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Evaluating time frame expectancies in physical activity social cognition: Are short- and long-term motives different?

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Running Head: Time-Framing

Evaluating Time Frame Expectancies in Physical Activity Social Cognition: Are Short- and Long-Term Motives Different?

Key Words: Theory of Planned Behaviour

Abstract

Promoting maintenance of regular physical activity (PA) is a public health priority, however, no research has examined whether the expectancies of proximal PA enactment are similar to the expectancies of longer maintenance. Thus, the purpose of this study was to evaluate whether PA expectancies, measured with constructs of the theory of planned behaviour (TPB), differed as a function of the time-frame (no time frame, next week, next month, next six months) used in the item stems. Undergraduate students (N = 409) completed self-report measures of the TPB that were randomly distributed with the possibility of receiving one of the four possible time-frames; results across the four groups were then compared. Analysis of variance tests showed 13 of 37 constructs were significantly ($p < .05$) different and post-hoc follow-up tests identified that the proximal time-frame had the significantly lower mean value. Chi-square tests of independent correlations, however, revealed few differences in TPB-intention correlations by time-frame. The results suggest that social cognitive correlates of PA intention are robust to time-frame deviations, but time-frame may affect the absolute values of some constructs. Overall, this is a positive finding because it suggests that PA promotion efforts focused on increasing expectancies do not have to tailor to proximal and more distal maintenance applications.

Regular physical activity (PA) has well-documented health benefits ¹ but relatively low participation prevalence ^{2,3}; thus promotion of PA is a public health priority. Similar to other health behaviours (e.g., healthy eating) that require sustained behavioural engagement, there has been a recent focus on differentiating short-term behavioural acts from long-term maintenance of the behaviour ⁴. In PA, this differentiation is also predicated on a commonly cited 50% drop-out of PA within the first six months of initiation ⁵. Therefore, a comprehensive understanding of short- and long-term PA is a worthy line of research in order to uncover what aspects may require tailoring in promotion efforts.

Research on this topic is relatively scant but some studies have begun to evaluate differences in adoption compared to maintenance. For example, Rhodes and Plotnikoff ⁶ found that self-regulation strategies, measured as processes of change, were more predictive of the translation of intention into behaviour for those adopting rather than maintaining PA. Still, a more basic factor that has not received research attention is whether reasons/motives for PA vary for short-term acts compared to longer-term maintenance. Specifically, proximal considerations of PA-related expectancies may differ from distal considerations. The importance of proximal and distal expectancies is highlighted in Bandura's ⁷ social cognitive theory, but the issue has not received attention in PA research. Thus, research on time-frame and PA-related social cognition is needed.

From an applied perspective, social cognitive constructs targeted to promote PA should also be sensitive to the appropriate time-framing if differences are evident. For example, the physical health and weight-loss benefits of regular PA are conceivably maintenance-based motives because they take considerable time to accrue. Tailored intervention approaches to PA motivation promotion may need to match the appropriate target expectancies to a time-frame

(e.g., proximal behavioural engagement versus maintenance). The current approach in most public health PA promotion is to show no time-frame differentiation in favour of a relatively straightforward listing of benefits of PA and strategies to overcome barriers^{8,9}. Although this may be sufficient to provide the motives for proximal and distal PA, it seems prudent to first establish that there are no differences in the motives/expectancies of PA by time-frame.

From a theoretical standpoint, differences that emerge in PA-related expectancies as a function of time-framing would underscore an additional moderator of expectancy and PA motivation relations. The findings may also help lead to a better understanding of short-term and long-term prediction models for PA. Currently, our understanding of time-frame issues in social cognition has focused on the distance between prospective assessments (e.g., time 1 and time 2)¹⁰⁻¹², but a difference between construal of concurrent distal and proximal PA expectations has not been evaluated.

Therefore, the purpose of this study was to evaluate whether PA expectancies differed as a function of the time-frame (no time frame, next week, next month, next six months) used in the item stems in terms of absolute value and their correlation with intention to engage in PA. The model chosen to evaluate PA expectancies in this study was Ajzen's¹³ theory of planned behaviour (TPB), based on its strong predictive capability in the PA domain¹¹. This theory suggests that intention, one's motivation to engage in a behavioural act, is the primary determinant of behaviour. In turn, intention is thought to be influenced by affective and instrumental attitudes (i.e., overall evaluations of the behaviour), subjective norm (i.e., perceived pressure to act on the behaviour from important others), and perceived behavioural control (PBC; i.e., perceived ability to perform the behaviour). The TPB also proposes that belief-level constructs comprise attitude (i.e., behavioural beliefs), subjective norm (i.e., normative beliefs),

and PBC (i.e., control beliefs). Belief-level constructs are hypothesized to include expectancy (e.g., PA will improve my health) and value (e.g., improving my health is important to me) components. Understanding these belief-level constructs is viewed as fundamental during the construction of TPB-based interventions ¹⁴.

There is a paucity of current work in the PA domain to draw upon when forming hypotheses for this study, however, limited research with other behaviours was considered. Specifically, it was hypothesized that means would be lower for the behavioural beliefs (e.g., appearance/weight control, fitness improvements, and prevention of disease) and instrumental attitude in the proximal time-frame compared to the distal time-frame. This was based on the rationale that 1) participants know these PA benefits take longer to achieve and 2) the tenets of construal level theory whereby distant events are construed in higher advocacy than proximal events ¹⁵. In terms of differences in expectancy-intention correlations by time-frame, however, related research in health screening has not supported a time-frame effect ^{16, 17}, and attempts to evaluate time-framing in any capacity with other health behaviours has also shown small to trivial effects ¹⁸⁻²⁰; thus, the null hypothesis was put forward. Finally, the absence of any time-frame for expectancies is used in PA research often, but has not been investigated in terms of how people construe this framing compared to more distinct time-frames (e.g., over the next month, over the next six months). It was thus hypothesized that if differences among time frames emerged, the absence of a time frame condition would resemble more distal/maintenance-based framing because it would be construed as generalized rather than proximal expectancies.

Method

Participants and Procedure

Four hundred and nine students volunteered to participate in the study during their introductory psychology courses. Informed consent was obtained from the participants. Participants attended large group sessions during September and October 2006, completing self-report measures of the TPB and past physical activity. Participants received one of four possible questionnaires that were randomly distributed in the sessions; this resulted in four independent groups of approximately $n = 100$. These questionnaires differed only by the time-frame used in the item stems for the TPB. The possible stems were: 1) no time frame 2) over the next week, 3) over the next month, and 4) over the next six months. The stems chosen reflect the most common time-frames used in TPB research with PA¹¹ as well as typical time-frames that encompass initiation and maintenance^{4,21}, and thus maintain ecological validity and generalizability to prior PA work.

Instruments

The definition of PA was chosen to reflect Health Canada's position stand for recommended weekly activity among adults²². PA was defined as activities performed with at least moderate intensity, 4 or more times per week, accumulating at least 30 minutes each time. Participants were asked to consider this definition when answering the TPB items.

Attitude towards regular physical activity was measured using 7 point bipolar adjective items as suggested by Ajzen and Fishbein²³. Three items were used to tap the instrumental (e.g., useful-useless, wise-unwise, beneficial-harmful) and three items were used to tap the affective (enjoyable-unenjoyable, pleasant-unpleasant, exciting-boring) aspect of attitude as suggested by Ajzen²⁴. Internal consistencies for these measures were borderline acceptable (affective attitude no time-frame $\alpha = .75$, next week $\alpha = .89$, next month $\alpha = .84$, next six months $\alpha = .71$; instrumental attitude no time-frame $\alpha = .59$, next week $\alpha = .66$, next month $\alpha = .58$, next six

months $\alpha = .64$). The statement that preceded the adjectives was “For me, regular physical activity [insert time frame] would be.”

Subjective norm was measured by three items on a 7-point scale that ranged from 1 (strongly disagree) to 7 (strongly agree). Two items measured the injunctive component of subjective norm and one item measured the descriptive component of subjective norm based on the recommendation of Ajzen²⁴. These components were aggregated to form a scale based on the findings of Rhodes and colleagues^{25,26}. The items were: (1) “Most people who are important to me would want me to engage in regular physical activity [insert time frame],” 2) “Most people whose opinions I value would approve of me engaging in regular physical activity [insert time frame],” and 3) “Most people who are important to me will engage in regular physical activity [insert time frame] themselves.” Internal consistency for this measure was borderline acceptable (no time-frame $\alpha = .61$, next week $\alpha = .68$, next month $\alpha = .54$, next six months $\alpha = .67$).

Perceived behavioural control was measured by three questions recommended by Rhodes and Courneya^{27,28}. The three PBC items were: 1) “[insert time frame], I have complete personal control over doing physical activity if I really wanted to do so”; on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree), 2) “Engaging in regular physical activity is mostly up to me [insert time frame], if I wanted to do so”; on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree), and 3) “Engaging in regular physical activity [insert time frame] if I wanted to do so would be...”; on a 7-point scale ranging from 1 (extremely difficult) to 7 (extremely easy). Internal consistency for the measure was acceptable (no time-frame $\alpha = .70$, next week $\alpha = .63$, next month $\alpha = .73$, next six months $\alpha = .73$).

Belief-level constructs of the theory of planned behaviour were used from a previously validated undergraduate sample²⁹. The behavioural expectancies (feel good, take too much time,

improve physical fitness, improve appearance/control weight, relieve my stress, reduce my chances of chronic disease) were asked using seven-point likert-type scales from 1 (extremely unlikely) to 7 (extremely likely) with the stem “for me, regular physical activity [insert time frame] would...” The corresponding value term was measured on a similar seven point scale by asking how important the outcome was for the participant [insert time frame] from 1 (extremely unimportant) to 7 (extremely important). Normative expectancies (friends, family, health professionals, spouse/romantic partner) asked about whether each referent would approve of the participant engaging in regular physical activity [insert time frame] from 1 (completely untrue) to 7 (completely true). These questions followed with corresponding value questions about what the referent thinks in terms of physical activity [insert time frame] being important from 1 (extremely unimportant) to 7 (extremely important). Finally, control expectancy questions asked participants to rate how easy they would find regular PA [insert time frame] if they wanted to despite certain barriers (no time, access to facilities, poor health, bad weather, cost, no one to do the activity with). These items were evaluated on a seven point scale from 1 (extremely difficult) to 7 (extremely easy). Corresponding power of the belief (value) was measured by asking participants to rate the likelihood of these barriers occurring [insert time frame] from 1 (extremely unlikely) to 7 (extremely likely).

Intention was measured using items from Rhodes, Blanchard, Matheson and Coble³⁰ and Courneya³¹. These items included: 1) “I intend to engage in regular physical activity ____ times per week [insert time-frame],” 2) “I am motivated to engage in regular physical activity [insert time-frame],” scored on a scale between 1 (extremely unmotivated) and 7 (extremely motivated); and 3) “I am determined to engage in regular physical activity [insert time-frame],” scored on a scale between 1 (extremely undetermined) and 7 (extremely determined). These items were

standardized and then aggregated to create the measure (no time-frame $\alpha = .71$, next week $\alpha = .87$, next month $\alpha = .70$, next six months $\alpha = .80$).

Past physical activity behaviour was measured using the Godin Leisure Time Exercise Questionnaire^{32,33}. The instrument contains three open ended questions covering the frequency of mild (e.g., easy walking), moderate (e.g., fast walking), and strenuous (e.g., jogging) exercise completed during free time for at least 30 minutes duration in a typical week. Our adaptation included substituting “physical activity” for “exercise.” Strenuous and moderate physical activity frequencies were aggregated to produce a total activity frequency at or above moderate intensity. Mild activity was not included as an indicator due to its incongruence with our definition of regular physical activity.

Analysis Plan

Mean differences in TPB constructs by time-frame were evaluated using a series of one-way analyses of variance tests. Significant findings were followed-up using Tukey post-hoc tests. To evaluate relationships in the TPB model, chi-square tests of independent sample correlations were performed across TPB constructs and the multiple R from the multivariate model. Significant differences in correlations were followed-up using Fisher Z tests. We decided to use intention as the critical dependent variable for this study. This was based on 1) our desire to evaluate distal and proximal PA motives (i.e., correlates of intention), and 2) an attempt to eliminate other confounds from the analyses. Variation of an actual prospective design time-frame introduces previously demonstrated memory and cognition stability confounds^{10,24} which make the assessment of simple time-frame expectancies and TPB-behaviour relations problematic. Type one error was set at .05 throughout and the analyses were powered to detect a small effect size ($f = .17$, $q = .19$).

Results

The mean age of participants was 21.74 (SD = 7.04 yrs), 70% were female, and the mean year in university for the sample was 1.79 (SD = 1.10). Further, in terms of prior PA status, 41% of the sample was not meeting the minimum recommended guidelines of PA set by Health Canada⁹ (i.e., 4 times per week accumulating 30 minutes, at a moderate intensity or higher) while 69% of the sample were not meeting Health Canada's general guidelines for activity (i.e., daily PA accumulating 30 minutes, at a moderate intensity or higher). Randomization of groupings resulted in equal n's across the no time-frame (n = 103), next week (n = 102), next month (n = 103) and next six months (n = 101) conditions. Analysis of variance and chi-square tests showed no significant differences for age, gender, year in school, and past physical activity ($p > .05$) across these time-frame conditions. Because of this null finding, these variables were not entered as covariates in any further analyses^A.

The analysis of mean TPB constructs by time-frame is detailed in Table 1. Overall, 12 of 37 tests showed significant differences in the small effect size range (i.e., $\eta^2 = .02 - .05$). Post-hoc tests indicated that the next week time-frame had lower means than all other time-frames for behavioural expectancies about feeling good and improving fitness, and the control (power/value) belief about the cost of PA. Similarly, the next week time-frame had lower means than no time-frame and the next month frame for the behavioural expectancy about improving appearance, the values of improving fitness, and abiding by physician norms, and the control belief (expectancy) about overcoming health barriers. The expectancy of reducing disease risk had lower means for next week and the next six months compared to next month, while its value term was lower for all specific time-frames when compared to no time-frame. Next week and next month were lower for the control belief (power/value) for poor health, while next week was

also lower than the next six months time-frame. Next week and no time-frame, however, were lower than next month and the next six months for the control belief (power/value) about bad weather. Finally, the control belief (power/value) about lack of recreation centre access was lower for the next month time-frame compared to the next six months and no time-frame.

The analysis of differences in TPB construct-intention associations by time-frame can be found in Table 2. Two of 37 tests displayed significant differences. Post-hoc tests, suggested that the six-month time-frame resulted in a larger subjective norm and intention association than the no time-frame and next week conditions. Also, the control belief (value/power) about lack of social support had a larger association with intention for next month compared to next week and the next six months.

Discussion

Understanding differences between initiation and maintenance of repetitive health behaviours has been recommended⁴, but no study had evaluated whether the reasons for acting on PA (i.e., expectancies) differed when short- or long-term performance was considered. Thus, this was the first study to evaluate simple manipulations of time-frame expectancies (no time frame, next week, next month, next six months) in the PA domain. Results, using Ajzen's¹³ TPB as a template for the types of expectancies considered, proved interesting and generally supported our hypotheses.

First, for the evaluations of TPB construct means, it was hypothesized that instrumental beliefs (e.g., appearance/weight control, fitness improvements, prevention of disease) and attitude in the proximal time-frame would be lower compared to more distal time-frames and that of the "no time-frame" condition. This hypothesis was based on the rationale that these PA benefits take longer to achieve and our speculation that this is quite well known among

participants. It was speculated that in the absence of a time frame, participants would generally consider the longer-term maintenance of PA. Additionally, there is general support in social psychology for a proposition called construal level theory whereby distant events are construed in higher advocacy than proximal events¹⁵. Overall, the results provided some support for this hypothesis. Approximately one third of the tests of TPB constructs showed differences by time-frame and almost all of these favoured the direction of lower mean values for the “next week” condition. The results also showed some support for our hypothesis that the no time-frame condition would act similar to the more distal time-frames (10/37 tests). Interestingly, these findings were prevalent in behavioural beliefs (feel good, increase fitness, improve appearance/control weight) and control beliefs (health, weather, cost), but the value that one places on health professionals was the only difference for subjective norm.

These results have practical utility when understanding PA motives and the application to promotion. From a TPB standpoint, mean levels of cognitions are important in the planning of interventions^{14, 34}. Variability in the constructs (i.e., from the ceiling) is needed in order to demonstrate room for potential change. The subsequent shrinking of expectancies in proximal time-frames compared to more distal time-frames may signal a more accurate reflection of PA motives. These results suggest that the range in these beliefs may actually increase in the proximal future; thus, belief-based interventions focusing on the immediate future may be a worthy endeavour for promotion efforts.

The findings, however, suggested that time-frame did not affect mean values in over 60% of the TPB constructs. Furthermore, we were not able to discern a clear difference between affective and instrumental beliefs as hypothesized. For example, proximal instrumental beliefs about fitness and appearance were lower than distal time-frames, but this was not observed in

expectations and values about reducing disease risk. Similarly, the behavioural belief about stress relief was not different by time-frame, but the expectancy about feeling good, arguably an affective belief, was similar to the findings for fitness and appearance. The null and mixed results suggest, at least among this undergraduate sample, that time-framing may not be a particularly robust factor in the absolute value of PA cognitions.

Our second hypothesis was that limited differences would emerge for proximal and distal expectancies in their prediction of intention. This was based largely on prior literature in other health behaviour domains showing small or null effects^{16, 17, 18-20}. Our results supported this null hypothesis generally. Although some minor differences emerged, no trends were present in the findings. This suggests that PA expectancies and intention, at least as measured by the TPB, are robust to time-frame manipulation and also provides evidence that motives for PA are relatively stable across various expected durations. The results should be considered a positive finding because they suggest that tailoring motivational content in PA by proximal and maintenance-based time frames alone may not be needed. As this is not a current approach in public health, the robustness of PA cognitions and intention supports this current practice although replication within a larger community sample would still be helpful.

One additional reason for this null finding may be the small effect-size correlations that TPB cognitions have with intention generally. With a few exceptions (affective attitude and beliefs, PPB, time and social support), TPB constructs may not possess the magnitude of correlations that could even result in meaningful differences. One explanation for these findings may be attenuation due to measurement error, but our results were similar to prior meta-analyses^{35, 36}. Deviations around small effect sizes are likely to be too small to be anything but trivial. Still, prior work in health screening has shown that consideration of future consequences, an

individual difference variable, moderates the effect of time frame on social cognition^{16, 17}.

Future study in the PA domain may prove helpful.

Finally, belief analyses are relatively scant in the TPB literature when compared to global (direct) assessments³⁷ and so it is helpful to summarize the belief-level correlates of intention from these data. Ajzen¹⁴ suggests that behavioural interventions should be implemented based on the TPB beliefs and their corresponding association with intention. Overall, the behavioural expectancies about feeling good, relieving stress, PA taking too much time (reverse association) and the behavioural value of increasing fitness appear to be important targets (medium effect size correlates of PA) for PA intention promotion within this undergraduate student sample. Additionally, focused attention on overcoming time barriers to PA and fostering social support may hold utility. TPB theory^{14, 24} would suggest that efforts to concentrate behavioural interventions on these beliefs may yield the most changes in terms of PA via intention. By contrast, a focus on instrumental expectancies (e.g., fitness, appearance, disease risk), normative beliefs, and other control beliefs (e.g., access, health, cost) may result in limited PA change utility at least in a college sample. It is notable that public health PA promotion and current PA research do not generally distinguish between these sets of beliefs^{8, 9, 38}. Future studies promoting these beliefs and evaluating the impact on PA would thus be prudent.

The results of this study need to be interpreted within the context of its limitations. First, the convenience sample of primarily female undergraduates may not generalize to the population at large. Still, the effect of age and gender on TPB expectancies are generally not robust^{11, 35}. Second, the time-frames used in this study were chosen based on their ecological validity from prior TPB research¹¹, but longer durations (e.g., 5 years) may have produced different results. Third, our sheer number of statistical tests undeniably raised the experimentwise type-one error.

The lack of significant findings, however, renders this violation moot. Finally, the beliefs used in this study were derived from prior pilot work and reflect most of the themes in TPB studies³⁷, but different beliefs may provide different findings.

Footnote

A. Gender, age, and year in school also did not correlate with intention. Thus, we did not include these variables as covariates in the analyses of TPB-intention correlations.

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References

1. Warburton DE, Nicol CW, Bredin SS. Health benefits of physical activity: the evidence. *Canadian Medical Association Journal*. 2006;174:801-809.
2. Canadian Fitness and Lifestyle Research Institute. 2002 Physical Activity Monitor. Available at: <http://www.cflri.ca/cflri/pa/surveys/2002survey/2002survey.html>. Accessed August, 2004.
3. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General*. Atlanta, GA: National Center for Chronic Disease Prevention and Health Promotion, Center for Disease Control and Prevention; 1996.
4. Rothman AJ, Baldwin AS, Hertel AW. Self-regulation and behavior change: Disentangling behavioral initiation and behavioral maintenance. In: Baumeister RF, Vohs

- KD, eds. *Handbook of self-regulation: Research, theory, and applications*. New York, NY: Guilford Press; 2004:130-148.
5. Dishman RK, Buckworth J. Increasing physical activity: A quantitative synthesis. *Medicine and Science in Sports and Exercise*. 1996;28:706-719.
 6. Rhodes RE, Plotnikoff RC. Understanding action control: Predicting physical activity intention-behavior profiles across six months in a Canadian sample. *Health Psychology*. 2006;25:292-299.
 7. Bandura A. *Self-efficacy, the exercise of control*. New York: Freeman; 1997.
 8. U.S. Department of Health and Human Services. Physical activity for everyone: Recommendations. *Center for Disease Control and Prevention*. Available at: <http://www.cdc.gov/nccdphp/dnpa/physical/recommendations/>. Accessed November 10, 2005.
 9. Health Canada. Health Canada's Physical Activity Guide. Available at: http://www.hc-sc.gc.ca/english/lifestyles/physical_activity.html. Accessed August, 2004.
 10. Sheeran P. Intention-behaviour relations: A conceptual and empirical review. In: Hewstone M, Stroebe W, eds. *European Review of Social Psychology*. Vol 12. Chichester, UK: John Wiley & Sons; 2002:1-36.
 11. Symons Downs D, Hausenblas HA. Exercise behavior and the theories of reasoned action and planned behavior: A meta-analytic update. *Journal of Physical Activity and Health*. 2005;2:76-97.
 12. Randall DM, Wolff JA. The time interval in the intention-behaviour relationship: Meta-analysis. *British Journal of Social Psychology*. 1994;33:405-418.

13. Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991;50:179-211.
14. Ajzen I. Construction of a theory of planned behavior intervention. Available at: <http://www-unix.oit.umass.edu/~aizen/pdf/tpb.measurement.pdf>. Accessed April 4, 2007.
15. Trope Y, Liberman N. Temporal construal. *Psychological Review*. 2003;110:403-421.
16. Orbell S, Perugini M, Rakow T. Individual differences in sensitivity to health communications: Consideration of future consequences. *Health Psychology*. 2004;23:388-396.
17. Orbell S, Hagger M. Temporal framing and the decision to take part in type 2 diabetes screening: Effects of individual differences in consideration of future consequences on persuasion. *Health Psychology*. 2006;25:537-548.
18. Weisner C, Kaskutas LA, Hilton ME, Barile AL. "When you were drinking" vs. "in the past 12 months": the impact of using different time frames in clinical and general populations. *Addiction*. 1999;94:731-736.
19. Bagozzi RP. Attitudes, intentions, and behavior: A test of some key hypotheses. *Journal of Personality and Social Psychology*. 1981;41:607-627.
20. Pomazal RJ, Jaccard JJ. An informational approach to altruistic behavior. *Journal of Personality and Social Psychology*. 1976;33:317-326.
21. Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *American Journal of Health Promotion*. 1997;12:38-48.
22. Health-Canada. Health Canada's Physical Activity Guide. Available at: http://www.hc-sc.gc.ca/english/lifestyles/physical_activity.html. Accessed August, 2004.

23. Ajzen I, Fishbein M. *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice Hall; 1980.
24. Ajzen I. Constructing a TPB questionnaire: Conceptual and methodological considerations. Available at: <http://www-unix.oit.umass.edu/~ajzen/>. Accessed April 7, 2007.
25. Rhodes RE, Courneya KS. Investigating multiple components of attitude, subjective norm, and perceived behavioral control: An examination of the theory of planned behavior in the exercise domain. *British Journal of Social Psychology*. 2003;42:129-146.
26. Rhodes RE, Blanchard CM, Matheson DH. A multi-component model of the theory of planned behavior. *British Journal of Health Psychology*. 2006;11:119-137.
27. Rhodes RE, Courneya KS. Self-efficacy, controllability, and intention in the theory of planned behavior: Measurement redundancy or causal independence? *Psychology and Health*. 2003;18:79-91.
28. Rhodes RE, Courneya KS. Differentiating motivation and control in the theory of planned behavior. *Psychology, Health and Medicine*. 2004;9:205-215.
29. Rhodes RE, Blanchard CM, Matheson DH. Motivational antecedent beliefs of endurance, strength, and flexibility activities. *Psychology, Health and Medicine*. 2007;12:148-162.
30. Rhodes RE, Blanchard CM, Matheson DH, Coble J. Disentangling motivation, intention, and planning in the physical activity domain. *Psychology of Sport and Exercise*. 2006;7:15-27.
31. Courneya KS. Predicting repeated behavior from intention: The issue of scale correspondence. *Journal of Applied Social Psychology*. 1994;24:580-594.

32. Godin G, Jobin J, Bouillon J. Assessment of leisure time exercise behavior by self-report: A concurrent validity study. *Canadian Journal of Public Health*. 1986;77:359-361.
33. Godin G, Shephard RJ. A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Science*. 1985;10:141-146.
34. Fishbein M, Von Haeften I, Appleyard J. The role of theory in developing effective interventions: Implications from Project Safer. *Psychology, Health and Medicine*. 2001;6:223-238.
35. Hagger M, Chatzisarantis NLD, Biddle SJH. A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology*. 2002;24:1-12.
36. Hausenblas HA, Carron AV, Mack DE. Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport and Exercise Psychology*. 1997;19:36-51.
37. Symons Downs D, Hausenblas HA. Elicitation studies and the theory of planned behavior: A systematic review of exercise beliefs. *Psychology of Sport and Exercise*. 2005;6:1-31.
38. Baranowski T, Anderson C, Carmack C. Mediating variable framework in physical activity interventions: How are we doing? How might we do better? *American Journal of Preventive Medicine*. 1998;15:266-297.

Table 1
Adjusted Mean differences of Theory of Planned Behaviour constructs by time-frame.

Construct	no time frame (n = 103)	next week (n = 102)	next month (n = 103)	next 6 months (n = 101)	F	η^2	Post-Hoc
Affective Attitude	5.60 (0.84)	5.45 (1.07)	5.51 (1.06)	5.60 (1.03)	0.53	.01	
Instrumental Attitude	6.45 (0.58)	6.30 (0.62)	6.42 (0.63)	6.29 (0.65)	1.11	.01	
<u>Behavioral Beliefs</u>							
Feel Good ^e	6.43 (0.69)	6.98 (1.22)	6.46 (0.89)	6.36 (0.82)	3.79**	.04	NW<All
Feel Good ^v	6.55 (0.81)	6.19 (0.91)	6.43 (0.96)	6.54 (1.01)	2.35	.01	
Take Too Much Time ^e	3.46 (1.52)	3.47 (1.75)	3.93 (1.52)	3.52 (1.54)	1.37	.02	
Take Too Much Time ^v	5.55 (1.16)	5.14 (1.33)	5.56 (1.08)	5.37 (1.08)	1.78	.02	
Increase Fitness ^e	6.48 (0.82)	6.22 (0.88)	6.56 (0.71)	6.47 (0.72)	2.35	.03	
Increase Fitness ^v	6.04 (1.09)	5.58 (1.35)	5.94 (1.14)	5.81 (1.27)	1.86	.02	
Improve Appearance ^e	6.22 (1.09)	5.62 (1.36)	6.15 (0.97)	5.81 (1.28)	4.34**	.05	NW<NM,NT; N6M<NT
Improve Appearance ^v	5.80 (1.14)	5.22 (1.44)	5.65 (1.38)	5.27 (1.42)	2.90*	.03	NW,N6M<NT
Reduce Disease Risk ^e	5.85 (1.10)	5.60 (1.08)	6.01 (1.03)	5.57 (1.16)	2.43	.03	
Reduce Disease Risk ^v	6.11 (1.22)	5.06 (1.48)	5.49 (1.61)	5.43 (1.45)	5.56*	.06	All<NT
Relieve Stress ^e	6.09 (1.15)	5.98 (1.08)	6.02 (1.03)	6.09 (1.05)	0.18	.00	
Relieve Stress ^v	6.27 (1.04)	5.76 (1.18)	5.92 (1.13)	6.09 (1.11)	2.55	.03	
Subjective norm	5.67 (0.81)	5.66 (1.01)	5.55 (0.82)	5.75 (0.96)	0.54	.01	
<u>Normative Beliefs</u>							
Spouse/Partner ^e	6.58 (0.87)	6.25 (1.13)	6.30 (1.15)	6.28 (1.13)	1.50	.02	
Spouse/Partner ^v	5.02 (1.49)	4.59 (1.40)	4.80 (1.53)	4.59 (1.42)	1.30	.02	
Family ^e	6.63 (0.69)	6.55 (0.84)	6.53 (0.89)	6.72 (0.68)	0.86	.01	
Family ^v	4.479 (1.47)	3.96 (1.52)	4.00 (1.58)	4.27 (1.64)	1.62	.02	
Friends ^e	6.51 (0.97)	6.49 (0.91)	6.36 (1.04)	6.39 (1.02)	0.24	.00	
Friends ^v	3.70 (1.49)	3.59 (1.36)	3.59 (1.54)	3.63 (1.54)	0.08	.00	
Physician ^e	6.61 (0.793)	6.67 (0.78)	6.56 (0.87)	6.63 (0.92)	0.23	.00	
Physician ^v	5.37 (1.49)	4.75 (1.52)	5.11 (1.43)	5.23 (1.58)	2.23	.03	
Perceived Behavioural Control	6.09 (0.98)	5.95 (0.99)	5.92 (1.10)	5.99 (1.02)	0.48	.01	
<u>Control Beliefs</u>							
Poor Health ^e	3.91 (1.65)	4.50 (1.54)	4.03 (1.94)	3.96 (1.49)	2.05	.02	
Poor Health ^v	3.49 (1.63)	2.57 (1.56)	2.55 (1.54)	3.14 (1.49)	6.90**	.07	NW,NM<NT; NW<N6M
Bad Weather ^e	5.04 (1.65)	5.30 (1.62)	5.26 (1.62)	5.09 (1.51)	0.49	.00	
Bad Weather ^v	4.42 (1.73)	5.35 (1.73)	5.04 (1.65)	5.00 (2.04)	3.05*	.03	NT<NM,N6M<NW
Lack of Time ^e	4.66 (1.62)	4.73 (1.64)	4.48 (1.76)	4.60 (1.57)	0.35	.00	
Lack of Time ^v	4.44 (1.73)	4.05 (1.87)	4.57 (1.71)	4.33 (1.75)	1.19	.01	
Cost ^e	5.22 (1.57)	5.48 (1.60)	5.35 (1.84)	5.26 (1.63)	0.34	.00	
Cost ^v	3.72 (1.69)	2.68 (1.64)	3.37 (1.88)	3.41 (1.71)	4.76**	.05	NW<All
Lack of Access ^e	4.74 (1.89)	5.06 (1.50)	5.15 (1.98)	5.00 (1.52)	0.78	.01	

Lack of Access ^v	3.34 (1.87)	2.74 (2.03)	2.29 (1.62)	3.03 (1.98)	4.17**	.04	NM<N6M,NT
Lack of Social Support ^e	5.00 (1.67)	5.15 (1.76)	4.99 (1.87)	5.12 (1.68)	0.18	.00	
Lack of Social Support ^v	3.93 (1.87)	3.61 (1.95)	3.60 (1.90)	3.75 (1.58)	0.55	.01	
Intention	0.16 (0.07)	0.07 (0.93)	0.29 (0.90)	0.24 (0.80)	1.73	.02	

* $p < 0.05$, ** $p < .01$; e = expectancy; v = value. NT = no time-frame, NW = next week, NM = next month, N6M = next 6 months. Means adjusted for past physical activity behaviour as a covariate.

Table 2

Partial Correlation differences among Theory of Planned Behaviour constructs with Intention by Time-Frame.

Construct	no time frame (n = 103)	next week (n = 102)	next month (n = 103)	next 6 months (n = 101)	χ^2	Post-Hoc
Affective Attitude	.31**	.30**	.37**	.31**	2.77	
Instrumental Attitude	.18	.19*	.16	.23*	0.46	
<u>Behavioral Beliefs</u>						
Feel Good ^e	.18	.09	.09	.30**	3.19	
Feel Good ^v	.12	.20*	.18	.03	1.78	
Take Too Much Time ^e	-.19	-.16	-.27*	-.05	2.61	
Take Too Much Time ^v	-.18	.01	-.01	-.11	2.40	
Increase Fitness ^e	-.20*	.06	.10	.25*	13.06**	NT<All
Increase Fitness ^v	.16	.45**	.27	.23*	5.73	
Improve Appearance ^e	-.26*	.11	.14	.28*	16.60**	NT<All
Improve Appearance ^v	-.08	.27*	.08	.31**	10.23*	NT<NW,N6M
Reduce Disease Risk ^e	-.13	.13	-.11	.04	4.65	
Reduce Disease Risk ^v	-.04	.11	.11	.15	2.12	
Relieve Stress ^e	.21*	.13	.14	.09	0.78	
Relieve Stress ^v	.08	.04	.07	.20*	1.52	
Subjective norm	-.12	.19	.20*	.26*	7.68	
<u>Normative Beliefs</u>						
Spouse/Partner ^e	-.03	.11	-.06	.16	3.42	
Spouse/Partner ^v	-.04	.10	-.09	.14	3.63	
Family ^e	-.14	.08	.13	.38**	14.66**	NT,NW<N6M
Family ^v	-.02	.22*	-.10	.04	5.66	
Friends ^e	-.03	.01	.15	.35**	9.44*	NT,NW<N6M
Friends ^v	-.11	.14	-.05	.03	3.52	
Physician ^e	.05	.03	.23*	.12	2.55	
Physician ^v	-.01	.14	.12	.11	1.39	
PBC	.24*	.16	.38**	.13	4.34	
<u>Control Beliefs</u>						
Poor Health ^e	.13	.08	-.06	.10	2.14	
Poor Health ^v	.02	.00	-.06	.08	0.99	
Bad Weather ^e	.21*	.24*	.23*	.20*	0.11	
Bad Weather ^v	.04	.15	.07	.11	0.70	
Lack of Time ^e	.21	.16	.42**	.36**	5.42	
Lack of Time ^v	.02	.01	.00	.05	0.14	

Cost ^e	.07	.15	.29**	.26*	3.32	
Cost ^v	.06	.06	-.06	.44**	16.06**	All<N6M
Lack of Access ^e	-.09	.01	.13	.18	4.46	
Lack of Access ^v	.10	-.08	-.22*	.31**	16.40**	NM,NW<N6M; NM<NT
Lack of Social Support ^e	.32**	.39**	.24*	.34**	1.43	
Lack of Social Support ^v	-.06	-.07	-.17	.30**	13.18**	All<N6M
Multivariate TPB	.38**	.30**	.45**	.37**	1.53	

† p < .10, * p < 0.05, ** p < .01; e = expectancy; v = value. NW = next week, NM = next month, N6M = next six months. Covariate = Past Physical Activity Frequency at a Moderate and Vigorous Intensity.