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Can Persuasive Messages Encourage Individuals to Create Action Plans for Physical Activity?

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Given the positive influence of action planning on physical activity, persuasive messages could be designed to promote action planning. The purpose of this paper was to test action planning messages in two studies. Participants were allocated to one of two message groups, reading either a physical activity only or physical activity plus action planning message (Study 1) and either a gain-framed or loss-framed action planning message (Study 2). The percent of individuals who created an action plan and the quality of the plans were evaluated. In Study 1, individuals in the physical activity plus action planning group created as many action plans as the physical activity only group, but their plans were higher quality. In Study 2, Week 2 differences between the gain- and loss-framed message groups were found for action planning. To our knowledge, these studies were the first to investigate message-induced action planning as a behavior. More research is needed to optimize these messages.

Keywords: action planning, message framing, exercise

Adults are recommended to participate in at least 150 min of moderate-to-vigorous physical activity and two strength training sessions a week (Canadian Society for Exercise Physiology, 2011; World Health Organization, 2010). Using this benchmark to evaluate physical activity levels, recent studies using accelerometer data reveal that very few adults (5–15%) meet these recommendations across various countries (Colley et al., 2011; Townsend et al., 2012; Tudor-Locke, Brashear, Johnson, & Katzmarzyk, 2010). Given these low rates, it is imperative that we investigate strategies to increase physical activity levels in the population.

One proposed method to increase physical activity participation is to identify and focus interventions on key mediating variables that play a role in motivating physical activity behavior change (Bauman, Sallis, Dzewaltowski, & Owen, 2002; Rhodes & Pfaeffli, 2010). These mediating variables are modifiable mechanisms that can be targeted in interventions to change physical activity levels (Bauman et al., 2002). Baranowski and colleagues (1998) called for more research to examine change in theory-based mediating variables in the domain of physical activity. However, the use of theory still remains low in health behavior research (Painter, Borba, Hynes, Mays, & Glanz, 2008).

A successful theoretical mediator in the physical activity domain is self-regulation (Rhodes & Pfaeffli, 2010). One self-regulatory strategy for encouraging people to engage in physical activity is action planning (Schwarzer, 2008). Action planning, a concept rooted in the health action process approach (Schwarzer, 2008), is a process individuals use to map their intended behavior (e.g., weekly physical activity). Individuals provide answers to four questions: (a) number of days in which they will participate in physical activity, (b) what types of physical activity they will do, (c) where they will participate in physical activity, and (d) when they will participate in physical activity. In a similar vein, implementation intentions are another planning construct. In this construct, if–then statements—which associate a situational context (if) with a corresponding goal response (then; Gollwitzer, 1999)—are added. For the purpose of this article, we focused on action planning from the health action process approach.

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Making these concrete and detailed plans improves a variety of health behaviors including physical activity (Schwarzer, Luszczynska, Ziegelmann, Scholz, & Lippke, 2008). Action planning interventions have shown to result in greater physical activity participation when compared with a control group in a variety of populations such people with chronic orthopedic conditions (e.g., arthritis; Fuchs, Seelig, Göhner, Burton, & Brown, 2012), adults in cardiac rehabilitation (Sniehotta, Schwarzer, Scholz, & Schüz, 2005), and the general population (Darker, French, Eves, & Sniehotta, 2010; Koring et al., 2012). A recent meta-analysis on action planning for physical activity demonstrated moderate effect sizes for physical activity behavior when interventions were compared with control groups (Carraro & Gaudreau, 2013).

In these interventions, action planning is used to foster physical activity behavior. Because of its success as a means of promoting physical activity and its behavioral nature, there may be value in investigating strategies that may specifically enhance engagement in action planning behaviors. Thus, in the studies reported in this article, action planning is investigated as the behavior of interest. The aim was then to promote the behavior of action planning by use of persuasive messaging strategies.

Messaging studies hold potential for testing simple strategies and targeting mediating variables. Because the traditional messages focusing on promoting physical activity have yielded small effects (Gallagher & Updegraff, 2012; Latimer, Brawley, & Bassett, 2010), messaging might be more effectively used to target key mediating variables. For instance, Woodgate and Brawley (2008) used a persuasive message strategy to increase self-efficacy, another key physical activity mediator, in cardiac rehabilitation participants. Notably, this study investigated self-efficacy as the dependent variable and showed that the message enhanced self-efficacy in this sample. Reviews of physical activity interventions have begun to determine the best strategies to change physical activity mediators such as self-efficacy (Williams & French, 2011; Ashford et al., 2010). Finding the best strategies and approaches for specific mediators can then help inform future persuasive messages/interventions. A similar approach has been used in the current study by focusing on persuasive messaging strategies aimed at influencing action planning. Another aspect of the rationale for our approach was based upon a recent review of physical activity brochures. Review authors identified that there was little planning content in these brochures. Only 0.13% of all surveyed brochures had any type of planning content (e.g., action planning or goal setting; (Gainforth et al., 2011). Given this limited research, theoretically based investigations are still required to determine whether messaging to promote action planning is efficacious. Our study aims to fill this gap.

Despite the ease of utilizing such an action planning messaging strategy, little research has tested messages that promote action planning as the behavioral outcome. Therefore, we have limited knowledge on the uptake of this behavior as influenced by persuasive messages. Compliance rates from physical activity interventions using action planning as a tool can provide some insight regarding the extent to which people create action plans. Michie, Dormandy and Marteau (2004) revealed that 25 of 40 women (63%) created an action plan to schedule/attend an antenatal screening test for Down's syndrome. In the physical activity literature, Skår, Sniehotta, Molloy, Prestwich, and Araújo-Soares (2011) randomized individuals to one of three planning groups and reported a 56–62% compliance rate. Wiedemann, Lippke, Reuter, Ziegelmann, and Schüz (2011) revealed that 19% active and 82% of inactive individuals created at least one action plan in their intervention. Our preliminary data further highlights the limited uptake of action planning in the physical activity setting. In a study testing the impact of a brochure using messages to promote physical activity, only 16% (n = 24/148) of individuals reported using a physical activity action planning tool in the brochure (Latimer, Rench, Rivers, & Salovey, 2006). Although these studies are informative regarding action planning rates in health behavior change interventions, they do not provide evidence about the effect of persuasive messages targeting action planning as a behavioral outcome. It is therefore crucial that initial studies test strategies to optimize persuasive messages aimed at influencing action planning behavior. Given that Rhodes and Pfaeffli (2010) highlighted that half of the physical activity interventions they reviewed failed to change the mediator and the outcome, our initial messaging studies are important. We need to properly design our investigation, such that our messaging strategy results in change in the mediator such as action planning in this study. Successful demonstration of such an effect is a necessary precursor for using the strategy as one part of an intervention to influence the more distal outcome of physical activity.

The purpose of this paper was to test persuasive messages to promote action planning for physical activity. As recommended in a recent review of persuasive messages for physical activity, future research needs to properly match messages goals with the proper outcome (Latimer et al., 2010). Therefore, in this study, persuasive action planning messages were designed to promote the behavioral outcome of action planning, the main outcome of our two studies. Both were conducted to address our purpose and test the efficacy of such messages. The first study was a proof-of-concept study, where we wanted to examine if supplementing a physical activity message with an action planning message would results in more individuals creating action plans and if those plans were more specific and detailed (i.e., higher quality) when compared with a physical activity only message. The second study extended the first study by testing the content of action planning message. Specifically, we adopted a message framing paradigm (Rothman & Salovey, 1997) to determine if it is best to write action planning messages that highlight either the benefit of planning (gain-framed message content) or the cost of not planning (loss-framed

message content). Investigating the specific content for messages is still lacking in the physical activity domain (Latimer et al., 2010).

Study 1

Little is known about effective messages to entice people to create a physical activity action plan. Our first study was a proof-of-concept test to examine if the type of message matters for action plan creation. Specifically, we sought to determine whether providing individuals with a message about physical activity and planning information would increase action plan rates compared with a message presenting physical activity information alone. We also examined the quality of the participants' physical activity action plans. A higher quality action plan is specific, detailed and includes all components of an action plan (i.e., what, where, when, and how). This specificity is important to investigate, because the quality of action plans is a better predictor of physical activity than the quantity of action plans as illustrated by de Vet, Oenema, & Brug (2011) with implementation intentions. We hypothesized that more individuals who received the physical activity plus action plan message would create action plans and their plans would be of higher quality than participants receiving the physical activity only message.

Method

Participants

A sample of 133 participants (99 women and 34 men; M_{age} = 41.8, SD = 11.6 years) took part in this study. Participants were recruited face-to-face at a local shopping mall and through online advertising via Facebook. Participants recruited face-to-face provided their e-mail to a research assistant who then emailed the study information and Web site to the participant. Individuals recruited through online advertising were immediately directed to the study Web site. The majority of participants were White (91%), and most had pursued postsecondary education: 33% of participants had a college diploma, 28% a university degree, and 8% a postgraduate degree.

Procedure

The study was approved by the appropriate research ethics board, and participants consented to complete a brief eligibility questionnaire. Participants were eligible for the study if they were not meeting the physical activity guidelines (<150 min of moderate and vigorous physical activity) but intended to increase their physical activity over the next 2 months, could read and understand English, and had access the Internet. Eligible participants then (a) provided consent to the study, (b) answered an online questionnaire, and (c) were randomly assigned to read either a generic message about the benefits of physical activity or an intervention message about the benefits of physical activity and action planning. The action planning message was embedded in the study Web site, and therefore, participants read the messages electronically (e.g., on a computer screen). After reading the provided message, participants were asked if they wanted to create a physical activity action plan or not. If participants wanted to create an action plan, they were provided with a blank textbox for each day of the week (i.e., Monday to Sunday). Participants could write an action plan for any of these days (i.e., what type of activity, where the activity will be conducted, when they will do the activity, and for how long). Following the completion of the study, the participants were debriefed and remunerated for their participation.

Messages

The information provided in the messages was adapted from the Centers for Disease Control and Prevention (2012) Web site and Canada's Physical Activity Guidelines and information sheets (Canadian Society for Exercise Physiology, 2011). The information provided in the physical activity only message discussed the development of the current physical activity guidelines, the benefits of physical activity, and the types of physical activity necessary to reach the guidelines. Finally, a vignette was provided describing an individual who had started to engage in physical activity and was experiencing the benefits of an active lifestyle.

The information provided in the action planning condition addressed the same physical activity messages in addition to the benefits of planning and the details on how to formulate effective physical activity action plans. A vignette was provided and described an individual who was able to successfully create and follow a physical activity action plan (see supplemental materials for messages).[1] In both experimental conditions, the characters in the vignettes were matched to the gender of the participants to increase relevance (Kreuter, Strecher, & Glassman, 1999). The length of both messages was equivalent.

Measures

Eligibility Questionnaire. To screen for activity level, participants were asked to read a brief description of Canada's Physical Activity Guidelines and choose one of six options, from a range reflected by the following two endpoint items: "Yes, I have been doing the recommended amount of exercise every week for more than 2 months" to "No, I am not doing the recommended amount of exercise and I do not intend to increase my exercise in the next 2 months" (Marcus, Selby, Niaura, & Rossi, 1992). Participants who were eligible responded to one of two categories: (a) No, I am not doing the recommended amount of every week, but I do exercise, and I intend to

start increasing my weekly exercise in the next 2 months; or (b) No, I am not doing any exercise, but I intend to begin doing exercise in the next 2 months.

Demographics. Participants indicated their age, sex, ethnicity, and highest level of education.

Message Recall Check. The following open-ended question was used to assess the key points of the messages that the participants remembered: "Please list the main ideas or messages the information you just read was trying to get across." The message was coded by two raters to determine whether action planning was either part of the message recall or not. The resultant coding demonstrated substantial agreement (kappa = .75).

Self-Report Action Planning. A three-item measure asking participants if they planned where, when, and what type of physical activity they would engage to meet the physical activity recommendations (i.e., the how much physical activity) in the next week was assessed to gather baseline action planning (Schwarzer, 2008). A Cronbach's alpha of .90 revealed good reliability.

Physical Activity Plan. Participants indicated whether they wanted to create a physical activity plan after reading either message. Participants who wanted to create an action plan were provided with a space on the online questionnaire for each day of the week to create their action plan. Two independent raters evaluated the quality of the written plans by assessing whether participants specified when, where, what, and how they planned to be active in the next week (between rater interclass correlation = .90). Following a similar coding scheme found in previous research (Skår et al., 2011; Ziegelmann, Lippke, & Schwarzer, 2006), participants received one point for each of the action planning components (i.e., what, where, when, and how) for each day they created an action plan, to a maximum of seven action plans (i.e., one plan/day). The total score of the quality per action plan was then divided by the number of action plans and multiplied by 100 to give a percentage of action plan quality, thus ranging from 0% to 100%. A higher score represented higher action plan quality. Total number of action plans (up to seven) was calculated in addition to the number of action plans that received a maximum score of 4 (de Vet et al., 2011).

Data Analysis. Using SPSS v.21, *t* tests and crosstabs with chi-squares were used to determine if any group differences existed on demographic data and the manipulation checks. Crosstabs with chi-square analyses were conducted to determine if differences existed on the dichotomous action planning measure by message group. Because chi-square analysis calculates the deviation between the observed and the expected score rather than comparing group scores (Field, 2009), we also ran post hoc proportion tests when the chi-square was significant with R v.3.0. Finally, we assessed the quality of the action plans by group with a one-way analysis of variance (ANOVA).

Results and Discussion

Randomization and Manipulation Check

Participants were allocated to read either a physical activity only message (n = 64) or a physical activity plus action planning message (n = 69). No significant differences were found between message groups on age, $t(130) = 0.58$, $p = .56$, gender, $\chi^2(1) = 3.41$, $p = .07$, education, $\chi^2(1) = 0.55$, $p = .76$, ethnicity, $\chi^2(1) = 1.16$, $p = .28$, and self-report action planning, $t(127) = 0.13$, $p = .89$, confirming randomization. In the message recall task, individuals in the planning group made reference to action planning more than individuals in the generic physical activity message group, action plan = 87%; generic = 3%, $\chi^2 = 90.86$, $p < .001$. Thus, the manipulation was effective in focusing individuals on the intervention stimulus material as intended.

Hypothesis Testing

For the primary outcome, the likelihood of creating an action plan was not enhanced by reading the action plan message, action plan = 45.3% (n = 34) versus generic 54.7% (n = 41), χ^2 (1) = 2.54, p = .13. A total of 75 individuals across both groups created an action plan after reading either message (M number of plans = 5.42, SD = 1.45). There were no difference on the number of action plans both groups created, $t(74) = 0.59$, $p = .59$. There was a significant difference between groups in the quality of action plans. Specifically, action plan quality was greater in the action plan message group ($M = 71.52$, $SD = 19.38$) than the generic message group ($M = 45.60$ $SD = 16.64$), $F(1, 73) = 38.83$, $p < .001$, partial $\eta^2 = .35$. The majority of participants (80%) did not create one plan that was rated as highest quality. All 15 participants that had at least one maximum score on action plan quality were in the action planning message group.

Contrary to our hypothesis, an action plan message was not more persuasive than a generic physical activity message to entice individuals to create action plans. All participants in message conditions were prompted to create an action plan immediately after reading a message. Following this prompt, approximately 50% of individuals created an action plan regardless of receiving either a physical activity only message or an action planning message. However, the importance of adding an action planning message to a physical activity message lies in the *quality* of the action plans. Specifically, individuals in the action planning message group wrote more specific and detailed plans (i.e., higher quality) than the counterpart group. The finding that an action plan message can create greater quality action plans is especially important because writing higher quality plans have been linked to greater physical activity participation (de Vet et al., 2011).

Our proof-of-concept action plan messaging study demonstrates that there is promising utility in adding an action planning message to a physical activity message

and therefore further research is important. Our findings also indicated that there is still room to improve action planning rates given that about half of study participants created an action plan. This rate could be increased in future research by using other persuasive strategies such as message framing.

Study 2

Action planning messages appear to increase the quality of action plans as identified in Study 1. The message in Study 1 focused on providing information on how to create an action plan. However, another health message strategy to increase action planning may be to modify the content of the messages (Latimer et al., 2010). This second study examined the content of the action planning message by adopting a message framing paradigm (Rothman & Salovey, 1997; Tversky & Kahneman, 1981). Message framing focuses on whether the message emphasizes the benefits of engaging in a behavior or the costs of failing to engage in a behavior. When the outcome is considered to be either low risk or certain, framing the information in terms of benefits (i.e., a gain-framed message) usually works best as individuals will try to avoid risks when considering the benefits. When the risk is either higher or the outcome is uncertain, a message focusing on the costs tend to be more persuasive (i.e., loss-framed message) as individuals will tolerate risk when considering losses. In health promotion contexts, Rothman and Salovey (1997) hypothesized that a gain-framed message will be more effective with preventive health behaviors (e.g., physical activity) because the benefits of participation in the health behavior are certain (e.g., physical activity decreases the chance of developing cardiovascular disease) and outweigh the risks (e.g., physical activity-related injury). In contrast, they proposed that a loss-framed message would be more persuasive for detection behaviors (e.g., mammography) because the outcomes of these behaviors are uncertain as they can reveal an unwanted illness or disease (e.g., discovery of breast cancer).

Inasmuch as message framing has yet to be applied to the behavior of action planning, Study 2 would be the first to investigate the effect of message framing in relation to this behavior. Because action planning is a low risk behavior, a gain-framed message is expected to be favored. Empirical support concerning health behaviors has consistently demonstrated the advantage of gain-framed messages for low-risk outcomes such as physical activity, skin care prevention (Gallagher & Updegraff, 2012), and marketing health-care products (Chang, 2007). However, it is unknown whether message framing can influence action planning behavior.

In Study 2, individuals read one of two action planning messages: either gain- or loss-framed. A gain- versus loss-framed message was investigated to remain consistent with the message framing paradigm. Because it is virtually impossible to create a no-frame message, a control condition is not applicable in these studies (Latimer et al., 2010). Messaging effects were examined immediately after reading the messages and 1 week later to determine if the framing effect persisted over time. The quality of the action plans was also examined in this study. We hypothesized that more individuals who received a gain-framed message would create physical activity action plans and have higher quality action plans than individuals who read a loss-framed message.

Methods

Participants

Adults were recruited from a variety of online sources such as social media and internet postings sites. Inclusion criteria required that individuals were at least 18 years old, and had not received medical advice that physical activity was contraindicated. Participants were also screened to determine if they either met the physical activity guidelines but for less than 6 months or did not meet the guidelines but intended to do so in the next 6 months (Marcus et al., 1992). All participants needed to be able to read English and have access to the Internet. A total of 2,931 individuals clicked on the recruitment ad, the majority simply did not fill out the screening form (n = 1677). Of the 1,254 eligible participants, only 741 completed the consent form, 564 completed the prequestionnaire, and 227 either read the gain- or loss-framed action planning message. These recruitment rates are consistent with internet recruitment for health research (Fenner et al., 2012).

The participants (N = 227) were mostly women (80%), single or married (48% or 31%, respectively), and White (81%). The sample mean age was 31.74 (SD = 13.71) years. Most participants had pursued postsecondary education, with 20% of participants completing a college diploma, 25% completing some university, 24% completing a bachelor's degree, and 8% completing a postgraduate degree.

Procedures

Once participants were deemed eligible and consent was obtained, participants answered a premessage questionnaire (i.e., demographic information and self-reported action planning) and then were randomized to one of two framed message groups: either gain (n = 100) or loss (n = 127). As in Study 1, immediately following reading the messages for their specific group (Week 1), all participants were asked if they wanted to create an action plan for the upcoming week. At Week 2, participants were emailed a link to the survey and asked whether they wanted to renew/create a new physical activity action plan. Individuals who created an action plan were asked to complete their action plan online. Participants were remunerated for their participation.

Messages

Because Study 1 results demonstrated the usefulness of providing an action planning message with a physical activity message, each group read a physical activity message followed by an action planning message. The physical activity message was the same as in Study 1. The content of the action planning message was either gain- or loss-framed. The gain-framed action planning message focused on the benefits of action planning (e.g., "By making a detailed physical activity plan, you are more likely to be regularly active and ultimately meet the physical activity guidelines"). The loss-framed action planning message highlighted the cost of not creating an action plan (e.g., "Failing to detail your plan increases the likelihood of falling short of being regularly active and working toward the physical activity guidelines"; see supplemental material for the messages).[1] Both messages were of equal length. These messages were pilot tested in one focus group and modified accordingly. The focus group participants were asked to read the gain-framed message and discuss the content of the message. The same process was repeated with the loss-framed message. The focus group participants suggested varying the physical activity examples to include community, home, and gym activities. They confirmed that the loss-frame message was more of a "wake-up" call, providing initial validation of the tone of the message. The participants also confirmed the clarity of specific framed-statements. The action planning messages were also coded with the behavior change technique taxonomy v1 (Michie et al., 2013) and reported in Table 1.

Measures. The same measures used in Study 1 were applied in Study 2. The baseline action planning measure was found to be reliable (Cronbach's alpha = .89). Two message framing manipulation check items replaced the open-ended question of Study 1. Participants indicated on a 5-point scale whether the message they read either focused heavily on the benefits of planning (1) or heavily on the risks of not planning (5). Participants also rated the tone of the message from 1 (*very positive*) to 5 (*very negative*).

Data Analysis. Using SPSS v.21, a similar analytical approach to Study 1 was undertaken. *t*-Tests and crosstabs with chi-squares were used to determine if (a) any differences on demographic variables and baseline self-reported action planning were found between individuals who drop out after the prequestionnaire versus individuals who completed Week 1 of the study, and (b) any message group differences existed on demographic data and the manipulation checks. Crosstabs with chi-square analyses were conducted at Week 1 and Week 2 to determine group differences in action planning rates, followed by proportion tests with R v.3.0 as post hoc evaluations. Specific to Study 2, separate McNemar tests were conducted for each group to determine if the percentage of individuals who planned differed from Week 1 to Week 2. Using the same scoring approach used in Study 1, we assessed the quality of the action plans by group using separate independent *t* tests for each week. In addition, we calculated the percentage of plans that received a maximum score of 4 over the total amount of action plans created (de Vet et al., 2011). A higher percentage indicated that more action plans received a maximum score.

Using intent to treat analysis, 84 (37%) missing data points were replaced for Week 2 to include all randomized participants (Gupta, 2011). Individuals who did not complete action plans at Week 2 were given the same action planning score as individuals who opted not to create a plan.

Table 1 Behavior Change Technique Coding for the Action Planning Messages

Behavior Change Technique	*Examples*	
	Framed Content: *Gain*	**Framed Content: *Loss***
Information about health consequences	"One successful method to help you work towards the physical activity guidelines is to create proper and detailed physical activity plans."	"Working toward the physical activity guidelines can be difficult, even more so if you do not create proper physical activity plans."
Information about emotional consequences	"Planning helps you to have a sense of accomplishment: 'I did it!'"	"If you don't make a plan, you will most likely be disappointed in yourself for not meeting your goals."
	Unframed Content	
Instruction on how to perform the behavior	"Plan HOW often you will be active this week and indicate WHEN, WHERE, and WHAT you will do to be active."	
Social comparison	"People often make plans that are too general."	
Demonstration of the behavior	"I will be active 3 days a week (HOW), on Mondays, Wednesdays, and Fridays at noon (WHEN). I will go to the gym (WHERE), run on a treadmill for 30 min, and bike for 20 min (WHAT)"	
Set graded tasks	Three different graded examples of physical activity plans provided: (1) starting out, (2) 150+ min of physical activity, and (3) meeting the guidelines with increased intensity.	

Results and Discussion

Preliminary Analyses

There were no differences on the demographics and self-reported action planning between individuals who read the messages (n = 227) and those that did not (n = 337): age, $t(561) = 0.75$, $p = .45$; gender, $\chi^2(1) = 0.69$, $p = .41$; education, $\chi^2(3) = 2.58$, $p = .51$; ethnicity, $\chi^2(1) = 0.003$, $p = .96$; action planning, $t(560) = 0.69$, $p = .49$. The message groups did not differ in terms of age, $t(224) = -0.77$, $p = .44$; gender, $\chi^2(1) = 0.28$, $p = .60$; education, $\chi^2(3) = 6.44$, $p = .09$; ethnicity, $\chi^2(1) = 0.28$, $p = .62$; and self-reported action planning, $t(225) = 0.22$, $p = .83$, indicating successful randomization. There was no difference found by group for both manipulation check items, message content: $t(214.14) = -0.96$, $p = .34$; tone: $t(217) = -.04$, $p = .97$ (see Table 2 for means). When comparing individuals who dropped out at Week 2 with those who completed that time point, no differences were found for age, $t(224) = -0.33$, $p = .74$; gender, $\chi^2(1) = 1.28$, $p = .26$; education, $\chi^2(3) = 1.39$, $p = .71$; ethnicity, $\chi^2(1) = 0.22$, $p = .64$; Week 1 action planning rate, $\chi^2(1) = 0.07$, $p = .79$; and message group, $\chi^2(1) = 0.08$, $p = .78$.

Hypothesis Testing

The percentage of plans that were created for each group across weeks is displayed in Table 2. Immediately after reading their respective messages (Week 1), there were no differences in action plan creation between groups. The gain-framed and loss-framed message group were equally likely to create action plans, $\chi^2(1) = 0.12$, $p = .67$. At Week 2, significant differences were found between framed message groups, $\chi^2(1) = 60.1$, $p = .01$.[2] The post hoc test confirmed that the gain-framed message group made proportionally more action plans compared with the loss-framed message group, $\chi^2(1) = 5.29$, $p = .02$.

McNemar tests were conducted for each group over the 2-week period to determine significant changes in action planning rates. The gain-framed message group sustained their rate of planning, McNemar $\chi^2(1) = 2.44$, $p = .12$, while the loss-framed group experienced a significant decrease in the rate of action planning, McNemar $\chi^2(1) = 21.12$, $p < .001$.

Two independent raters evaluated the quality of the action plans for each week (interclass correlation > .86) and the groups were compared at Week 1 and 2. No differences were observed for either Week 1, $t(102) = 0.29$, $p = .77$, Cohen's $d = .05$, or Week 2, $t(51) = -0.29$, $p = .77$, Cohen's $d = -.08$ on the quality of plans. The same results were found regarding the number of action plans made: Week 1, $t(102) = -0.25$, $p = .80$; Week 2, $t(51) = -0.45$, $p = .65$ (see Table 2). At Weeks 1 and 2, 44 and 15 individuals had at least one action plan that received the maximum score for quality. When observing the percentage of highest quality actions plans/number of action plans, there were no significant difference between both groups at Week 1, $t(42) = 1.48$, $p = .15$, and Week 2, $t(13) = 0.35$, $p = .97$, Cohen's $d = .02$. A moderate effect was revealed for Week 1 (Cohen's $d = .45$) supporting a larger percentage of highest quality action plans in the gain-frame group ($M = 81.00$, $SD = 27.77$) compared with the loss frame group ($M = 67.72$, $SD = 30.60$).

The hypothesis regarding the extent of action plan creation was supported at Week 2, where a larger proportion of individuals in the gain-framed message group created an action plan. Week 1 results are similar to those of Study 1 to the extent that when individuals are prompted to create an action plan after reading a message, the message content appears to be less influential than the prompt. However, the message content that focused on the

Table 2 Manipulation Check, Action Plan Creation Rates, Action Plan Quality Scores, and Number of Action Plans Created by Message Framing Group in Study 2

	Gain-Framed	Loss-Framed
Manipulation Check, *M* (*SD*)		
Message Content	1.34 (0.69)	1.44 (0.95)
Tone	1.66 (0.78)	1.66 (0.78)
Number (%) of Created Action Plans		
Week 1	46 (46%)	62 (49%)
Week 2	35 (35%)	26 (21%)
Quality of Action Plans, *M* (*SD*)		
Week 1	69.04 (22.25)	67.82 (20.40)
Week 2	57.69 (19.62)	59.47 (24.35)
Number of Action Plans, *M* (*SD*)		
Week 1	5.18 (1.50)	5.25 (1.55)
Week 2	5.62 (1.45)	5.81 (0.31)

Note. Manipulation check variables are on a scale of 1 (*benefits of planning*) to 5 (*the risks of not planning*). The tone of the message was scaled as 1 (*very positive*) or 5 (*very negative*). The quality of action plans scores were on a 0–100% scale.

benefits of planning (i.e., gain-framed) was more effective at motivating individuals to create an action plan 1 week after reading the message despite a prompt. In contrast, the loss-framed group significantly decreased action planning rates at 1 week despite receiving a prompt. Based on the results of this study, a gain-framed approach appears to be effective because the rate of action planning is more likely to be sustained over 1 week compared with a loss-framed message.

Despite these positive findings, caution still needs to be taken in their interpretation because our manipulation checks were not significant. We further discuss this limitation in the general discussion section. Although no differences were found for action plan quality in this study, it appears that either a gain- or loss-frame results in plans of equal quality. This result seems to agree with that of Study 1, suggesting that any provision of action planning information results in better quality planning versus the absence of such information from persuasive messages. It appears that it is important to inform individuals how to properly create detailed action plans to ensure quality.

General Discussion

The purpose of Study 1 and 2 was to test messaging strategies for their efficacy in persuading individuals to create action plans. Across both studies, 45–55% of individuals created action plans for physical activity immediately after reading a message on physical activity and action planning. Results of Study 2 highlight that a gain-framed message promoting the benefits of action planning for physical activity participation in upcoming weeks sustained action planning over 1 week when compared with the loss-framed message group. Regarding the quality of action plans, providing instructions to create an action plan was found to be helpful for developing higher quality action plans than not providing this step-wise information. Considering the results of both studies, it appears that a gain-framed message that explains how to properly create detailed physical activity action plans may be a promising strategy to affect this self-regulatory behavior.

The average action plan rates immediately after reading the information provided was consistent across both studies: 50% for Study 1, and 46% at Week 1 for Study 2. These rates are promising in comparison with the rates found in action planning information provided via a brochure (only 16% created action plans; Latimer et al., 2006) and comparable to the compliance rate of a physical activity action planning intervention (Skår et al., 2011). Given that no differences were found between groups on action planning rates for unframed messages in Study 1 and differences were found at Week 2 in Study 2, the main conclusion that can be drawn is that a gain-framed action planning message results in sustained action planning rates whereas a loss-framed message results in a decline. Because action planning can be viewed as a low-risk behavior, the gain-framed advantage found in Study 2 is consistent with message framing perspectives (Rothman & Salovey, 1997). This support also agrees with findings from studies testing message framing with low-risk outcomes (Chang, 2007; Gallagher & Updegraff, 2012).

Regarding the quality of action plans, it was revealed that when a message informs its reader about steps to create an action plan, the plan is of higher quality and thus more specific and detailed. Framing the action planning message did not have a differential influence on action planning quality. Although not statistically significant, the gain-framed message group did create slightly more action plans that were of maximum quality as revealed by the moderate effect size. Quality scores in Study 2 were comparable to the action planning message group and higher than the physical activity only group (i.e., no action plan) of Study 1. Provision of how-to-plan information appears to be sufficient to increase the quality of action plans. However, there could be a slight benefit to a gain-frame message on plan quality, but these results are still preliminary.

Although we cannot compare studies directly, it is promising that our finding appears to be similar to interventionist-assisted action planning versus self-administered action planning (Ziegelmann et al., 2006) with respect to fostering action planning quality. Ziegelmann and colleagues showed that action plans were created with higher quality when an interventionist helped with developing the action plan compared with self-administered action planning. Given that the current study was able to increase action plan quality by providing detailed information on action planning, a future study testing the reach and efficacy of an in-person versus alternative method (e.g., online planning tool) would be interesting.

Practical Applications

While being mindful that our results are preliminary, it can be tentatively suggested that a persuasive message protocol about action planning promotion messages can help participants create higher quality action plans. Further, we suggest that a gain-framed strategy appears to be useful in developing future message content for action planning when we consider our results in the context of the broader messaging literature for promoting physical activity (Latimer et al., 2010). Therefore, a gain-framed action planning message that informs readers "how to" create specific and detailed physical activity action plans appears to be the most promising strategy to promote action planning behavior.

Strengths, Limitations, and Future Research

These studies were characterized by the following strengths. First, the focus was on action planning as the dependent behavioral variable to examine messaging strategies that would promote this self-regulatory construct. Second, we addressed the call to ground studies

in theory, (i.e., Study 1 and 2, action plans, health action process approach; Study 2, message framing). Third, by using a prospective design in Study 2, we examined whether messaging effects on action planning endured over time, a first relative to action planning through messaging in the physical activity literature.

However, preliminary studies are not without limitations. First, our participants were predominantly women, thus limiting the generalizability of our findings. A second limitation was the nonsignificant manipulation checks in Study 2. This result was surprising given the focus group confirmed the differences in the tone of the messages. However, focus group participants read both messages, which allowed for a direct comparison of the framed-message and may be the reason why they validated the difference. The nonsignificant difference in the experiment could be also be explained by the mixed-framed message read by the loss-framed planning group. This group read a positive physical activity message followed by a loss-framed action planning message. Exposure to both types of content for the loss-framed group may have confounded the interpretation and tone of the loss-framed action plan message. This is only a speculation, however, as there is little research on mixed-framed messages (e.g., Chang, 2007). Future studies could clarify effects produced by those types of messages, especially for action planning. A third limitation was that we recruited inactive individuals who were willing to change their physical activity levels in the upcoming months rather than in the next week. A future improvement with better time frame correspondence would be to test these action planning messages with individuals who are ready to increase their physical activity in the next week to determine if the messages are more or less effective.

Action planning rates were modest despite the fact that action planning is a simple behavior. More studies are needed to test other approaches (e.g., message tailoring) to determine the optimal content of messages that would encourage more individuals to create action plans. Such research is also necessary to determine why certain individuals did not create postmessage action plans. Uncovering these reasons would further inform us about efficacious content for action planning messages and their feasibility in altering that behavior via messaging approaches. This study provided some insight about how to build action planning messages, but future research testing strategies of messaging to improve quality and frequency of use of this self-regulatory strategy is warranted. Future studies should also investigate the longevity of effects of gain-framed, action-planning messages to determine whether they persist or decay and whether these effects can actually influence individuals to execute their physical activity as planned. Finally, once strong and effective action planning messages are constructed they should be tested to determine if these action planning promoting messages also lead to increases in physical activity participation. If such results are found in future studies, a strong messaging strategy to increase this health behavior will have been established.

These proof-of-concept studies may have implications for the feasibility of future interventions aimed to reach larger segments of the population. This implication concerns scalable interventions, which is defined by Milat, King, Bauman, and Redman (2013) as

> the ability of a health intervention shown to be efficacious on a small scale and or under controlled conditions to be expanded under real world conditions to reach a greater proportion of the eligible population, while retaining effectiveness. (p. 5)

One implication of utilizing this strategy through messaging is that it offers potential as a scalable method of promoting action planning that could have broader reach. This implication begs for more research of the type illustrated by our studies.

Conclusion

Our investigations attempted to promote action planning by testing different persuasive messages. We found a probable gain-framed content advantage and highlighted the importance of providing detailed how-to action planning in persuasive messages. We clearly have to determine if we can demonstrate larger effects regarding the frequency of use of action plans via persuasive messaging. Nonetheless, it seems important to explore strategies for messaging that promote this action planning behavior given the evidence of its success in fostering and being related to changes in various health behaviors. Research about the coupling of persuasive messaging with instruction about action planning is a research area still in its infancy. Our studies are one small but promising step toward its development.

Notes

1. The messages used in these studies can be obtained by contacting Dr. Shane Sweet at shane.sweet@mcgill.ca.

2. Analyses were also conducted for individuals who only completed Week 2 (n = 143). Results were the same as the intent to treat analysis. Week 1, no group differences: $\chi^2 = 0.002$, $p = .97$, Cramer's $V = .01$. Week 2, gain-framed message group created more plans than loss-frame message group: $\chi^2 = 6.85$, $p = .01$, Cramer's $V = .22$.

References

Ashford, S., Edmunds, J., & French, D.P. (2010). What is the best way to change self-efficacy to promote lifestyle and recreational physical activity? A systematic review with meta-analysis. *British Journal of Health Psychology, 15,* 265–288. PubMed doi:10.1348/135910709X461752

Baranowski, T., Anderson, C., & Carmack, C. (1998). Mediating variable framework in physical activity interventions. How are we doing? How might we do better? *American*

Journal of Preventive Medicine, 15, 266–297. PubMed doi:10.1016/S0749-3797(98)00080-4

Bauman, A.E., Sallis, J.F., Dzewaltowski, D.A., & Owen, N. (2002). Toward a better understanding of the influences on physical activity: The role of determinants, correlates, causal variables, mediators, moderators and counfounders. *American Journal of Preventive Medicine, 23,* 5–14. PubMed doi:10.1016/S0749-3797(02)00469-5

Canadian Society for Exercise Physiology. (2011). Canadian physical activity guidelines for adults. Retrived from http://www.csep.ca/CMFiles/Guidelines/CSEP_PAGuidelines_adults_en.pdf

Carraro, N., & Gaudreau, P. (2013). Spontaneous and experimentally induced action planning and coping planning for physical activity: A meta-analysis. *Psychology of Sport and Exercise, 14,* 228–248. doi:10.1016/j.psychsport.2012.10.004

Centers for Disease Control and Prevention. (2012, August 7). *Physical activity.* Retrieved February 18, 2014, from http://www.cdc.gov/physicalactivity/index.html

Chang, C-T. (2007). Health-care product advertising: The influences of message framing and perceived product characteristics. *Psychology and Marketing, 24,* 143–169. doi:10.1002/mar.20156

Colley, R.C., Garriguet, D., Janssen, I., Craig, C.L., Clarke, J., & Tremblay, M.S. (2011). Physical activity of Canadian adults: Accelerometer results from the 2007 to 2009 Canadian Health Measures Survey. *Health Reports, 22,* 7–14. PubMed

Darker, C.D., French, D.P., Eves, F.F., & Sniehotta, F.F. (2010). An intervention to promote walking amongst the general population based on an 'extended' theory of planned behaviour: A waiting list randomised controlled trial. *Psychology & Health, 25,* 71–88. PubMed doi:10.1080/08870440902893716

de Vet, E., Oenema, A., & Brug, J. (2011). More or better: Do the number and specificity of implementation intentions matter in increasing physical activity? *Psychology of Sport and Exercise, 12,* 471–477. doi:10.1016/j.psychsport.2011.02.008

Fenner, Y., Garland, S., Moore, E., Jayasinghe, Y., Fletcher, A., Tabrizi, S., . . . Wark, J. (2012). Web-based recruiting for health research using a social networking site: An exploratory study. *Journal of Medical Internet Research, 14,* e20. PubMed doi:10.2196/jmir.1978

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Washington, DC: Sage Publications.

Fuchs, R., Seelig, H., Göhner, W., Burton, N.W., & Brown, W.J. (2012). Cognitive mediation of intervention effects on physical exercise: Causal models for the adoption and maintenance stage. *Psychology & Health, 27,* 1480–1499. PubMed doi:10.1080/08870446.2012.695020

Gainforth, H.L., Barg, C.J., Latimer, A.E., Schmid, K.L., O'Malley, D., & Salovey, P. (2011). An investigation of the theoretical content of physical activity brochures. *Psychology of Sport and Exercise, 12,* 615–620. PubMed doi:10.1016/j.psychsport.2011.06.002

Gallagher, K.M., & Updegraff, J.a. (2012). Health message framing effects on attitudes, intentions, and behavior: A meta-analytic review. *Annals of Behavioral Medicine, 43,* 101–116. PubMed doi:10.1007/s12160-011-9308-7

Gollwitzer, P.M. (1999). Implementation intentions: Strong effects of simple plans. *The American Psychologist, 54,* 493–503. doi:10.1037/0003-066X.54.7.493

Gupta, S.K. (2011). Intention-to-treat concept: A review. *Perspectives in Clinical Research, 2,* 109–112. PubMed doi:10.4103/2229-3485.83221

Koring, M., Richert, J., Parschau, L., Ernsting, A., Lippke, S., & Schwarzer, R. (2012). A combined planning and self-efficacy intervention to promote physical activity: A multiple mediation analysis. *Psychology, Health & Medicine, 17,* 488–498. PubMed doi:10.1080/13548506.2011.608809

Kreuter, M.W., Strecher, V.J., & Glassman, B. (1999). One size does not fit all: The case for tailoring print materials. *Annals of Behavioral Medicine, 21,* 276–283. PubMed doi:10.1007/BF02895958

Latimer, A.E., Brawley, L.R., & Bassett, R.L. (2010). A systematic review of three approaches for constructing physical activity messages: What messages work and what improvements are needed? *The International Journal of Behavioral Nutrition and Physical Activity, 7,* 36. PubMed doi:10.1186/1479-5868-7-36

Latimer, A.E, Rench, T., Rivers, S.E., & Salovey, P. (2006). [Testing tailored physical activity brochures], unpublished raw data.

Marcus, B.H., Selby, V.C., Niaura, R.S., & Rossi, J.S. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport, 63,* 60–66. PubMed doi:10.1080/02701367.1992.10607557

Michie, S., Dormandy, E., & Marteau, T.M. (2004). Increasing screening uptake amongst those intending to be screened: The use of action plans. *Patient Education and Counseling, 55,* 218–222. PubMed doi:10.1016/j.pec.2003.09.005

Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., . . . Wood, C. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behavior change interventions. *Annals of Behavioral Medicine, 46,* 81–95. PubMed doi:10.1007/s12160-013-9486-6

Milat, A.J., King, L., Bauman, A.E., & Redman, S. (2013). The concept of scalability: Increasing the scale and potential adoption of health promotion interventions into policy and practice. *Health Promotion International, 28,* 285–298. PubMed doi:10.1093/heapro/dar097

Painter, J.E., Borba, C.P.C., Hynes, M., Mays, D., & Glanz, K. (2008). The use of theory in health behavior research from 2000 to 2005: A systematic review. *Annals of Behavioral Medicine, 35,* 358–362. PubMed doi:10.1007/s12160-008-9042-y

Rhodes, R.E., & Pfaeffli, L.A. (2010). Mediators of physical activity behaviour change among adult non-clinical populations: A review update. *The International Journal of Behavioral Nutrition and Physical Activity, 7,* 37–47. PubMed doi:10.1186/1479-5868-7-37

Rothman, A.J., & Salovey, P. (1997). Shaping perceptions to motivate healthy behavior: The role of message

framing. *Psychological Bulletin, 121,* 3–19. PubMed doi:10.1037/0033-2909.121.1.3

Schwarzer, R. (2008). Modeling health behavior change: How to predict and modify the adoption and maintenance of health behaviors. *Applied Psychology, 57,* 1–29.

Schwarzer, R., Luszczynska, A., Ziegelmann, J.P., Scholz, U., & Lippke, S. (2008). Social-cognitive predictors of physical exercise adherence: Three longitudinal studies in rehabilitation. *Health Psychology, 27,* S54–S63. PubMed doi:10.1037/0278-6133.27.1(Suppl.).S54

Skår, S., Sniehotta, F.F., Molloy, G.J., Prestwich, A., & Araújo-Soares, V. (2011). Do brief online planning interventions increase physical activity amongst university students? A randomised controlled trial. *Psychology & Health, 26,* 399–417. PubMed doi:10.1080/08870440903456877

Sniehotta, F.F., Schwarzer, R., Scholz, U., & Schüz, B. (2005). Action planning and coping planning for long-term lifestyle change: Theory and assessment. *European Journal of Social Psychology, 35,* 565–576. doi:10.1002/ejsp.258

Townsend, N., Bhatnagar, P., Wickramasinghe, K., Scarborough, P., Foster, C., & Rayner, M. (2012). *Physical activity statistics 2012.* London, UK: British Heart Foundation.

Tudor-Locke, C., Brashear, M., Johnson, W., & Katzmarzyk, P. (2010). Accelerometer profiles of physical activity and inactivity in normal weight, overweight, and obese U.S. men and women. *The International Journal of Behavioral Nutrition and Physical Activity, 7,* 60. PubMed doi:10.1186/1479-5868-7-60

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211,* 453–458. PubMed doi:10.1126/science.7455683

Wiedemann, A.U., Lippke, S., Reuter, T., Ziegelmann, J.P., & Schüz, B. (2011). The more the better? The number of plans predicts health behaviour change. *Applied Psychology: Health and Well-Being, 3,* 87–106. doi:10.1111/j.1758-0854.2010.01042.x

Williams, S.L., & French, D.P. (2011). What are the most effective intervention techniques for changing physical activity self-efficacy and physical activity behaviour – and are they the same? *Health Education Research, 26,* 308–322. PubMed doi:10.1093/her/cyr005

Woodgate, J., & Brawley, L.R. (2008). Use of an efficacy-enhancing message to influence the self-regulatory efficacy of cardiac rehabilitation participants: A field experiment. *Rehabilitation Psychology, 53,* 153–161. doi:10.1037/0090-5550.53.2.153

World Health Organization. (2010). *Global recommendations on physical activity for health.* Geneva, Switzerland: Author.

Ziegelmann, J.P., Lippke, S., & Schwarzer, R. (2006). Adoption and maintenance of physical activity: Planning interventions in young, middle-aged, and older adults. *Psychology & Health, 21,* 145–163. PubMed doi:10.1080/1476832050018891

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