants experienced the most significant increase in intentions from Time 1 to Time 2 if they had high levels of BAS Drive approach motivation (these effects were also sustained from Time 2 to Time 3). Although these effects were somewhat surprising given that some studies have provided indirect evidence that higher levels of approach motivation should be better at facilitating the effects of gain-framed messages (e.g., Mann et al., 2004), we felt that a combination of individual (e.g., attitude toward sport participation) and contextual (e.g., regulatory fit) factors present in the current study may have explained the nature of the results. Results from this study suggest that gain-framed messaging researchers should consider examining BAS Drive as a potential moderating variable in future studies.

### **Linking the Two Studies**

Although the two studies mentioned above were presented in separate articles, they were a part of the same experiment and, thus, the results of one are likely linked to the results of the other. In terms of possible self activation, as mentioned, more individuals in the experimental group showed evidence of describing a sport hoped-for possible self than those in the control group. People in the experimental group also registered for more sport programs and requested more newsletters. Because possible self activation has been shown to be related to behavioural change, such as increases in physical activity (e.g., Murru & Martin Ginis, 2010), it is possible that the participants who registered for sport programs and requested newsletters were the same participants who possessed a sport hoped-for possible that had been activated as a result of exposure to the sport gain-framed messages. This, of course, would mean that the sport hoped-for possible selves would have mediated the relationships between the messages and registration and also between the messages and newsletter requests.

It was also notable that experimental group participants also elaborated more on their sport hoped-for possible selves than the control group. Therefore, another possibility would be that increases in sport hoped-for possible self elaboration could also have mediated the relationship between the messages and the sport outcomes. Thematic analyses gave us some insight into the nature of the sport hoped-for possible selves the experimental group were more likely to describe (relative to the control group)—they were more likely to describe hoped-for possible selves relating to delaying the effects of aging through sport, and they were also more likely to describe hoped-for possible selves relating to social benefits that may arise through sport. Therefore, it is possible that the formation of these specific futuristic goals may have caused certain individuals in the experimental group to be sufficiently motivated to attempt to

reduce the discrepancy between their current selves and their newly activated sport hoped-for possible selves, thus, creating the between-group differences on sport registration and sport newsletter requests.

### **Future Directions and Limitations**

Two main pieces of information can be taken from this investigation. First, consistent with some other messaging studies in the physical activity domain (e.g., Latimer, Rench, et al., 2008), we found that gain-framed messages were able produce positive effects regarding both cognitive (e.g., intentions) and behavioural (e.g., registration) outcomes, while controlling for different factors such as aging self-perceptions and season of the year in which the measurements were taken. However, this is the first investigation to show that gain-framed message exposure can affect outcomes relating specifically to sport. Second, this is also the first investigation to demonstrate that gain-framed messages can activate and elaborate sport hoped-for possible selves. That said, although these results certainly fill voids in the literature, this research can be advanced if the results obtained in both studies are replicated with other cohorts, and especially if expanded gain-framed messaging interventions can demonstrate significant effects on sporting behaviour. The sample used in this study was purposefully specific (e.g., at least somewhat regularly involved in sport in youth, did not find regular sport participation to be highly risky) because it was thought that these individuals might be more receptive to the gain-framed approach and would possibly respond favourably to our novel informational approach to promote engagement in adult sport activity. Now that we have established that an expanded gain-framed message intervention can positively affect different sport outcomes in a higher-probability sample, researchers should test the utility of similar interventions in the future with other demographics to enhance generalizability of findings. Additionally, the evidence of activation of

sport hoped-for possible selves in Study 1 does not mean that these activated selves actually influenced any of the sport outcomes examined in Study 2. Therefore, future research should examine the potential mediational role of hoped-for possible selves in the relationship between gain-framed messages and different outcomes, such as intentions, attitudes, and actual behaviour. Furthermore, as both loss-framed messages and feared possible selves have been linked to the avoidance motivational system (e.g., Hoyle & Sherrill, 2006; Mann et al., 2004), activation of feared possible selves as a result of exposure to loss-framed messaging could also be explored.

However, despite the strengths of this investigation, it was not without limitations. One limitation was the fact that social desirability was not accounted for in the self-reported sport hoped-for possible self activation analysis. Both the experimental and control group indicated similar levels of Likert-scale activation; however, significantly more individuals in the experimental group were able to describe an activated sport hoped-for possible self. This discrepancy in results between the two different activation analyses indicates that the control group may have acknowledged activation in order to provide a socially desirable answer. Another main limitation surrounds the measurement of possible self activation—it is unclear if the mere measurement of possible self activation independently influenced the results from Study 2. Having participants think about and describe a possible self that has not been previously activated has been a technique used as a form of behavioural intervention in the past (e.g., Murru & Martin Ginis, 2010). Although this was controlled by ensuring the description of possible selves was retrospective rather than generative in nature, it is difficult to know if the act of describing a possible self influenced the results (e.g., encouraging further elaboration on sport hoped-for possible selves). One improved method of controlling for this in the future would be to include four groups: a standard message group and a standard control group (i.e., conditions that

do not have a possible self protocol), and an expanded message group and an expanded control group (i.e., conditions that do have a possible self protocol). This would allow for isolation of the effects of the messaging intervention so that groups with and without possible self protocols could be compared.

Third, in Study 2, combined moderate and strenuous scores from the GLTEQ (Godin & Shephard, 1985) were combined to create a measure of weekly sport activity levels. Although we believed that this strategy would allow us to detect the majority of participant sport activity (because the majority of the many examples listed in the moderate and strenuous sections of the GLTEQ are sports), it is also likely some non-sport physical activity was also captured. Therefore, we encourage researchers to seek out and use better sport instruments in the future to ensure that sport activity is more accurately measured. Finally, there is a possibility that a difference in sport activity levels between the experimental and control group was not observed at Time 3 because the sport programs for which experimental participants had registered for had not yet begun at that point, meaning that sport activity may have been measured too early. Initiation in sport may take longer than it does traditional exercise (e.g., lifting weights, gym activity), possibly because sport requires more of a wait after registration (e.g., for the next season to begin). Therefore, researchers who have the intention of measuring prospective sport activity may want to consider scheduling multiple follow-ups post-intervention in order to capture any potential change in sport behaviour.

### **Practical Implications**

The evidence demonstrated by these two studies should aid sport programmers in attracting more 40-59 year-old adults, who were active in sport in youth but have since quit and not returned on a regular basis. Study 2 showed that the expanded gain-framed messaging

intervention utilized in this investigation was more effective than an expanded control condition in persuading people to request newsletters that outline sport opportunities that are offered locally. The expanded messaging intervention also persuaded more people to register for sport programs. This means that sport practitioners may be able to actually cause more people in this demographic to increase their level of interest in adult sport and also cause more people to enrol in sport by using gain-framed messages (paired with a possible self protocol) similar to the ones used in the current investigation. This may be especially effective if the messages were to be delivered online, as they were in the current investigation, because it would allow practitioners to easily access individuals in their target population. With regard to the three-way interaction for sport intention, these results suggest that, depending on certain individual and contextual factors, both a sport gain-framed message video espousing established adult sport involvement opportunities and a physical activity and sport quiz may have value in terms of motivating individuals in this cohort to increase their intent of participating in sport. In particular, evidence from the current thesis suggests that an expanded sport gain-framed intervention may encourage more significant increases in sport intentions in individuals who have lower BAS Drive levels.

In conclusion, Study 1 demonstrated that experimental group participants most saliently attended to the gain-framed message that described potential health and fitness benefits that could result from adult sport participation. That study also showed that individuals in the experimental group provided more elaboration than the control group relevant to the adult sport involvement opportunities relating to the delay of aging and being with friends while describing their sport hoped-for possible selves. This suggests that the above three messages may have been the most important in terms of influencing the results documented in Study 2. Therefore, given what we know at present, sport practitioners would be prudent to ensure that they included gain-

framed messages in their advertisements that describe the health and fitness, aging, and social benefits associated with regular adult sport participation because an emphasis of these topics may cause individuals in this demographic to engage in more sport activity.



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### **Statement of Contributions**

As the lead investigator, I was responsible for designing the entire research project, and for submitting and obtaining my own ethics approval from the University of Ottawa's Health Sciences and Science Research Ethics Board. I also constructed the online questionnaires and recruited the participants who completed them. Lastly, I conducted the data analyses, interpreted results and discussed findings that led to the two journal articles.

My thesis supervisor, Dr. Bradley W. Young, helped design the project, aided in the completion of the ethics submission, provided feedback for data analyses, and he edited the different versions of this document. Scott Rathwell helped with the qualitative analyses in Study 1—specifically, he was the second coder necessary for all inter-rater reliability calculations. Finally, Joseph V. Mathews wrote the java script used for the online video that was shown to experimental group participants.

## Appendix A: Consent Form



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### Time 1

0%

Dear participant,

Thank you for your interest in this research. The purpose of this study is to examine the effects of information about physical activity on the short-term activity of 40-59 year-old adults. This research is significant because it may provide evidence to support informational approaches for increasing physical activity levels in this age group.

The entire study consists of three separate time points in which you will be required to complete a series of online surveys that are certified safe and secure. The first time point should take you approximately 15 minutes to complete. Following completion of the first time point, you will receive an e-mail 7 days later inviting you to complete a second time point which should take 20 minutes to complete. Following completion of the second time point, you will receive an e-mail one month later inviting you to do the final time point, which should take 10 minutes to complete. Only participants who meet certain eligibility criteria will be asked to further participate, meaning that some individuals will not take part in Time points 2 and 3.

To thank you for your contribution to the research, you will be entered in a draw with the chance of winning one of six cash prizes of \$50. All participants who begin the first component of the online study will be automatically entered in the draw.

All the information you provide will remain confidential and only the researchers listed below have access to your data. The data collected for this study will be published in scientific journals. When the final report is written, it will be done in such a way as to conceal the identity of all participants.

Your participation is entirely voluntary and if at any time you wish to withdraw from the study, you may do so freely without penalty of any kind.

There is the very slight possibility that certain questions about whether you see yourself as physically active in future may cause you to feel emotionally uncomfortable. In this case, you may contact the researchers below to request information for appropriate resources to help with such discomfort.

If you have any questions, please feel free to contact either of the investigators below. If you have concerns about the content of the questionnaire or the ethical conduct of the study, you may contact the Protocol Officer for Ethics in Research as indicated below.

**By clicking the 'Next' button below, you indicate that you freely consent to participate in this study.** This means that you have been informed of the requirements, understand that you have the opportunity to ask questions and discuss this study, and have been assured that your information will remain confidential. If you wish to withdraw from the study after submitting the questionnaire, please indicate to the researchers your intention to withdraw by e-mail. Your information will be removed from the study upon your request and destroyed. Please print a copy of the consent form to keep for your personal records.

Further information on the prize draw: Upon completion of the study, six e-mails will be randomly selected amongst those who have entered and the people whose e-mails have been drawn will be informed by e-mail. If each winner cannot be reached within 14 days from the date of the draw, the prizes will be awarded to the subsequent people that are randomly selected and so on until the prizes have been awarded. The odds of winning a prize will depend on the number of eligible entries received. The prize must be accepted as awarded or forfeited. The e-mail that you provide when you enter the draw is collected for the purposes of contacting you if you are selected in the draw. The contact information you have provided will be kept confidential and then destroyed once the prizes have been awarded. We reserve the right to cancel the draw or cancel the awarding of the prizes if the integrity of the draw or the research or the confidentiality of the participants is compromised. This draw is governed by the applicable laws of Canada.

**Appendix B: Ethics Certificate****File Number:** H09-12-02**Date (mm/dd/yyyy):** 10/15/2012

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

**Ethics Approval Notice**  
**Health Sciences and Science REB**

**Principal Investigator / Supervisor / Co-investigator(s) / Student(s)**

| <u>First Name</u> | <u>Last Name</u> | <u>Affiliation</u>               | <u>Role</u>        |
|-------------------|------------------|----------------------------------|--------------------|
| Bradley           | Young            | Health Sciences / Physiotherapy  | Supervisor         |
| Alexander         | Lithopoulos      | Health Sciences / Human Kinetics | Student Researcher |

**File Number:** H09-12-02**Type of Project:** Master's Thesis

**Title:** Gain-framed messages and sport in middle-aged adults: Effects on intentions, sport activity, and the activation of possible selves

| <b>Approval Date (mm/dd/yyyy)</b> | <b>Expiry Date (mm/dd/yyyy)</b> | <b>Approval Type</b> |
|-----------------------------------|---------------------------------|----------------------|
| 10/15/2012                        | 10/14/2013                      | Ia                   |

(Ia: Approval, Ib: Approval for initial stage only)

**Special Conditions / Comments:**

N/A

File Number: H09-12-02

Date (mm/dd/yyyy): 10/15/2012



**Université d'Ottawa**  
Bureau d'éthique et d'intégrité de la recherche

**University of Ottawa**  
Office of Research Ethics and Integrity

This is to confirm that the University of Ottawa Research Ethics Board identified above, which operates in accordance with the Tri-Council Policy Statement and other applicable laws and regulations in Ontario, has examined and approved the application for ethical approval for the above named research project as of the Ethics Approval Date indicated for the period above and subject to the conditions listed the section above entitled "Special Conditions / Comments".

During the course of the study the protocol may not be modified without prior written approval from the REB except when necessary to remove subjects from immediate endangerment or when the modification(s) pertain to only administrative or logistical components of the study (e.g. change of telephone number). Investigators must also promptly alert the REB of any changes which increase the risk to participant(s), any changes which considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project and safety of the participant(s). Modifications to the project, information/consent documentation, and/or recruitment documentation, should be submitted to this office for approval using the "Modification to research project" form available at: <http://www.research.uottawa.ca/ethics/forms.html>

Please submit an annual status report to the Protocol Officer four weeks before the above-referenced expiry date to either close the file or request a renewal of ethics approval. This document can be found at: <http://www.research.uottawa.ca/ethics/forms.html>

If you have any questions, please do not hesitate to contact the Ethics Office at extension 5387 or by e-mail at: [ethics@uOttawa.ca](mailto:ethics@uOttawa.ca).

**Signature:**

Kim Thompson

Protocol Officer for Ethics in Research  
For Daniel Lagarec, Chair of the Health Sciences and Sciences REB

## Appendix C: Demographics Questionnaire



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### Time 1

7%

**Please enter your e-mail address in the space below.**

Enter an e-mail address that you know you will check regularly for at least the next 5 weeks so that we can send you the links to access Time 2 and Time 3 of the study. You will also be notified through e-mail if you win one of the six \$50 prizes.

**Please indicate your sex.**

- ☐ Male  
☐ Female

**How old are you (in years)?**

Next

**Appendix D: Current Health**

uOttawa

**Time 1**

15%

Are you currently healthy enough to regularly participate in physical activity?

- ☐ Yes  
☐ No

[Next](#)

## Appendix E: Sport Stage of Change



## Time 1

23%

For each of the following questions, please choose 'No' or 'Yes'. Please be sure to read the questions carefully. Note: a sport can be undertaken individually or as part of a team. Participants adhere to a common set of rules or expectations, there is some degree of competition, and a defined goal exists.

|                                                               | No                    | Yes                   |
|---------------------------------------------------------------|-----------------------|-----------------------|
| 1. I currently participate in sport                           | <input type="radio"/> | <input type="radio"/> |
| 2. I intend to participate in more sport in the next 6 months | <input type="radio"/> | <input type="radio"/> |

For sport activity to be *regular*, it must add up to a *total* of 30 minutes or more per day and be done at least 5 days per week. For example, you could play basketball for 30 minutes or play basketball three times (10 minutes each time) for a daily total of 30 minutes 5 times per week for it to be considered *regular*.

|                                                                      | No                    | Yes                   |
|----------------------------------------------------------------------|-----------------------|-----------------------|
| 3. I currently engage in regular sport activity                      | <input type="radio"/> | <input type="radio"/> |
| 4. I have been regularly participating in sport in the last 6 months | <input type="radio"/> | <input type="radio"/> |



**Appendix F: Sport in Youth**

uOttawa

**Time 1**

30%

**At any point before you reached 20 years old, did you regularly participate in sport (outside of gym class)?**

- ☐ No
- ☐ Somewhat
- ☐ Yes

[Next](#)

**Appendix G: Perceived Sport Risk**

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**Time 1**

46%

Please consider your current status today and answer the following question.

Not at all

Extremely

Do you believe that regularly  
participating in sport is risky?

[Next](#)

## Appendix H: Attitude Toward Sport Participation



uOttawa

**Time 1**

53%

Please consider your current status today and answer the following questions.

|                                                                                                  | Not at<br>all         |                       |                       |                       |                       |                       |                       |                       | Extremely             |
|--------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I am in favor of regular participation in sport.                                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Regularly participating in sport is beneficial.                                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Regular participation in sport is important.                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Regularly participating in sport is an effective way of promoting health and preventing illness. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Next

## Appendix I: BAS Scale



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## Time 1

61%

Each item of this questionnaire is a statement that a person may either agree with or disagree with. For each item, indicate how much you agree or disagree with what the item says. Please be as accurate and honest as you can be. Respond to each item as if it were the only item. That is, don't worry about being "consistent" in your responses.

|                                                                             | Very true for me      | Somewhat true for me  | Somewhat false for me | Very false for me     |
|-----------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. I go out of my way to get things I want.                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. When I'm doing well at something I love to keep at it.                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. I'm always willing to try something new if I think it will be fun.       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. When I get something I want, I feel excited and energized.               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. When I want something I usually go all-out to get it.                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. I will often do things for no other reason than that they might be fun.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. If I see a chance to get something I want I move on it right away.       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. When I see an opportunity for something I like I get excited right away. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. I often act on the spur of the moment.                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. When good things happen to me, it affects me strongly.                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. I crave excitement and new sensations.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. When I go after something I use a "no holds barred" approach.           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. It would excite me to win a contest.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Next

## Appendix J: Aging-Related Cognitions



### Time 1

69%

We wish for you to reflect on your current views on aging while answering the following questions.

|                                                                 | Definitely true       |                       |                       | Definitely false      |
|-----------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Aging means to me that I cannot take on as much as before.      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Aging means to me that I am less energetic and fit.             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Aging means to me that I am less healthy.                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Aging means to me that I can still learn new things.            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Aging means to me that my capabilities are increasing.          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Aging means to me that I cannot make up for my personal losses. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Aging means to me that I continue to make plans.                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Aging means to me that I can still put my ideas into practice.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Next

## Appendix K: Sport Gain-Framed Message Web Page



### Time 2

16%

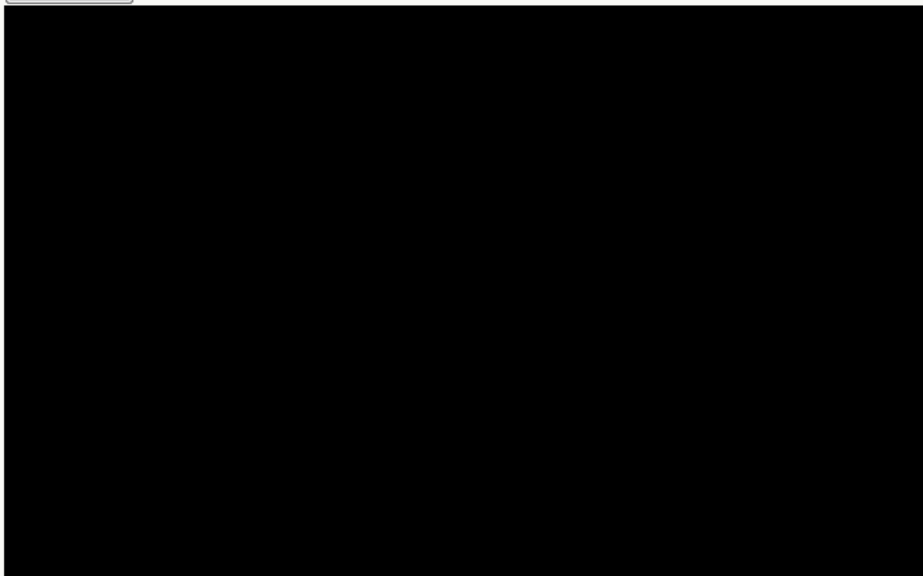
The Canadian Physical Activity Guidelines recommend that adults between the ages of 18-64 accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week. Many people reach these recommendations through traditional exercise methods (e.g., going to the gym) or by participating in what is known as Masters sport.

**Masters sport** is organized sport for adults that involves formal enrollment in a club, league, program, or formal registration for a sport event. Masters sport is structured so that adults expect to be involved in scheduled sport activities, such as competitions/games against other adults who are of similar age. The degree of competitiveness can vary widely, from weekly occurrences in one's locality to major national and international multi-sports events that are held in different countries. In fact, Masters sport is an emerging phenomenon and some say it is the fastest growing sport cohort in the Western world. Our research with Masters sport participants indicates that there are many **advantages** that arise when people are **regularly involved** in adult sport over **extended periods of time**.

We would now like you to watch a short video which describes some of these advantages. Afterwards, we will ask you a few questions based on your thoughts regarding the video.

Once you click the 'Play Video' button (above the top left portion of the video player) you will not be able to pause or replay the video. Therefore, it is important that you pay attention in order to not miss any information. Also, adjust your volume/speakers now if you need to in order to ensure that you hear all that is said in the video.

**Only press 'Next' after having watched the video.**

[Play Video](#)[Next](#)

**Appendix L: Involvement Opportunities and Sport Gain-Framed Messages**

| Message Themes                | Messages                                                                                                                                                                                                                                |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enjoyment                     | Participants in Masters sport tell us that it is a way for them to enjoy themselves and have fun. If you get into Masters sport, you will learn to love the game again, like you did when you were younger.                             |
| To improve health and fitness | Masters sportspersons claim that their participation has caused them to become fitter and healthier. By doing Masters sport, you too can increase your aerobic capacity, strength and flexibility, and overall health.                  |
| To improve physical skills    | Masters sport gives people chances to develop new physical capabilities and to prevent existing ones from declining. It will give you opportunities to work on techniques and strategies in your sport.                                 |
| To do something exciting      | Participants tell us that Masters sport helps prevent them from ever being bored. You too will find yourself constantly stimulated by thrills and challenges in training and competition.                                               |
| To travel                     | You will be more likely to travel and see new places through adult sport. Participants tell us that it lets them break away from the same daily routine by offering chances for away games, tournaments, or training camps.             |
| To relieve stress             | Masters sport is a way for you to significantly reduce stress and tension. Masters participants indicate that, oftentimes following training, they feel calmer and more relaxed.                                                        |
| To delay the effects of aging | Many Masters sport participants tell us that they continue to do it because it helps delay the effects of aging. Masters sport can give you a chance to retain a youthful look and feel.                                                |
| To achieve competitive goals  | Masters participants tell us that they regularly have opportunities to pursue their competitive goals. If you take up Masters sport, you too can compare yourself against your own standards and can test your skills against others.   |
| To be with friends            | Masters sport participants tell us that it provides great opportunities for fellowship with other likeminded individuals. If you get into Masters sport, you will also make many friends whom you can interact with on a regular basis. |

*Note.* Sport gain-framed messages are displayed in the order they were presented in the video.

**Appendix M: Sport Gain-Framed Message Manipulation Check****Time 2**

25%

Of the nine main messages that appeared in the video, in 1 or 2 sentences, please describe the main theme of two of those messages in the space below.

Enter the first message in the space below.

Enter the second message in the space below.

[Next](#)



## Appendix N: Physical Activity and Sport Quiz Web Page



### Time 2

16%

#### Test Your Knowledge about Physical Activity and Sport Quiz

The following quiz is based on information published in scientific articles and governmental reports. We are interested in finding out how knowledgeable people are regarding this information. **Choose the best answer.** Please do not search for the answers. Instead, try to answer the questions based on your current knowledge. Correct answers are provided on the next page.

**1. People of all ages need to be active to be healthy. How many Canadians are not active enough to achieve health benefits?**

- ☐ All
- ☐ One-third (1/3)
- ☐ None
- ☐ Two-thirds (2/3)

**2. What percentage of adults over the age of 50 recognize the importance of physical activity to maintain health?**

- ☐ 98%
- ☐ 40%
- ☐ 76%
- ☐ 68%

**3. Physical inactivity is as dangerous to your health as smoking.**

- ☐ True
- ☐ False

**4. The Canadian Physical Activity Guidelines for Adults recommend that adults participate in:**

- ☐ 10 minutes of light physical activity per day
- ☐ 60 minutes of vigorous physical activity once per week
- ☐ 30 minutes of moderate physical activity three times per week
- ☐ 150 minutes of moderate- to vigorous physical activity per week

**5. Adults who were physically inactive as children tend to become more active as adults.**

- ☐ True
- ☐ False

**6. If you're not active for at least 30 minutes at a time, you will not gain health benefits.**

- ☐ True
- ☐ False

**7. Fifty-seven percent of Canadian children and youth are not active enough for healthy growth and development.**

- ☐ True
- ☐ False

**8. Adults who participate in little physical activity tend to have children who are less active.**

- ☐ True
- ☐ False

**9. In order to get teens more active, the Canadian Physical Activity Guidelines for Youth recommend that teens:**

- ☐ Get the neighbours together for a game of pick-up basketball, or hockey after dinner
- ☐ Walk, bike, rollerblade or skateboard to school
- ☐ Do a fitness class after school
- ☐ Go to a gym on the weekend
- ☐ All of the above

**10. Individuals with disabilities can be physically active and participate in a wide range of activities.**

- ☐ True
- ☐ False

**11. Children who engage in little physical activity can cause their parents to be less active.**

- ☐ True
- ☐ False

**12. In order to get adults more active, the Canadian Physical Activity Guidelines for Adults recommend that adults:**

- ☐ Join a weekday community running or walking group
- ☐ Train for and participate in a run or walk for charity
- ☐ Take up a favourite sport again or try a new sport
- ☐ Be active with the family on the weekend
- ☐ All of the above

**13. According to the Heart and Stroke Foundation of Canada, what percentage of baby boomers are obese?**

- ☐ 25%
- ☐ 30%
- ☐ 35%
- ☐ 40%

Next

**Time 2**

25%

**Quiz Answers!**

1. People of all ages need to be active to be healthy. How many Canadians are not active enough to achieve health benefits?

- a) All
- b) One-third (1/3)
- c) None
- d) Two-thirds (2/3)**

2. What percentage of adults over the age of 50 recognize the importance of physical activity to maintain health?

- a) 98%**
- b) 40%
- c) 76%
- d) 68%

3. Physical inactivity is as dangerous to your health as smoking.

- a) True**
- b) False

4. The Canadian Physical Activity Guidelines for Adults recommend that adults participate in:

- a) 10 minutes of light physical activity per day
- b) 60 minutes of vigorous physical activity per week
- c) 30 minutes of moderate physical activity three times per week
- d) 150 minutes of moderate- to vigorous physical activity per week**

5. Adults who were physically inactive as children tend to become more active as adults.

- a) True
- b) False**

6. If you're not active for at least 30 minutes at a time, you will not gain health benefits.

- a) True
- b) False**

7. Fifty-seven percent of Canadian children and youth are not active enough for healthy growth and development.

- a) True**
- b) False

8. Adults who participate in little physical activity tend to have children who are less active.

- a) **True**
- b) False

9. In order to get teens more active, the Canadian Physical Activity Guidelines for Youth recommend that teens:

- a) Get the neighbours together for a game of pick-up basketball, or hockey after dinner
- b) Walk, bike, rollerblade or skateboard to school
- c) Do a fitness class after school
- d) Go to a gym on the weekend
- e) **All of the above**

10. Individuals with disabilities can be physically active and participate in a wide range of activities.

- a) **True**
- b) False

11. Children who engage in little physical activity can cause their parents to be less active.

- a) **True**
- b) False

12. In order to get adults more active, the Canadian Physical Activity Guidelines for Adults recommend that adults:

- a) Join a weekday community running or walking group
- b) Train for and participate in a run or walk for charity
- c) Take up a favourite sport again or try a new sport
- d) Be active with the family on the weekend
- e) **All of the above**

13. According to Heart and Stroke Foundation of Canada, what percentage of baby boomers are obese?

- a) 25%
- b) **30%**
- c) 35%
- d) 40%

Next

**Appendix O: Self-Reported Possible Self Activation for Experimental and Control**

Experimental:

**Time 2**

33%

Sometimes when people consider messages about sport, they are able to think about or see themselves in the future. In particular, people might think about the type of adult sport participant that they would one day like to become. Sometimes, after considering messages about sport, people are able to envision themselves in the future as an adult sportsperson and the kinds of experiences that might be in store for them.

|                                                                                                                            | Not at all            |                       | Somewhat              |                       |                       | Very much             |
|----------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Did you find that the messages about adult sport got you thinking about a future sport self that you would like to become? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

[Next](#)

Control:



## Time 2

33%

Sometimes when people consider questions about physical activity and sport, they are able to think about or see themselves in the future. In particular, people might think about the type of adult sport participant that they would one day like to become. Sometimes, after considering questions about physical activity and sport, people are able to envision themselves in the future as an adult sportsperson and the kinds of experiences that might be in store for them.

|                                                                                                                                             | Not at all            |                       |                       | Somewhat              |                       |                       | Very much             |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Did you find that the questions about physical activity and sport got you thinking about a future sport self that you would like to become? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Next

**Appendix P: Possible Self Description Web Pages for Experimental and Control**

Experimental:

**Time 2**

41%

You have indicated that the messages about adult sport did prompt you to think about a future sport self that you would like to become. Please **take a few minutes** to reflect upon and describe this future self in the space below. Try to provide a detailed description of this future self that you have envisioned.

[Next](#)

Control:



## Time 2

41%

You have indicated that the questions about physical activity and sport did prompt you to think about a future sport self that you would like to become. Please **take a few minutes** to reflect upon and describe this future self in the space below. Try to provide a detailed description of this future self that you have envisioned.

Next



## Appendix Q: Self-Regulatory Submechanisms for Experimental and Control

Experimental:



### Time 2

50%

The following questions ask you about the future sport self that you just described. Please be sure to read the questions carefully.

|                                                                                                                       | Not at all<br>important |                       |                       | Somewhat<br>important |                       |                       | Very<br>important     |
|-----------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| How important is it to you to achieve the future self that the messages about adult sport got you thinking about?     | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|                                                                                                                       | Not at all<br>capable   |                       |                       | Somewhat<br>capable   |                       |                       | Very<br>capable       |
| How capable do you feel of achieving the future self that the messages about adult sport prompted you to think about? | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|                                                                                                                       | Not at all              |                       |                       | Somewhat              |                       |                       | Very much             |
| To what extent does this future self describe you now?                                                                | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Next

Control:

**Time 2**

50%

The following questions ask you about the future sport self that you just described. Please be sure to read the questions carefully.

|                                                                                                                                        | Not at all<br>important |                       |                       | Somewhat<br>important |                       |                       | Very<br>important     |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| How important is it to you to achieve the future self that the questions about physical activity and sport got you thinking about?     | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|                                                                                                                                        | Not at all<br>capable   |                       |                       | Somewhat<br>capable   |                       |                       | Very<br>capable       |
| How capable do you feel of achieving the future self that the questions about physical activity and sport prompted you to think about? | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|                                                                                                                                        | Not at all              |                       |                       | Somewhat              |                       |                       | Very much             |
| To what extent does this future self describe you now?                                                                                 | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Next

## Appendix R: Sport Intentions



uOttawa

## Time 1

84%

Please answer the following questions.

|                                                                                                                           | Not at all<br>likely  |                       |                       |                       |                       |                       | Extremely<br>likely   |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| How likely is it that you will regularly participate in sport in the next 6 months?                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| How likely is it that you will participate in sport activity sometime soon?                                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| If you were faced with the decision to begin regular participation in sport today, how likely is it that you would do so? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| How tempted would you be to put off starting regular sport activity?                                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Do you plan to be regularly involved in sport in the next half year?                                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Next

## Appendix S: Sport Newsletter Web Page



### Time 2

75%

We are currently in the planning stages of creating an e-mail newsletter or catalogue for sport enthusiasts which describes a wide variety of adult sport opportunities that are currently offered in the Ottawa area.

Furthermore, those who would like to receive the newsletter will have the option of receiving sport information that is specifically tailored to their own interests. For example, subscribers will have the option to receive information about sports that are typically played during certain seasons of the year (e.g., winter only), and they will also have the option to receive information about different types of sports in which they would be most interested (e.g., team sports only).

Would you like to receive such a newsletter?

**Appendix T: Godin Leisure Time Exercise Questionnaire for Time 1 and Time 3**

Time 1:

**Time 1**

76%

Please answer the following questions.

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

**a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY)**

(e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

Times Per Week (please type number in space below)

**b) MODERATE EXERCISE (NOT EXHAUSTING)**

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

Times Per Week (please type number in space below)

**c) MILD EXERCISE (MINIMAL EFFORT)**

(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)

Times Per Week (please type number in space below)

Time 3:



### Time 3

42%

Please answer the following questions.

1. During the past 7-Day period (the past week), how many times did you do the following kinds of exercise for more than 15 minutes during your free time?

**a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY)**

(e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

Times Per Week (please type number in space below)

**b) MODERATE EXERCISE (NOT EXHAUSTING)**

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

Times Per Week (please type number in space below)

**c) MILD EXERCISE (MINIMAL EFFORT)**

(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)

Times Per Week (please type number in space below)

**Appendix U: Sport Registration**

uOttawa

**Time 3**

71%

In the past 4 weeks, have you formally enrolled in a sport club, league, or program, or registered for a sport event?

- ☐ Yes  
☐ No