DELIBERATE ENGAGEMENT AS A STRATEGY FOR PROMOTING BEHAVIOR CHANGE WHILE ENHANCING WELL-BEING

by

Jason D. Duvall

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Natural Resources and Environment)
in The University of Michigan
2010

Doctoral Committee:

Associate Professor Raymond K. De Young, Co-Chair
Professor Rachel Kaplan, Co-Chair
Professor Stephen Kaplan
Associate Professor Caroline R. Richardson

ACKNOWLEDGEMENTS

This research would not have been possible without the thoughtful contributions and support of a great many people. First and foremost, I will be forever grateful to my committee members for guiding me through this mysterious process. Together they helped me turn a vague research idea about outdoor walking into a fascinating study with far-reaching implications. Much of this effort was possible because Caroline Richardson generously offered both her time and her expertise in physical activity research. I am also deeply grateful to Ray De Young, Rachel Kaplan, and Stephen Kaplan who have challenged and supported me with enthusiasm throughout my graduate career. Their work has not only influenced the direction of my research but it has also fundamentally changed the way I see the world. They have provided me with countless opportunities to grow as a scholar and offered me sage advice that will always be treasured.

I am also very fortunate to have worked alongside many kind and talented graduate students in the Environmental Psychology Lab many of whom have made valuable contributions to this project. Special thanks go to Kim Wolske who has been a wonderful collaborator, thoughtful co-GSI, and extraordinary friend during the last seven years.

In addition, I would like to thank Angela Larkin for teaching me how to use the physical activity monitors and make sense of some rather complicated data. Joe Kazemi from the Center for Statistical Counseling and Research was instrumental in helping me analyze and interpret much of the data presented in this dissertation. I am also indebted to the many people who volunteered to participant in this study.

I am extremely grateful to my family and friends. My parents, Marilyn and David, my sister, Annie, and my brother, Matthew, have all been wonderful supporters throughout this sometimes daunting process. Many friends from Ann Arbor, Omaha, Columbus, and Chicago have also offered words of support and encouragement for which I will always be thankful.

Last but certainly not least, I must thank Taj, Cleo, and Melissa Francis. Taj and Cleo continually reminded me to stop and enjoy the many simple events that unfold each and every day. As for Melissa, she has helped me at every point along the way. Melissa has been a remarkable companion. She has offered me friendship, love, compassion, insight, and laughter – oftentimes just when they were needed most. Without her this research would not have been possible.

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ABSTRACT

Changing behavior is difficult. Approaches which focus on educating people about the consequences of behavior or providing incentives for performance often do not fare well. This dissertation contrasts such an approach with one that helps individuals deliberately engage the mind by encouraging richer and more diverse interactions with the behavior setting. While this engagement-based approach is likely applicable to a number of behaviors, it is explored here in the context of promoting outdoor physical activity.

To investigate this approach, 117 adults were randomly assigned to one of two treatment conditions– Standard Care (schedule setting, commitment) or Engagement (awareness plans) – and asked to take at least three, 30 minutes outdoor walks each week for two weeks. Walking behavior was measured using surveys, walking logs, and accelerometers. Survey instruments were used to investigate changes in psychological well-being and satisfaction with the walking environment. Baseline measures were collected prior to the intervention.

Results show that individuals in both treatment conditions reported similar changes in walking behavior. However, only participants in the Engagement condition experienced

significant improvements in multiple dimensions of psychological well-being. In addition, among participants who walked at low to moderate levels those assigned to the Engagement condition were more likely to obtain these psychological benefits. Individuals in the Engagement condition also reported being more satisfied with several distinct aspects of the walking environment. These changes in satisfaction were particularly strong for participants who walked with another person.

Overall, the findings indicate that strategies designed to help individuals deliberately interact and explore a behavior setting can be useful for promoting the adoption and maintenance of outdoor walking routines. These strategies may also make it easier for individuals to achieve other important benefits, including improvement in psychological well-being and enhanced perceptions of the local environment. Because deliberate engagement is able to leverage a number of powerful but often underappreciated cognitive and motivational forces, there is reason to believe that this behavior change strategy is valuable to a wide variety of behaviors and contexts.

CHAPTER 1

INTRODUCTION

Every day we are confronted with tasks that, though necessary, are challenging to initiate and hard to maintain. Taking action on many of these tasks may be beneficial, but performing them can be tedious and uninteresting. Most behavioral interventions attempt to deal with these problematic situations by making people more aware of the potential consequences or by providing incentives for their performance. Unfortunately, these efforts are often ineffective at changing behavior over the long-term (Abrahamse, Steg, Vlek, & Rothengatter, 2005; De Young, 2000; Ingledew, Markland, & Medley, 1998).

An alternative approach is the focus of the work presented in this dissertation. It involves changing how behavior is experienced while being performed. It draws on research suggesting that efforts to make an activity more engaging can help people to reinterpret the experience and allow uninteresting tasks to become more appealing (Hidi, 2000; Hidi & Renninger, 2006; Sansone, Weir, Harpster, & Morgan, 1992). This can be done by introducing a new source of interest unrelated to the task, for instance listening to music or talking with a friend. It is also possible to become more actively engaged in the task itself or in the surrounding environment. Such forms of deliberate

engagement are especially intriguing since they can help individuals experience a specific, even familiar, situation differently. Adopting this new perspective may make it possible to explore different aspects of an activity and learn new things about oneself, the task, or the behavior setting. The insights gained from this approach could, therefore, make it easier to take on this very same behavior in the future.

PROBLEM STATEMENT

What are the advantages of using a deliberate form of engagement? The work presented here explores whether becoming more actively engaged in the physical environment is an effective strategy for helping individuals adopt and maintain an outdoor walking routine, a task that many find difficult to initiate and sustain. Using an engagement-based strategy to deal with this issue may prove valuable for several reasons.

First and foremost, efforts to help people walk regularly outdoors are of considerable practical significance given recent trends in obesity and inactivity (Barnes, 2007; CDC, 2005, 2008; Mokdad, Marks, Stroup, & Gerberding, 2004). While outdoor walking is seen as a simple, low-cost way to address this problem, standard interventions have not had much success in helping people to sustain physical activity routines (Dishman, 2001; Morgan & Dishman, 2001). This indicates that there is a genuine need to explore alternative strategies, such as encouraging deliberate engagement.

There is also evidence suggesting that outdoor physical activity, sometimes referred to as green exercise, may be associated with improvements to psychological well-being (Pretty, Griffin, Sellens, & Pretty, 2003; Pretty, Peacock, Sellens, & Griffin, 2005). Efforts that help people tune in to the environment and notice fascinating aspects of the setting may make it easier for them to achieve these psychological benefits (S. Kaplan, 2001). This raises the possibility that strategies which encourage deliberate engagement in the walking environment could have positive impacts on mental effectiveness and well-being.

Finally, engagement strategies may help to change the walker's perceptions of the walking environment. This outcome is particularly important given that environmental features, such as accessibility, safety, aesthetics, and climate have been shown to play an important role in determining whether people participate in outdoor physical activity (Addy, et al., 2004; B. B. Brown, Werner, Amburgey, & Szalay, 2007; Eyler, Brownson, Bacak, & Housemann, 2003; Giles-Corti & Donovan, 2003; Merrill, Shields, White, & Druce, 2005). Designing the environment to provide these features may be useful for achieving the desired outcome. Until that happens, however, a less costly and more adaptable process is desirable. Thus the research presented here examines ways to engage people in what is available, thus helping them learn to reinterpret a setting and see it in a new way.

OVERVIEW OF CHAPTERS

Findings from a study comparing two approaches to encourage outdoor walking are the basis for the next three chapters. The study investigates benefits of using awareness plans, a particular type of engagement strategy. An awareness plan can be thought of as a cognitive strategy for how to select and process information in the environment (Leff, 1984; Leff & Gordon, 1979; Leff, Thousand, Nevin, & Quiocho, 2002). Such a plan attempts to influence engagement by helping the user to conduct a more careful investigation of the setting or adopt a more playful, curious orientation toward current experience. In order to determine the effectiveness of this engagement-based approach, a group of walkers using awareness plans was compared to a group using a more traditional walking intervention focused on making a schedule and agreeing to follow it.

Chapter 2 explores whether engagement strategies can be used to increase walking behavior. The results presented indicate that awareness plans appear to work as well as traditional strategies in influencing outdoor walking. Findings from the study also show that engagement strategies may be more useful to individuals with less prior experience maintaining a walking routine.

Chapter 3 examines how engagement strategies affect psychological well-being. The findings presented suggest that using awareness plans to promote more active forms of engagement with the environment may make it easier for individuals to achieve the

psychological benefits typically associated with outdoor physical activity. Other findings are consistent with the notion that awareness plans may enable individuals to get more psychological benefits from shorter bouts of outdoor activity.

Chapter 4 investigates whether engagement strategies can affect participants' satisfactions with the walking environment. The findings discussed in this chapter indicate that individuals who used awareness plans reported being more satisfied with several aspects of the walking environment. In addition, the results suggest that this effect was particularly strong for individuals who walked with another person.

The final chapter, Chapter 5, takes a more theoretical focus in order to understand the notion of deliberate engagement and its role in the process of behavior change. It considers deliberate engagement more broadly and distinguishes this approach from other more traditional approaches to changing behavior. A theoretical framework, the Reasonable Person Model (S. Kaplan & Kaplan, 2003, 2009), is then used to explain why an engagement-based approach to behavior change may offer important advantages. The chapter concludes by exploring the wider applicability of engagement strategies.

CHAPTER 2

USING ENGAGEMENT TO ENCOURAGE OUTDOOR WALKING

BACKGROUND

Despite growing evidence that regular physical activity is associated with improvements to both physical and psychological health (Biddle, 1995; Boutcher, 2000; Fox, 1999; Warburton, Nicol, & Bredin, 2006; Weuve, et al., 2004), rates of obesity and inactivity continue to increase at a troubling pace (Barnes, 2007; Mokdad, et al., 2004). At present more than half of adults in the United States do not engage in recommended levels of physical activity (CDC, 2008).

One effort to address this problem is focused on encouraging outdoor walking, which is seen as an appealing, accessible, and low-cost approach to combating obesity and increasing physical activity. However, designing effective interventions to promote physical activity in general and walking specifically has proven to be a challenging proposition (Hillsdon & Thorogood, 1996; D. Ogilvie, et al., 2007).

The lack of success has led some researchers to promote physical activity from a more holistic, ecological perspective and to consider the influence of a broad range of

intrapersonal, social, and environmental factors (Giles-Corti, Timperio, Bull, & Pikora, 2005; Sallis & Owen, 2002). Advocates of this ecological model suggest that while previous research provides us with a fairly good understanding of how individual and social forces contribute to physical activity, it largely ignores environmental factors. The result is a renewed effort to investigate how various environmental attributes contribute to physical activity participation.

Studies exploring environmental factors suggest that accessibility, safety, aesthetics, and climate play a critical role in determining levels of physical activity (B. B. Brown, et al., 2007; Eyler, et al., 2003; Giles-Corti & Donovan, 2003; Humpel, Owen, Iverson, Leslie, & Bauman, 2004). While these findings prompt a long overdue reexamination of how we plan and design communities, the immediate impact has been limited since many communities lack the resources necessary to create more walkable settings. Furthermore, there is no assurance that making these changes would result in increased physical activity (Kahn, et al., 2002). Even in the most well designed communities and hospitable climates incorporating regular physical activity into daily routines is challenging.

Thus, there is a growing need to examine strategies which can encourage regular year-round physical activity in a wide variety of existing outdoor settings, even if they are less than ideal. One direction that has received little empirical attention draws on cognitive engagement strategies to guide the walker's patterns of attending to and interacting

with the walking environment. Such strategies may make walking in ordinary, everyday settings more appealing if they focus on the kinds of mental operations that humans find highly rewarding, such as recognizing objects, making inferences about what happened in the past, predicting what could happen in the future, or evaluating different aspects of the world around us (S. Kaplan & Kaplan, 1982). If effective, these strategies could provide health practitioners with a flexible, relatively inexpensive way to make existing settings more acceptable and familiar settings more interesting.

Awareness plans, which can be thought of as a set of instructions for how to select and process information in the environment (Leff, 1984; Leff & Gordon, 1979; Leff, et al., 2002), are an engagement-based strategy that may be particularly useful. These plans attempt to influence engagement by encouraging the user to conduct a more careful investigation of the setting or adopt a more playful, curious perspective toward the environment (see Table 2.1). Some support for this approach is provided by the work of Sansone and colleagues (Sansone & Smith, 2000; Sansone, et al., 1992) who have found that the use of interest-enhancing strategies can make performance of a boring task more enjoyable and intrinsically satisfying. Their findings have also indicated that continued use of these strategies can result in a more positive redefinition of an activity, thereby increasing the likelihood the activity will be continued into the future. This suggests that engagement-based strategies, such as awareness plans, may make it easier for an individual to sustain an outdoor walking routine.

TABLE 2.1 Sample awareness plans

Plan Category	Example
Focus on your senses	Focus on sounds. If the area is quiet, listen to the silence. If the area is full of sounds, focus on each one and notice how they differ.
Take on a new job or role	Imagine you're an artist looking for beauty in everyday things.
Make guesses or inferences	How would this area be different if everyone had to grow their own food?
Use magic	If you could cast spells that changed the environment what would you change?

It is worth noting that awareness plans and mindfulness-based techniques share a common goal of focusing awareness and attention to current experience (Bishop, et al., 2004; K. W. Brown & Ryan, 2004). The two approaches, however, attempt to achieve this outcome in very different ways. First, awareness plans are intended to actively guide awareness and attention. This structured, deliberate approach is distinct from many mindfulness-based techniques which ask the individual to abandon their agenda in order to observe all the various thoughts and sensation that arise (Bishop, et al., 2004). Mindfulness-based practices also typically encourage the individual to take note of both internal and external events (K. W. Brown, Ryan, & Creswell, 2007). Awareness plans, by contrast, are only intended to help one focus attention on features of the external environment. Finally, mindfulness techniques tend to discourage evaluating, judging, or elaborating on current experience (K. W. Brown, et al., 2007). Many

awareness plans, on the other hand, actively promote the use of these cognitive processes in an effort to help the individual become more engaged.

The purpose of this study is to investigate whether an intervention utilizing awareness plans can be used to increase outdoor walking. To determine the value of this engagement-based approach the intervention using awareness plans is compared to a more conventional intervention based on health contracts, a strategy capable of encouraging physical activity participation (Cress, et al., 2006; Haber & Looney, 2000). While the engagement-based approach is expected to lead to improvements in outdoor walking behavior, there is evidence suggesting that focusing on the surrounding environment can sometimes interfere with task performance and delay task completion (Sansone & Thoman, 2006). This raises the possibility that the use of awareness plans could encourage less intense, but longer walks.

METHODS

Participants

One hundred and seventeen adults living in Southeast Michigan were recruited during May through August of 2008 by posting flyers in various locations around the community and placing announcements in two local newspapers. The flyers and announcements invited adults interested in starting or restarting an outdoor walking routine to participate. Eligible participants were at least 18 years of age and free of existing health conditions that could interfere with walking regularly outdoors. The

study was approved by the University of Michigan Institutional Review Board. Written informed consent was obtained from all participants. Of this sample, participants were predominantly female and between 40-69 years of age (see Table 2.2). A majority of these individuals (86%) also indicated that they had in the past made multiple attempts to initiate a regular walking routine.

TABLE 2.2 Characteristics of participants

Gender (%)	
female	88.6
male	11.4
Age (%)	
18-29	14.2
30-39	13.3
40-49	15.9
50-59	31.0
60-69	17.7
70-79	5.3
80 and above	2.7
Average number of walks per week	2.0
Average duration of each outing (minutes)	20.7
Average amount of other physical activity per week (minutes)	135.6

Fourteen participants withdrew from the study before completing the intervention. The demographic characteristics of this group were not statistically different from individuals who completed the intervention. Reasons given for dropping-out included injury (n=1), lack of monetary incentives (n=2), lack of time (n=2), physical difficultly of walking (n=2), and lack of interest (n=7). Of those who completed the post-intervention survey, 64 % returned the follow-up survey four weeks later. There was no evidence

suggesting that demographic characteristics of those who responded to the follow-up survey were significantly different from non-responders.

Treatment Conditions

Initially participants were randomly assigned to one of two groups. One group (*n*=65) was randomly assigned to one of two treatment conditions, Standard Care or Engagement. The other participants (*n*=52) were placed on a one-week waitlist Prior to random assignment to one of the two treatment conditions.

After meeting face to face with the researcher, participants on the waitlist completed a pretest survey and were given an accelerometer, which they were asked to wear as much as possible each day during the waitlist period. At the end of this period, a survey investigating walking behavior was administered and participants were randomly reassigned to one of the treatment conditions.

Prior to beginning either treatment, participants met with the researcher, completed a pretest survey, and were given the goal of taking at least three 30-minute outdoor walks during each of the subsequent two weeks. Each participant received a binder containing walking logs, a short step-by-step guide of how to carry out the treatment, and a list of walking safety tips. During this meeting participants were also given an accelerometer and instructed to wear it as much as possible each day during the treatment period. At the end of the two week treatment participants completed a

survey and returned all study materials. Four weeks later participants were mailed a follow-up survey.

Standard Care

In addition to the materials described above, participants assigned to the Standard Care condition (*n*=58) worked with the researcher to create a personalized walking schedule. Once participants identified the days and times they intended to walk they signed a pledge, stating that they agreed to walk during the times specified.

Engagement

Instead of a walking schedule, participants in the Engagement condition (*n*=59) received a list of awareness plans (see Table 2.1, above) designed to influence how they engaged in and interacted with the physical environment (Leff, 1984; Leff & Gordon, 1979; Leff, et al., 2002). Participants were asked to use one of the awareness plans as the focus of each walk during the treatment period and were free to experiment with different awareness plans, create their own plans, or use the same plan multiple times.

Measurement

Demographics

The pretest survey instrument, completed at the initial meeting, included questions regarding demographic information (e.g., age, gender) and prior history of walking behavior, including frequency and duration of walks as well as previous experience

initiating and maintaining a walking routine. Self-efficacy was also measured on the pretest survey using a modified version of the New General Self-Efficacy Scale (Chen, Gully, & Eden, 2001), which is intended to evaluate one's overall confidence in the ability to achieve goals and deal with adversity.

The same survey also assessed how often participants engaged in other forms of physical activity. Start of treatment, end of treatment, and follow-up surveys all included questions about how much time participants spend doing physical activity other than walking.

Walking behavior

Walking behavior was measured using surveys, walking logs, and accelerometers. The survey instrument was used to assess the number and duration of walks taken during the preceding week. Surveys were administered at the end of the one week waitlist period, the end of the two week treatment period, and at follow-up. Walking behavior was assessed during the two-week intervention period using walking logs and accelerometer data. Walking logs recorded the date of each walk as well as the time each walk started and ended. A waist-mounted Actical accelerometer (Phillips Respironics, Bend, OR USA) was used to validate walking logs and record the number, duration, and intensity of walks. The Actical device contains an omni-directional sensor, allowing measurement of acceleration in multiple planes. It provides a reliable and valid measure of physical activity (Esliger & Tremblay, 2006; Pfeiffer, Mciver, Dowda,

Almeida, & Pate, 2006). Walking behavior was assessed by examining each participant's accelerometer data during the time periods indicated in the walking logs. To constitute a walk, participants were required to reach and maintain a minimum threshold of 500 activity counts per minute, indicating they had achieved at least light activity. Activity Energy Expenditure (AEE) was used to determine intensity of walks. This energy expenditure calculation assumed all participants were of average height and weight (Female - 63.8", 163 lbs.; Male - 69.2", 190 lbs.).

Use of awareness plans

Walking logs were also used to determine the extent to which participants used awareness plans while walking. Over the course of the two-week intervention period participants were asked to record the awareness plans used during each walk. In addition, the end of treatment survey collected information about participants' experience with the Engagement condition by asking individuals to rate on a 5-point scale (*strongly disagree* to *strongly agree*) how difficult it was to stay focused on the awareness plans and their intention to use these plans in the future. The follow-up survey also investigated whether participants continued to use awareness plans while walking.

Analysis

Linear mixed models were used to examine interactions within and between treatment conditions and walking behavior. This method was chosen because it allows analysis of

correlated observations that are measured repeatedly, under different conditions (West, Welch, & Galecki, 2006). The linear mixed model also permits inclusion of participants who have missing data, giving it a distinct advantage over more traditional repeated-measures analysis methods which remove such cases (West, et al., 2006).

A model based on a diagonal covariate matrix was used to investigate data related to number of walks taken per week and a model using an unstructured covariate matrix was used to analyze data related to duration and intensity of those walks. In all cases a top-down model building strategy was used which involves starting with the fixed effects of all possible covariates and interactions and removing non-significant fixed effects until the best overall fit is achieved (West, et al., 2006). The linear mixed models controlled for participants' self-efficacy and their prior experience maintaining a walking routine. Once an appropriate fit was determined the mixed model analysis was used to examine all within and between group interactions by conducting a series of pairwise comparisons based on estimated marginal means.

For the waitlist group, paired samples t-tests were used to investigate changes in walking behavior from the start to the end of the waitlist period. Unless reported $p<.05$ is used to report significance. Three individuals (Engagement n=2; Standard Care n=1) were excluded from the analysis because their self-reported and objectively determined walking behavior far exceeded that of all other participants. In addition, accelerometer data was missing for fourteen individuals (Engagement n=7; Standard Care n=7) due to

instrument malfunction, failure to use the device, or inconsistency between accelerometer data and walking logs.

RESULTS

Walking behavior

Walking behavior of participants assigned to the waitlist condition remained unchanged during the one week control period (see bottom of Table 2.3). T-test results indicated that individuals in this group reported no statistically significant changes in either the number of walks taken or the total time spent walking.

Linear mixed model results (see top of Table 2.3) indicate that the number of walks taken per week increased significantly for participants in both treatment groups during the intervention. Individuals in the Engagement group took more than one and a half more walks per week (mean difference = 1.77, $p \leq .001$) and participants in the Standard Care condition took about two more walks per week (mean difference = 1.95, $p \leq .001$). At follow-up both groups returned to near baseline levels, with the Engagement (mean difference = -.96, p=.045) and Standard Care groups (mean difference = -1.29, p=.007) yielding a significant decline compared to the final week of treatment.

Data on total time spent walking per week (see top of Table 2.3) show both treatment groups significantly increasing their total time walking during the treatment period, with the Engagement group walking nearly three times as long (mean difference = 85.50,

p≤.001) and the Standard Care group walking almost two and a half times as long (mean difference = 80.54, p≤.001). At follow-up, a significant decline was experienced by individuals in the Engagement (mean difference = -55.56, p≤.001) and Standard Care conditions (mean difference = -53.91, p≤.001) from the end of treatment. In spite of this decline, there was a significant overall increase in total time walking from start of treatment to follow-up for participants in the Engagement (mean difference = 29.94, p=.023) and Standard Care conditions (mean difference = 26.63, p=.042).

Walking log and accelerometer data confirm that participants were successful in achieving the goal of taking at least three 30-minute outdoor walks each week (see Table 2.4). Although individuals in the Standard Care condition took more walks during the first week of the treatment period according to the walking log (mean difference =.56, p=.015) and accelerometer data (mean difference =.66, p=.016), there was no significant difference during the second week. It is also important to note that walking behavior, in terms of total duration and intensity of walks, did not differ significantly between the two conditions during the first or second week of the treatment period. Furthermore, within each treatment condition walking behavior stayed relatively stable throughout the two week intervention period.

TABLE 2.3 Survey data of participant walking behavior by treatment condition

Treatment Conditions	Walking Behavior during the previous week					
	Start of Treatment		End of Treatment		Follow-up	
	n	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)
Number of Walks						
Engagement	56	1.9 (.29)[a]	51	3.7 (.26)[b]	31	2.7 (.39)[a]
Standard Care	57	2.1 (.29)[a]	50	4.0 (.26)[b]	33	2.7 (.39)[a]
Total Time Walking (minutes)						
Engagement	54	44.3 (8.04)[a]	51	129.8 (11.49)[b]	31	74.3 (13.82)[c]
Standard Care	54	57.7 (8.04)[a]	50	138.3 (11.49)[b]	32	84.3 (13.75)[c]

Notes: Number of walks and Total time walking are based on estimated marginal means from the linear mixed model. Estimated marginal means sharing an alphabetic superscript in the same row are not different from one another at p<.05.

Control Condition	Change in Walking Behavior during the one week waitlist control period		
	n_{pairs}	Average Δ (SD)	*p*
Number of Walks	48	.29 (2.25)	.374
Total Time Walking (minutes)	47	9.04 (47.82)	.201

Note: Change in Number of walks and Total time walking for participants in the waitlist control condition are based on paired t-tests results.

TABLE 2.4 Log and accelerometer data of participant walking behavior by treatment condition

	Log Data				Accelerometer Data			
	Week 1 of Treatment		Week 2 of Treatment		Week 1 of Treatment		Week 2 of Treatment	
	n	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)
Number of walks								
Engagement	50	3.2 (.16)[a,1]	50	3.1 (.21)[a]	47	2.9 (.19)[a,2]	47	2.8 (.21)[a]
Standard Care	49	3.7 (.16)[a,1]	49	3.3 (.21)[a]	42	3.5 (.19)[a,2]	42	3.4 (.22)[a]
Total time walking (minutes)								
Engagement	50	132.6 (9.73)[a]	50	135.4 (13.54)[a]	47	124.2 (11.36)[a]	47	119.2 (12.35)[a]
Standard Care	49	144.6 (9.71)[a]	49	141.2 (13.52)[a]	42	145.7 (11.90)[a]	42	141.5 (12.94)[a]
Intensity (kilocalories)								
Engagement					46	154.3 (11.01)[a]	44	139.7 (11.11)[a]
Standard Care					42	160.9 (11.45)[a]	41	157.4 (11.43)[a]

Notes: Number of walks, Total time walking, and Intensity of log and accelerometer data are based on estimated marginal means from the linear mixed model. Estimated marginal means sharing an alphabetic superscript in the same row are not different from one another at $p < .05$. Estimated marginal means sharing a numeric superscript in the same column are different from one another at $p < .05$.

Based on Tables 2.3 and 2.4 it might appear that the Standard Care condition produced better overall performance since in nearly every instance, frequency and total duration values are higher for this group. However when examining these data in terms of change in number of walks and total time walking (see Figure 2.1) a different conclusion emerges. As Figure 2.1 shows, the patterns for the two conditions are strikingly similar. The lone exception, the only significant difference between the groups, is for the number of walks taken during the first week, based on the log and accelerometer data (see Table 2.4). However, since no difference was detected for total time walking during this same period it is reasonable to conclude that while the Standard Care condition resulted in a greater immediate increase in number of walks, it did not result in individuals spending significantly more time walking. Furthermore, any differences between treatments disappear after the first week.

Although the similarity in effectiveness between treatment conditions is a noteworthy finding by itself, the mixed model analysis of these data also allowed for another potentially useful distinction to be drawn. One variable in particular, prior experience maintaining a walking routine, was found to have an independent, consistent, and statistically significant effect on both number of walks and total time spent walking.

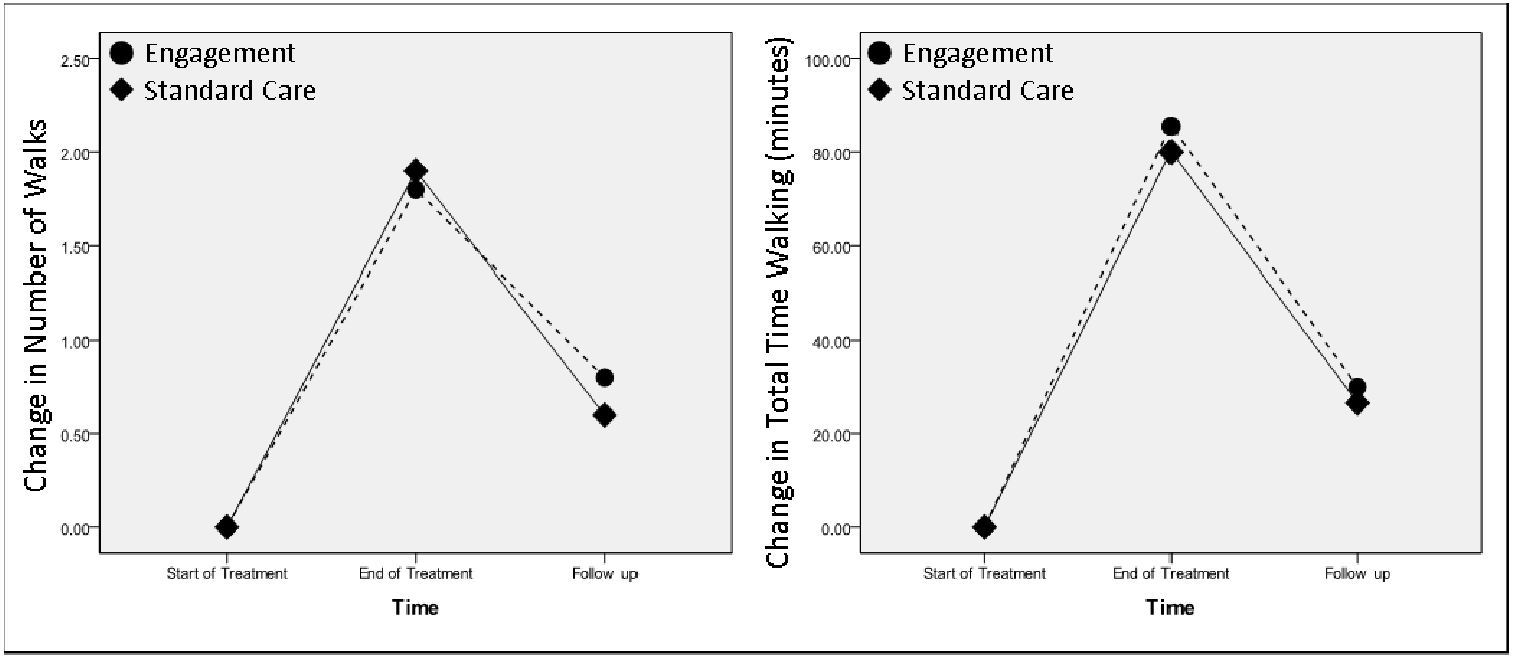

FIGURE 2.1 Change in walking behavior based on survey data

Experience maintaining a walking routine

Pretest survey data were used to group participants based on their previous success at maintaining a walking routine, with those indicating they had been able to maintain a routine for a few months or more classified as more experienced and the others designated as less experienced.

The patterns for both these groups were similar when examining the increase in number of walks taken during the treatment period, regardless of condition (see Table 2.5). In all instances, the mean number of walks taken exceeded the three walks per week goal, although the change in number of walks was more dramatic for those with less prior experience. For this group, however, the follow-up data showed a return to a level that was statistically indistinguishable from the baseline. By contrast, the number of walks for the more experienced group at follow-up stayed above three per week.

In terms of total walking time, the results indicate a significant increase during the treatment period in all instances (see Table 2.5), with total walking time always exceeding the 90 minute per week goal. The pattern of increase, however, is somewhat different than for the number of walks. The increase for those with less experience is particularly noteworthy: almost fourfold for the Standard care group and well over that (4.29) for the Engagement group. For those with more experience, the Engagement group also showed a somewhat greater gain in total walking time than the Standard care group (2.27 vs. 1.83 times the baseline level, respectively). At follow-up, the total

walking time is statistically indistinguishable from the baseline level for all but the less experienced participants in the Engagement condition who reported spending significantly more time walking at follow-up than at the start of treatment (mean difference = 39.84, p=.027).

Use of awareness plans

Data collected from walking logs indicate that participants in the Engagement condition used an awareness plan on over 94% of walks. The walking logs also show that awareness plans which involved using one's senses to be more engaged in the environment (e.g., focusing on sights or sounds) tended to be most popular, being used on 68% of walks.

Analyses of end of treatment survey data suggest that participants' experience with the Engagement condition was positive. Most participants (57%) did not feel it was difficult to stay focused on the awareness plans while walking and a large majority of participants (75%) indicated they would be likely to use awareness plans in the future. Data from the follow-up survey shows that four weeks after the intervention over 45% of the participants assigned to the Engagement condition reported using awareness plans at least occasionally while walking.

TABLE 2.5 Survey data of participant walking behavior based on prior experience maintaining a walking routine and treatment condition

	Walking behavior during the previous week					
	Start of Treatment		End of Treatment		Follow-up	
	n	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)
Number of walks						
Less Experienced						
Engagement	27	1.6 (.41)[a]	24	3.7 (.38)[b]	17	2.3 (.53)[a]
Standard Care	34	1.6 (.37)[a]	29	3.8 (.34)[b]	20	2.3 (.49)[a]
More Experienced						
Engagement	29	2.2 (.40)[a]	27	3.6 (.36)[b]	14	3.1 (.53)[a, b]
Standard Care	23	2.5 (.44)[a]	21	4.3 (.40)[b]	13	3.2 (.60)[a, b]
Total time walking (minutes)						
Less Experienced						
Engagement	26	29.0 (11.48)[a]	24	124.4 (16.46)[b]	17	68.9 (18.80)[c]
Standard Care	31	30.8 (10.56)[a, 1]	29	121.8 (14.99)[b]	19	59.6 (17.70)[a]
More Experienced						
Engagement	28	59.7 (11.13)[a]	27	135.3 (15.70)[b]	14	79.7 (20.12)[a]
Standard Care	23	84.6 (12.28)[a, 1]	21	154.7 (17.60)[b]	13	109.1 (21.18)[a]

Notes: Number of walks and Total time walking are based on estimated marginal means from the linear mixed model. Estimated marginal means sharing an alphabetic superscript in the same row are not different from one another at $p \leq .05$. Estimated marginal means sharing a numeric superscript in the same column are different from one another at $p \leq .05$.

DISCUSSION

The waitlist group, showing no difference in their walking during the one week waitlist period, served as a useful control for participants' motivation to increase their walking behavior and the use of an accelerometer. By contrast, both treatment conditions showed significant increases in the number and duration of walks, exceeding the goal of at least three 30-minute walks during each of two weeks. Participants in both the Engagement and Standard Care treatments also failed to sustain the increases achieved during the intervention period when walking behavior was measured four weeks after the completion of the treatment. On the whole, then, the results suggest that both treatments are in many respects comparable in their effectiveness.

These findings may be partially due to the psychological limits placed on one's behavior by creating and committing to a walking schedule. As individuals set aside specific blocks of time to walk they may become less willing to let walks extend beyond the prescribed time frame or walk at unplanned times. While possible, this explanation seems insufficient in light of the fact that survey, walking log, and accelerometer data confirmed that participants in the Standard Care condition exceeded the minimum goal of three 30-minute outdoor walks each week. Another potential explanation for these similarities in walking behavior is that both treatments had a pre-defined goal and included self-monitoring, strategies that have been shown to be of modest success at encouraging physical activity (Aittasalo, Miilunpalo, Kukkonen-Harjula, & Pasanen, 2006; Conn, Valentine, & Cooper, 2002; Shilts, Horowitz, & Townsend, 2004). Finally, these

similarities may possibly be due to the fact that volunteering for the study created a strong walking intention for participants in both treatment conditions. However, since no changes were found during the initial week for the waitlist group, this explanation also seems less probable.

The fact that Engagement worked as well as the Standard Care approach is important given the predominance of the latter strategy. It is striking that an intervention designed to provide ways to become interested and involved in the physical environment during the walk was able to match the performance of an intervention designed to facilitate the creation and development of a specific action plan. This raises the possibility that, given the right conditions, the use of strategies designed to facilitate the development of intrinsic motives, such as interest, can be as valuable as, and a useful complement to, more traditional strategies which tend to utilize strong extrinsic motives, such as goal setting, social pressure, or incentives.

The relevance of intrinsic motives is also supported by some of the differences found with respect to the role of experience. For the less experienced participants both interventions effectively helped achieve a substantial increase in walking during the treatment period. By contrast to the Standard Care group, however, those in the Engagement group were more likely to sustain their duration of walking for the following four weeks. This suggests that creating interest and awareness in the physical environment not only helps extend the duration of each walk, but can help individuals

to make measurable and durable changes in walking behavior. The engagement-based approach may work particularly well for this group, since less experienced walkers may be more inclined to associate the act of walking with boredom, frustration, or other feelings of negative affect. Awareness plans could make this situation more manageable because they can be used to occupy the mind and shift one's focus, thereby transforming this activity into a more positive and interesting experience.

In addition, these results lend support to the idea that the effectiveness of walking interventions may vary depending on certain individual differences (D. Ogilvie, et al., 2007). While the Standard Care condition was effective with less experienced individuals, the Engagement condition seemed to work even better for this group, indicating strategies aimed at enhancing the walking experience may be especially helpful to individuals who lack familiarity and competence with carrying out a regular outdoor walking routine. These findings also raise the possibility that other individual level factors could influence the effectiveness of engagement strategies. Individuals with higher levels of trait mindfulness, need for cognition, and creativity, for instance, may experience greater benefits from an engagement-based approach. Likewise, individuals who are more intrinsically motivated and focused on mastery goals may find engagement strategies more appealing.

Limitations and Future Research

There are several limitations that should be considered when interpreting findings from the present research. First, it is important to acknowledge the issue of self-selection. The study consisted of a fairly motivated sample of mostly middle-aged women, making it difficult to determine how generalizable these results are to other groups. While individuals who responded to the follow-up survey were not significantly different from non-responders in terms of demographic variables, it is possible that follow-up results represent the experience of more highly motivated participants. As a consequence, there is need for further research to explore the potential benefits of engagement strategies with other populations, including more sedentary, less motivated individuals.

The short nature of the intervention is also problematic since the impact of engagement strategies on walking behavior may change with continued use. As a result, future studies should attempt to incorporate engagement-based strategies into longer intervention periods. In addition, the Accelerometer-based results need to be regarded cautiously as data from fourteen individuals was missing and information related to body mass index was not collected.

Finally, since the present study did not restrict participants in where they chose to walk, examination of the role played by particular physical characteristics of the walking environment is not possible. Conceivably such characteristics may interact with treatment conditions. Future research which takes physical characteristics of the

walking environment into account could help determine whether certain settings are more compatible with particular types of engagement strategies and whether using awareness plans could make walking in familiar, everyday settings more appealing and interesting.

CONCLUSION

Overall, these findings indicate that interventions which include cognitive engagement strategies can be as effective as traditional interventions which involve planning, schedule setting, and commitment. Participants in both interventions made temporary improvements in walking behavior, but for the most part failed to sustain these improvements in the long term. In addition, there was some evidence suggesting that engagement strategies may be particularly beneficial to those individuals who lack previous experience in following a walking routine.

Given the results of this study, the use of cognitive engagement strategies warrants further research. It would be useful to explore interventions lasting more than two weeks and that permit a variety of strategies. While these findings suggest that engagement strategies may be a useful behavior change tool, researchers and clinicians must continue to develop and test strategies focused on helping people maintain, not just adopt, outdoor physical activity routines. Along these lines, future studies should investigate the benefit of incorporating engagement strategies into existing interventions. In addition, there is a need to examine whether use of engagement

strategies can positively influence individuals' perceptions of the walking environment and whether these strategies can enhance the psychological benefits one gains from walking, such as improved mood or cognitive functioning.

CHAPTER 3

ENHANCING THE BENEFITS OF OUTDOOR WALKING WITH ENGAGEMENT STRATEGIES

BACKGROUND

The link between increased physical activity and improvements in physiological health, including the prevention of cardiovascular disease, diabetes, various types of cancer, hypertension, obesity, and osteoporosis is well established (Warburton, Nicol, & Bredin, 2006). The ability of physical activity to influence psychological health, however, has received far less attention until relatively recently.

Fortunately, health researchers have begun to recognize the important role regular physical activity can play in maintaining and enhancing mental health and psychological well-being. Studies have shown that even moderate intensity activities, such as walking, are associated with reductions in anxiety (Biddle, 1995; Fox, 1999; Scully, Kremer, Meade, Graham, & Dudgeon, 1998), as well as improvements in mood (Biddle, 2000; Fox, 1999; Lichtman & Poser, 1983; Scully, et al., 1998), cognitive functioning (Boutcher, 2000; Cotman & Berchtold, 2002; Kramer, et al., 1999; Weuve, et al., 2004), and overall quality of life (Oka, et al., 2000).

Similar psychological benefits have also been shown to result from exposure to natural environments, including improvements to mood (Hull & Michael, 1995), attentional functioning (Kuo, 2001; Taylor, Kuo, & Sullivan, 2001; Tennessen & Cimprich, 1996; Wells, 2000; Hartig, Evans, Jamner, Davis, & Garling, 2003) and overall well-being (Kaplan, 2001). As a result, a number of researchers have attempted to bring these two parallel sets of findings together by proposing that physical activity that takes place in *green* environments may be particularly beneficial (Pretty, et al., 2003; Pretty, et al., 2005).

If true, this notion of *green exercise* provides yet another powerful reason for health researchers and practitioners to develop strategies capable of encouraging regular outdoor physical activity. At the same time, this theory raises a number of interesting questions regarding how to select and utilize outdoor settings that are most effective for encouraging physical activity and enhancing psychological health.

Environments for Physical Activity

Settings which are most effective in supporting outdoor physical activity, such as biking or walking, typically possess a number of specific environmental attributes. In particular accesses to sidewalks and trails (Eyler, et al., 2003; Giles-Corti & Donovan, 2003), low levels of automobile traffic (B. B. Brown, et al., 2007; Troped, Saunders, Pate, Reininger, & Addy, 2003), the presence of street lighting (Addy, et al., 2004), neighborhood cleanliness (Duncan & Mummery, 2005), and the aesthetic quality of the environment

(Giles-Corti, Broomhall, et al., 2005; Humpel, Owen, & Leslie, 2002; King, et al., 2000) have all been shown to be associated with increased levels of activity.

Environments for Psychological Health

While exposure to more natural environments is generally associated with greater improvements in psychological health (De Vries, Verheij, Groenewegen, & Spreeuwenberg, 2003), there is disagreement regarding what causes these changes and which environmental characteristics are most responsible. The two most widely accepted theories have attempted to explain these improvements by focusing on the ability of the environment to either reduce stress (Ulrich, et al., 1991) or restore attentional resources (R. Kaplan & Kaplan, 1989).

Ulrich, et al. (1991) proposed that improvements to mental health and well-being are due to a reduction in stress. According to this view, exposure to unthreatening, attractive natural settings makes it easier for humans to regulate states of emotional and physiological arousal, stimulate feelings of pleasure, and reduce negative affect. Therefore environments most capable of enhancing psychological health must be free of potential stressors and contain an aesthetically pleasing arrangement of natural elements.

Attention Restoration Theory (ART), on the other hand, hypothesizes that natural environments enhance psychological health and well-being by allowing individuals to

reduce mental fatigue and replenish the attentional resources necessary for self-regulation and cognitive inhibition (R. Kaplan & Kaplan, 1989; S Kaplan, 1995). According to ART, performing certain tasks, such as staying focused on and tracking uninteresting stimuli, requires an effortful form of attention. The capacity to voluntarily employ or direct attention is limited, however, and over time this capacity becomes depleted making it increasingly difficult to remain focused and regulate behavior. In order to regain the capacity to direct attention one must let it rest. One way to facilitate restoration is to seek out and spend time in settings that are engaging and able to effortlessly capture attention (S. Kaplan & Berman, 2010). Therefore, in order to be restorative, an environment needs to contain fascinating objects or events and provide opportunities for exploration and discovery. In addition the setting should allow one to take a break from problems and everyday demands and be supportive of one's goals and inclinations (Herzog, Maguire, & Nebel, 2003; R. Kaplan & Kaplan, 1989).

Although natural settings appear to be particularly good at meeting these criteria and restoring the capacity to direct attention, it is a mistake to assume the amount of restoration one receives is solely dependent on the content in the environment. It is more accurate to think of restoration as an interactive process that occurs between the person and the external environment. In other words, the degree of restoration one receives depends not only on the structure of and features in that setting, but also on how one chooses to interact with that setting. For instance, the restorative potential of a setting abundant with nature may be decreased if one decides to use this environment

to return neglected phone calls. Likewise, the restorative potential of a more modest natural setting may be enhanced if one chose to perform a task, such as listening for bird songs, that encourages greater engagement with the physical environment.

While finding environments that meet all of the criteria described above may be ideal for raising levels of physical activity and well-being, such settings are not widely available, especially in the urban context. Repeatedly using readily available settings can all too often result in a boring or even frustrating experience which discourages physical activity. Interestingly, traditional interventions that encourage outdoor physical activity tend to focus heavily on behavioral initiation strategies, such as scheduling and goal setting and largely ignore ways to make one's experience in these non-ideal environments more interesting and satisfying.

The purpose of the present study is to investigate the usefulness of strategies designed to enhance the physical activity experience itself. In particular, the study explores the possibility of altering how one engages in and interacts with the environment. Such a cognitive engagement strategy may be effective in increasing outdoor physical activity because it relies on a number of cognitive processes that people find highly rewarding, namely recognizing objects, inferring what has happened in the past, predicting what could happen in the future, and evaluating different aspects of the world around us (Kaplan & Kaplan, 1982).

These strategies may also allow highly familiar or even uninteresting settings to be experienced in new ways, making it easier to deal with issues of boredom. This hypothesis is, in fact, supported by the work of Sansone and colleagues (Sansone & Smith, 2000; Sansone & Thoman, 2005, 2006; Sansone, et al., 1992; Sansone, Wiebe, & Morgan, 1999), who have found that the use of interest-enhancing strategies can make performance of a boring task more enjoyable and intrinsically satisfying. Their findings have also indicated that continued use of these strategies can cause one to redefine an activity more positively, thereby increasing the likelihood one will stick with the task and carry it out again in the future. This notion is closely paralleled in the work of Hidi and colleagues (Hidi, 2000; Hidi & Harackiewicz, 2000; Hidi & Renninger, 2006) who have proposed that encouraging interest in contextual features can, over time, cause an activity to become more personally interesting and meaningful. Taken together, these findings suggest facilitating engagement with the environment may be a useful method for enhancing the intrinsic motives that seem to be important for sustaining a physical activity routine (Ingledew, et al., 1998; Maltby & Day, 2001).

In addition, cognitive engagement strategies may be able to enhance the psychological benefits associated with outdoor physical activity. Since, according to ART, the restorative experience can vary depending on the nature of the person-environment interaction, it is reasonable to assume that encouraging active involvement in the walking environment may result in greater benefits to attentional functioning and psychological well-being (S. Kaplan, 2001). By contrast, using strategies which do not

encourage engagement in the environment would presumably be less likely to produce these positive psychological outcomes.

Therefore, the goal of this study is to investigate whether an intervention which uses cognitive engagement strategies can increase outdoor walking behavior and improve psychological well-being. In order to do this, the effectiveness of an engagement-based intervention is compared to a more standard intervention that relies on setting and committing to a walking schedule.

METHODS

Participants

One hundred and seventeen adults were recruited during late spring and summer by posting flyers in various locations around the community and placing announcements in two local newspapers. The flyers and announcements invited adults interested in starting or restarting an outdoor walking routine to participate. Eligible participants were at least 18 years of age and free of existing health conditions that could interfere with walking regularly outdoors. Participants were predominantly female (88%) and between 40-69 years of age (64%). A majority of the participants (86%) indicated that they had in the past made multiple attempts to initiate a regular walking routine. Fourteen participants withdrew from the study before completing the intervention and 66 individuals returned the final follow-up survey (64% return rate).

Treatment Conditions

Initially participants were randomly assigned to either a waitlist control group or an experimental treatment group. Participants in this latter group (*n*=65) were then randomly assigned to one of two treatment conditions, Standard Care or Engagement. After one week waitlisted participants (*n*=52) were randomly assigned to the same two treatment conditions.

Prior to beginning either treatment, participants met with the researcher, completed a pretest survey, and were given the goal of taking at least three 30-minute outdoor walks during each of the subsequent two weeks. Each participant received a binder containing walking logs, a short step-by-step guide of how to carry out the treatment, and a list of walking safety tips. At the end of the two week treatment, participants completed a survey and returned all study materials. Four weeks later participants completed a follow-up survey.

Participants in the waitlist group completed the pretest survey both when they initially met with the researcher and then again at the end of the week, before being instructed about the treatment to which they were assigned.

Standard Care

In addition to the materials described above, participants assigned to the Standard Care condition (*n*=58) worked with the researcher to complete a personalized walking

schedule. Once participants identified the days and times they intended to walk, they signed a pledge stating that they agreed to walk during the times specified.

Engagement

Instead of a walking schedule, participants in the Engagement condition (*n*=59) received a list of awareness plans (see Table 3.1) designed to influence how they engaged in and interacted with the physical environment (Leff, 1984; Leff & Gordon, 1979; Leff, et al., 2002). Participants were asked to use one of the awareness plans as the focus of each walk during the treatment period. While participants were free to experiment with different awareness plans or create their own, the majority of participants reported using one of the provided awareness plans multiple times during the two week intervention.

TABLE 3.1 Sample awareness plans

Plan Category	Example
Focus on your senses	Focus on sounds. If the area is quiet, listen to the silence. If the area is full of sounds, focus on each one and notice how they differ.
Take on a new job or role	Imagine you're an artist looking for beauty in everyday things.
Make guesses or inferences	How would this area be different if everyone had to grow their own food?
Use magic	If you could cast spells that changed the environment what would you change?

Measures

Total time spent walking

Total time walking was measured using surveys, walking logs, and accelerometers. The survey instrument was used to assess the number and duration of walks taken during the preceding week. Surveys were administered before the start of the intervention, at the end of the one week waitlist period, the end of the two week treatment period, and at follow-up. During the two week intervention period, walking behavior was also assessed using walking logs which recorded the date of each walk, the time each walk started and ended, and whether the individual walked alone or with another person. A waist-mounted Actical accelerometer (Phillips Respironics, Bend, OR USA) was also used to obtain an objective measure of total time spent walking during the treatment period. The Actical device contains an omni-directional sensor, allowing one to measure acceleration in multiple planes and provides a reliable and valid measure of physical activity (Esliger & Tremblay, 2006; Pfeiffer, et al., 2006). Walking time was assessed by examining each participant's accelerometer data during the time periods indicated in the walking logs. To constitute a walk, participants were required to reach and maintain a minimum threshold of 500 activity counts per minute, indicating they had achieved at least light activity.

Psychological well-being

Survey items related to psychological well-being were included in the pretest, at the end of the two week treatment, and four weeks later in the follow-up survey. These items

assessed attentional functioning as well as vitality and affective experience. Attentional functioning was assessed using a modified version of the Attentional Functioning Index (AFI), which is designed to measure perceived effectiveness in 10 everyday activities which require self-regulation and executive control (Cimprich, 1992; Tennessen & Cimprich, 1996). Participants were asked to rate how well they felt they had been functioning using a 5-point scale (*not very well* to *extremely well*). The vitality and affective experience measure consisted of 12 positive and negative feelings which participants rated in terms of how frequently they experienced them on a 5-point scale (*never* to *always*). This measure was largely developed by adapting items included on the Subjective Vitality Scale (Ryan & Frederick, 1997) and the Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988). A complete set of items included in each of the psychological well-being measures can be found in Appendix C.

Demographic information

The pretest survey instrument included questions regarding demographic information (e.g., age, gender) and prior history of walking behavior, including frequency and duration of walks as well as previous experience initiating and maintaining a walking routine. Self-efficacy was also measured on the pretest survey using a modified version of the New General Self-Efficacy Scale (Chen, et al., 2001), which is intended to evaluate one's overall confidence in the ability to achieve goals and deal with adversity.

Surveys were also used to assess whether participants engaged in other forms of physical activity. Start of treatment, end of treatment, and follow-up surveys all included questions about how much time participants spent doing physical activity other than walking.

Analysis

In order to ensure construct validity and identify common themes a factor analysis was conducted on the AFI and the vitality and affective experience items using principal-axis factoring with Varimax rotation. Factor structure was based on item loadings of at least .45, Eignvalues greater than 1.0, and alpha coefficients of at least .75. Items loading on more than one factor were excluded.

Linear mixed models were used to examine interactions within and between treatment conditions for walking behavior and psychological well-being over time. This method was chosen because it allows one to analyze correlated observations that are measured repeatedly, under different conditions (West, et al., 2006). The linear mixed model also allows inclusion of subjects who have missing data, giving this approach a distinct advantage over more traditional repeated-measures analysis methods, which remove subjects who do not have data at all time points (West, et al., 2006).

A model based on an unstructured covariate matrix was used to investigate survey, walking log, and accelerometer data related to total time walking. To evaluate data

related to psychological well-being a model based on a compound symmetry covariate matrix was employed. In all cases a top-down model building strategy was used, which involves starting with the fixed effects of all possible covariates and interactions and removing non-significant fixed effects until the best overall fit is achieved (West, et al., 2006). As a result, self-efficacy and participants' prior experience maintaining a walking routine were controlled for in the mixed model examining total time walking. The model used to investigate well-being controlled for both self-efficacy and participants' walking behavior during the treatment period. Once an appropriate fit was determined, the mixed model analysis was used to examine all within and between group interactions by conducting a series of pairwise comparisons based on estimated marginal means.

For the waitlist group, paired samples t-tests were used to analyze all walking and well-being data during the waitlist period. Unless otherwise noted, $p \leq 0.05$ is used to report significance. Three individuals were excluded from the analysis of total time walking because their walking behavior far exceeded that of all other participants.

RESULTS

Development of psychological well-being measures

Factor analysis of the AFI confirmed the items were part of a single factor related to one's ability to function effectively (see Table 3.2). One item, "being on time for appointments," failed to load on this factor and was dropped from the attentional

functioning measure. Analysis of the vitality and affective experience items yielded two factors. The first, "feelings of frustration" consisted of items related to negative affective experience. The second factor, "feelings of contentment" included a number of items related to subjective well-being and reflects feelings of fulfillment and enthusiasm with current experience. Correlations among the three psychological well-being factors ranged between .48 and .59; given their high internal consistency and focus on different dimensions of well-being, they were kept as separate measures.

TABLE 3.2 Psychological well-being measures

Category name and items included	Alpha*
ATTENTIONAL FUNCTIONING	.88
resisting distractions	
remembering to do all the things I started	
keeping my mind on what I am doing	
planning my daily activities	
finishing things that I started	
deciding what is most important to do next	
remember to do important things	
pacing myself	
not interrupting other people	
FEELINGS OF FRUSTRATION	.83
irritable	
impatient	
FEELINGS OF CONTENTMENT	.78
content	
satisfied	
excited	
energized	
relaxed	

*Alpha values represent the reliability of each cluster of items

Time spent walking

Walking behavior of participants assigned to the waitlist condition remained unchanged during the one week control period (see bottom portion of Table 3.3). T-test results indicated that individuals in this group reported no statistically significant change in total time spent walking.

Survey data of individuals in the treatment conditions show improvements in walking behavior, with the Engagement (mean difference = 85.50, $p \leq .001$) and the Standard Care group (mean difference = 80.54, $p \leq .001$) reporting a significant increase in total time walking. At follow-up, a significant decline was experienced by individuals in the Engagement (mean difference= -55.56, $p \leq .001$) and Standard Care conditions (mean difference = -53.91, $p \leq .001$) from the end of treatment. In spite of this decline, there was a significant overall increase in total time walking from start of treatment to follow-up for participants in the Engagement (mean difference = 29.94, p=.023) and Standard Care conditions (mean difference = 26.63, p=.042). There were no significant differences between treatment conditions at start of treatment (mean difference = 13.37, p=.243), end of treatment (mean difference = 8.41, p=.606), or at follow-up (mean difference = 10.06, p=.607).

TABLE 3.3 Total time spent walking per week based on treatment condition

Treatment Conditions	Total Time Walking (minutes)							
	Start of Treatment		Mid Treatment		End of Treatment		Follow-up	
	n	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)
Engagement								
Survey	54	44.3 (8.04)[a]			51	129.8 (11.49)[b]	31	74.3 (13.82)[c]
Walking Log			50	132.6 (9.73)[a]	50	135.4 (13.54)[a]		
Accelerometer			47	124.2 (11.36)[a]	47	119.2 (12.35)[a]		
Standard Care								
Survey	54	57.7 (8.04)[a]			50	138.3 (11.49)[b]	32	84.3 (13.75)[c]
Walking Log			49	144.6 (9.71)[a]	49	141.2 (13.52)[a]		
Accelerometer			42	145.7 (11.90)[a]	42	141.5 (12.94)[a]		

Notes: Total time walking is based on estimated marginal means from the linear mixed model. Estimated marginal means sharing an alphabetic superscript in the same row are not different from one another at $p \leq .05$. The differences in total time walking for participants in the treatment conditions are based on mixed model results of pairwise comparisons between estimated marginal means.

Control Condition	Change in Total Time Walking (minutes)		
	n_{pairs}	Average Δ (SD)	*p*
Survey	47	9.04 (47.82)	.201

Note: Change in total time walking for participants in the waitlist control condition is based on paired t-tests results.

Walking log and accelerometer data confirm that participants were successful in achieving the goal of walking for at least 90 minutes each week (three 30-minutes walks). In addition, time spent walking did not differ significantly between the two conditions during the treatment period according to log (Mid treatment mean difference = 12.03, p=.384; End of treatment mean difference = 5.84, p=.761) and accelerometer data (Mid treatment mean difference = 21.48, p=.195; End of treatment mean difference = 22.29, p=.216). Within each treatment condition walking behavior also stayed relatively stable with log and accelerometer data indicating no changes during the two week treatment period for participants in the Engagement (Walking log mean difference = 2.78, p=.807; Accelerometer mean difference = -4.97, p=.683) or Standard Care conditions (Walking log mean difference = -3.41, p=.763; Accelerometer mean difference = -4.16, p=.744).

Psychological well-being

As with time spent walking, the psychological well-being of participants assigned to the waitlist condition also remained unchanged during the one week control period (see bottom portion of Table 3.4). T-test results indicated that individuals in this group reported no significant changes in attentional functioning, feelings of frustration, or feelings of contentment.

As shown in Table 3.4 and Figure 3.1, exposure to the Engagement condition was most effective at improving psychological well-being, with the Engagement group reporting

significant increases in attentional functioning and feelings of contentment during the treatment period along with a significant decrease in feelings of frustration. Although attentional functioning of the Engagement group declined significantly from the end of treatment to follow-up, feelings of frustration and contentment remained unchanged during this period. None of the three psychological well-being measures changed significantly from the start of treatment to follow-up.

Conversely, individuals in the Standard Care condition reported no significant changes in either attentional functioning or feelings of frustration as illustrated by the relatively flat line of the Standard Care group in Figure 3.1. This group did, however, experience a significant increase in feelings of contentment during the treatment period, a change which persisted and resulted in a significant improvement in feelings of contentment from the start of the treatment to follow-up.

A number of interesting observations can also be drawn by comparing the two treatment conditions. As Figure 3.1 clearly shows, the Engagement condition produces greater improvements in both attentional functioning and frustration during the treatment period. The change in feelings of contentment, however, is strikingly similar between the two treatments. This suggests that attentional functioning and feelings of frustration can be influenced by altering how one interacts with the walking environment, while feelings of contentment are affected more by an increase in time spent walking.

TABLE 3.4 Psychological well-being of participants over time

Treatment Conditions	Mean psychological well-being						Change in psychological well-being					
	Start of Treatment		End of Treatment		Follow-up		Start to End of Treatment		End of Treatment to Follow-up		Start of Treatment to Follow-up	
	n	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	Mean Difference	*p*	Mean Difference	*p*	Mean Difference	*p*
Attentional Functioning												
Engagement	51	3.29 (.10)	51	3.68 (.10)	31	3.25 (.14)	.40	.000	-.44	.001	-.04	.768
Standard Care	50	3.30 (.10)	48	3.49 (.10)	32	3.43 (.12)	.19	.058	-.05	.709	.13	.349
Feelings of Frustration												
Engagement	51	3.13 (.12)*	51	2.75 (.12)	31	3.02 (.18)	-.39	.006	.27	.158	-.12	.525
Standard Care	50	2.77 (.13)*	48	2.67 (.13)	32	2.78 (.19)	-.10	.473	.11	.588	.01	.968
Feelings of Contentment												
Engagement	51	3.05 (.10)	51	3.44 (.09)	31	3.26 (.11)	.39	.000	-.18	.140	.21	.084
Standard Care	50	3.10 (.10)	48	3.46 (.09)	32	3.36 (.11)	.36	.000	-.10	.460	.26	.049

Notes: Mean psychological well-being scores are based on estimated marginal means from the linear mixed model. Estimated marginal means sharing an asterisk (*) are different from one another at $p \leq .05$. Changes in psychological well-being for participants in the treatment conditions are based on mixed model results of pairwise comparisons between estimated marginal means.

Control Condition	Change in psychological well-being		
	n_{pairs}	Average Δ (SD)	*p*
Attentional Functioning	50	.08 (.55)	.281
Feelings of Frustration	50	-.18 (.72)	.083
Feelings of Contentment	50	.12 (.45)	.072

Note: Changes in psychological well-being for participants in the waitlist control condition are based on paired t-tests results.

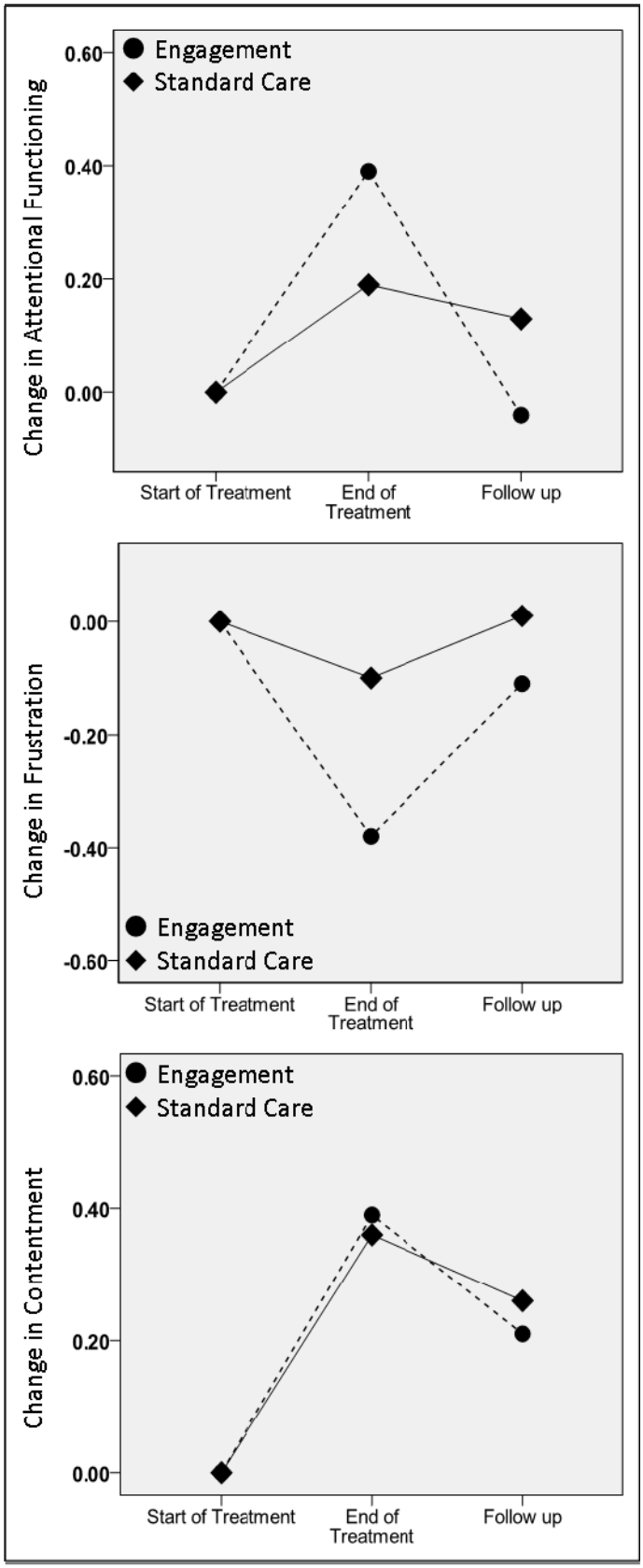

FIGURE 3.1 Changes in psychological well-being over time

Interaction of treatment, well-being, and walking behavior

While these results provide an overall picture of how each treatment influenced well-being, the linear mixed model analysis also indicated that the effect of treatment on psychological well-being differed depending on the amount of time participants spent walking.

In order to account for walking behavior in the linear mixed model, participants were separated into three groups based on the amount of time they reported walking during the two week intervention. Since participants were expected to walk 30-minutes three times a week, or 180 minutes over the two weeks, those who reported walking less than that amount were categorized as Under Compliers (Engagement n=9; Standard Care n=7). The Complier group (Engagement n=28; Standard Care n=25) consisted of participants who reported walking between 180 to 300 minutes. Those who reported walked more than 300 minutes were considered Over Compliers (Engagement n=14; Standard Care n=16) since they walked more than one and a half times longer than expected.

Linear mixed model results indicate that, as expected, Under Compliers experienced no significant changes in any of the psychological well-being measures regardless of treatment condition (see Table 3.5). As shown in Figure 3.2, however, the Standard Care condition scores were opposite the expected direction at the end of treatment both for feeling of frustration and attentional functioning. For the attentional

functioning measure, the two treatment conditions differed significantly at the end of treatment (mean difference = .88, p=.007).

TABLE 3.5 Change in psychological well-being based on level of compliance with the walking routine

	Change in psychological well-being during the treatment period					
	Under Compliers		Compliers		Over Compliers	
	Mean Difference	*p*	Mean Difference	*p*	Mean Difference	*p*
Attentional Functioning						
Engagement	.26	.195	.58	.000	.35	.033
Standard Care	-.12	.587	.29	.016	.40	.008
Feelings of Frustration						
Engagement	-.24	.405	-.72	.000	-.20	.403
Standard Care	.37	.253	-.49	.005	-.19	.384
Feelings of Contentment						
Engagement	.34	.065	.40	.000	.42	.005
Standard Care	.35	.093	.20	.071	.53	.000

Notes: Changes in psychological well-being are based on mixed model results of pairwise comparisons between estimated marginal means.

Overall, participants in the Complier group showed significant improvements in psychological well-being. In terms of attentional functioning, individuals in both the Engagement and Standard Care conditions reported significant increases during the treatment period. Compliers in both treatment conditions experienced significant declines in feelings of frustration. With respect to feelings of contentment, however, only Compliers in the Engagement condition experienced a significant increase. While the results for the two conditions follow a similar pattern, as shown in Figure 3.2, the amount of change between the baseline and post-treatment measurements is notably greater in the case of the Engagement group for each of the psychological variables.

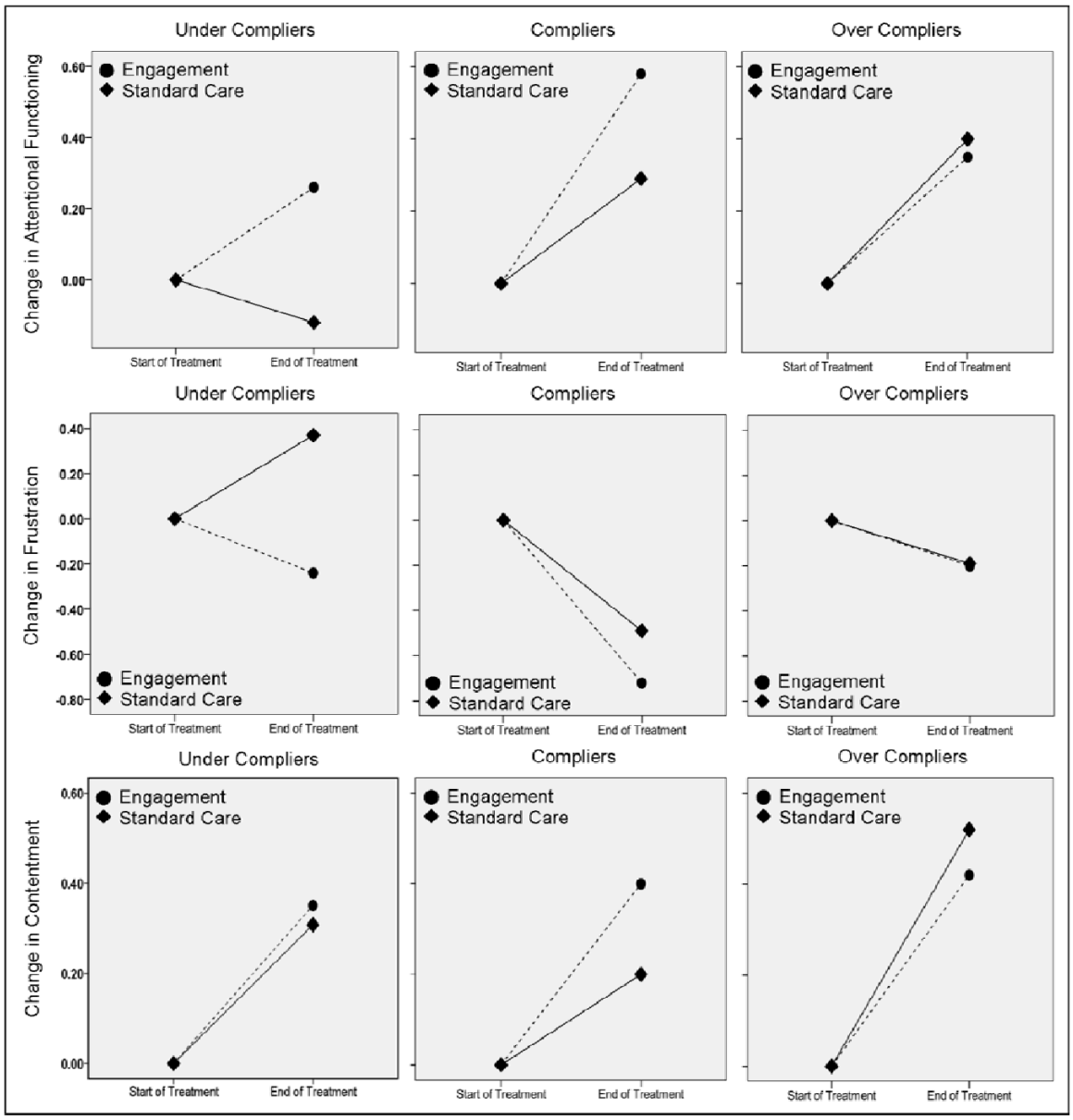

FIGURE 3.2 Changes in psychological well-being based on compliance with treatment

Over Compliers – those who far exceeded expectations regarding time spent walking – showed improvements in both attentional functioning and contentment, regardless of treatment condition. Interestingly, their feelings of frustration were not significantly affected.

Figure 3.2 permits an overview of the differences between the treatment conditions as well as among the levels of compliance. While the overall patterns are quite similar for the two treatments, the changes are consistently in the expected direction and stronger for the Engagement condition. For the Standard Care condition in two instances the results are opposite of expectation, in one case the change is not significant where it is for the other condition, and in the other instances the changes are of lesser magnitude.

Although these findings are correlational in nature and therefore need to be interpreted with caution, they raise the possibility that the amount of time spent walking may have different outcomes depending on the treatment. The changes in attentional functioning and frustration illustrated in Figure 3.2 provide some indication of this pattern. At high levels of walking participants in both conditions experienced similar changes. With decreasing amount of time spent walking, however, the Engagement condition seems to make more of a difference.

DISCUSSION

Engagement vs. Standard Care

These findings present a strong case for incorporating cognitive engagement strategies into interventions designed to encourage outdoor walking. Not only did the Engagement-based approach produce changes in walking behavior that were comparable to the Standard Care treatment, it was also more effective at producing positive changes in psychological well-being.

There are several potential explanations for the differences in well-being between treatment conditions. One possibility is that adhering to the Standard Care condition makes sufficient demands on self-regulation and attentional resources and as a result interferes with some aspects of well-being. These demands may have made it more difficult for Standard Care participants to experience improvements in attentional functioning or to reduce frustration within the two week treatment period. It is possible that given more time Standard Care participants would have been able to gain greater familiarity with the action plan and less attentional resources would be needed, thus making it easier to achieve improvements in well-being.

This explanation, however, is perhaps less plausible since the instructions for the Standard Care condition minimize the need to make future decisions about when and how long to walk and hence may conserve attentional resources. By contrast, individuals in the Engagement condition may have had to invest attentional resources in order to maintain their focus on an awareness plan while walking. Furthermore, the Engagement group received no help with the potentially demanding task of determining how to incorporate walking into their weekly routine, an activity that would require further use of attentional resources. Taken together, it is reasonable to assume that both treatment conditions require comparable investments of attentional resources.

Therefore, it seems likely that the awareness plans used in the Engagement condition were responsible for enabling participants to gain greater psychological benefits. It

appears these awareness strategies, which were intended to enhance the walking experience by creating interest in the setting, may have the added advantage of priming participants for a restorative experience by encouraging them to orient to the environment. This finding not only provides a compelling reason to incorporate cognitive engagement strategies into walking interventions, but it is also consistent with ART.

The higher scores in psychological well-being for participants in the engagement condition are intriguing when one considers the ART assumption that altering the person-environment interaction can influence the restorative benefits one receives. While more research is clearly needed, these findings raise the possibility that using engagement strategies may help one to discover a larger number and greater diversity of fascinating stimuli. During a typical outdoor walking experience it is easy to overlook many aspects of the environment that, upon closer inspection, can be quite fascinating. Strategies that help one to become more aware of these features could increase the richness and diversity of the setting, creating an environment that has more to explore. Finally, focusing on the awareness plan and being more attentive to the environment may make it easier to set aside distracting thoughts.

The analysis of interactions among treatment, well-being, and walking behavior also suggests that engagement strategies can be used to help one get more psychological benefits from time spent walking, particularly at low to moderate levels. Although

Under Compliers did not experience significant improvements in well-being in either condition, the data show the attentional functioning and frustration scores of the two treatments move in opposing directions. Compliers, on the other hand, show significant increases in well-being for both treatments. However, only the Engagement condition was able to produce improvements on all three dimensions of well-being. Over Compliers in both treatment conditions experienced nearly identical changes with respect to attentional functioning, frustration, and commitment. Overall this suggests that, in terms of influencing well-being, efforts to promote engagement and involvement with the environment may be particularly salient at shorter durations of outdoor activity.

These findings are also interesting from the perspective of health professionals. Results of the study suggest that efforts to help individuals become more engaged and involved during the actual walking experience may be just as valuable as traditional strategies, such as schedule setting, designed to help individuals initiate and sustain a walking routine. Techniques that encourage individuals to conduct a more detailed investigation of the walking environment or adopt a more playful, curious orientation toward the walking experience may be particularly effective in this regard. This approach is especially appealing since other research has suggested that using engagement strategies can make performance of relatively boring tasks more enjoyable (Sansone, et al., 1992).

Limitations & Future Research

There are limitations that should be acknowledged when interpreting the findings from this study. First, the brevity of the intervention makes it difficult to determine whether cognitive engagement strategies could have a positive impact on walking behavior or well-being in the long term. As a result, future studies should attempt to incorporate engagement-based strategies into more standardized six to eight week intervention periods. This study also relied solely on a self-report measure of attentional functioning. While the AFI is theoretically sound and has proven to be a reliable measure of attentional capacity (Cimprich, 1992, 1993; Tennessen & Cimprich, 1996), it would be encouraging to see current findings replicated with behavioral measures, such as the Digit Span Forward/Backward or the Attentional Network Test (Posner & Rothbart, 2007). In addition, not restricting participants in where they chose to walk increased ecological validity but precludes examination of the role played by particular physical characteristics of the walking environment and their potential interaction with treatment conditions. Future research which accounts for the physical characteristics of the walking environment could help to determine whether certain settings are more compatible with particular types of engagement-based strategies. Finally, the study consisted of a fairly motivated sample of mostly middle-aged women, making it difficult to know whether these results can be generalized to other groups. Therefore, there is need for further research to explore the potential benefits of engagement strategies with other populations, including more sedentary, less motivated individuals.

CONCLUSIONS AND IMPLICATIONS

The finding that the Engagement condition was particularly effective in improving multiple dimensions of psychological well-being suggests that it is useful to promote strategies which encourage interaction and involvement with the external setting. Such cognitive engagement strategies may be able to help more individuals achieve the mental health benefits associated with *green exercise*.

It is also useful to note that the cognitive engagement strategy proved as effective at increasing walking behavior as the more traditional approach. This raises the possibility that incorporating strategies designed to create greater interest in the physical setting within traditional interventions may help individuals to initiate and maintain an outdoor walking routine. Although the current study is limited to a two-week intervention, it is possible that influencing walking behavior in the long term may be enhanced if individuals are able to observe positive changes in their mood and cognitive functioning.

The engagement-based approach also provides health practitioners with a flexible and low cost way of helping individuals deal with environments that are not necessarily ideal for walking or for enhancing well-being. While physically redesigning communities may be needed to increase both physiological and psychological health in the long term, transforming communities will take both time and resources. In the meantime, the strategies proposed by this engagement-based approach may be able to help individuals use existing nearby environments more effectively.

CHAPTER 4

USING ENGAGEMENT STRATEGIES TO ALTER PERCEPTIONS OF THE WALKING ENVIRONMENT

BACKGROUND

Over the past decade health researchers and practitioners have focused considerable attention on understanding the various factors that influence outdoor physical activity (Bauman, Sallis, Dzewaltowski, & Owen, 2002; Seefeldt, Malina, & Clark, 2002). These efforts have not only resulted in a greater appreciation of the role of the physical environment, but also have generated tremendous interest in the idea of *active living*, an initiative to promote design principles that foster more physically active lifestyles (activeliving.org, 2008). Implementing design-based solutions, however, entails many limitations, not least of which is the time and money it takes to affect such changes. Fortunately, there may be an alternative available that involves influencing individuals' perceptions of the environment without changing the physical setting (Humpel, Marshall, Leslie, Bauman, & Owen, 2004). The focus of the present study is to investigate whether encouraging greater engagement with the environment can have positive influences on physical activity and feelings of satisfaction with the environment in its unaltered state.

Overview of environmental factors

The features present in the environment and the condition of those features can provide important cues to help individuals decide what behaviors are both possible and most appropriate (Gibson, 1977). A considerable amount of research has identified certain environmental attributes that are supportive of physical activity. In particular four categories of attributes have been shown to be associated with physical activity participation; these are: accessibility, safety, aesthetics, and climate/geographic location.

Accessibility

A number of attributes related to accessibility have been correlated with increased physical activity, including distance to recreational facilities (Booth, Owen, Bauman, Clavisi, & Leslie, 2000), open spaces (Giles-Corti, Broomhall, et al., 2005) and local shops (Giles-Corti & Donovan, 2003). In addition, the presence and availability of sidewalks and walking trails have been associated with increased activity (Addy, et al., 2004; Eyler, et al., 2003).

Safety

Research also indicates that outdoor activity is influenced by a number of safety related factors. While factors such as heavy automobile traffic (Troped, et al., 2003; van Lenthe, Brug, & Mackenbach, 2005) have been associated with lower rates of activity, street lighting (Addy, et al., 2004) and neighborhood cleanliness (Duncan & Mummery, 2005)

have been linked to increased physical activity. In addition, there is evidence that social aspects of the environment can contribute to feelings of safety, with more walking occurring among individuals who trust their neighbors (Addy, et al., 2004).

Aesthetics

A number of studies has shown a strong relationship between the aesthetic quality of the environment and levels of physical activity, with factors such as the presence of natural features (B. B. Brown, et al., 2007; Giles-Corti & Donovan, 2003), attractive and interesting scenery (Spence, et al., 2006), and a variety of views (McCormack, et al., 2004) all positively influencing activity levels. Likewise, a lack of aesthetic quality and enjoyable scenery has been associated with decreased activity (Eyler, et al., 2003; King, et al., 2000).

Climate and Geographic Location

Physical activity participation also appears to be influenced by patterns of climatic and seasonal changes, with activity increasing during warmer months and during periods of lower humidity and precipitation (Merrill, et al., 2005; Pivarnik, Reeves, & Rafferty, 2003). In addition, some studies suggest that one's geographic location may be important, with rates of participation increasing in coastal (Bauman, Smith, Stoker, Bellew, & Booth, 1999) and more urbanized settings (Martin, et al., 2005).

While there is a need to consider how these attributes might be manipulated to increase physical activity, relying entirely on a design-based approach is problematic. Efforts to modify infrastructure are extremely costly and time intensive, and not all of the attributes are amenable to such manipulation. Furthermore, even where improvements can be made, people will still likely struggle to incorporate physical activity into their daily routine. As a result, it is also necessary to develop intervention strategies that help individuals adapt to existing environments, even when these settings are less than ideal.

Such strategies require no changes to the physical setting but rather focus on how the environment is perceived (Humpel, Owen, et al., 2004). Spending time in a particular setting, thus increasing familiarity, can be a way to influence perceptions (Humpel, Marshall, et al., 2004). A different strategy may be to increase exploration by fostering greater mental involvement with the environment. This engagement-based approach not only has the potential to alter perceptions, but it also offers a flexible and low-cost approach for increasing the number of settings that may be acceptable for physical activity.

If encouraging greater engagement and involvement with the outdoor environment can reduce the likelihood that outdoor settings become dull or boring, such a strategy could make it easier to maintain outdoor activity over the long-term. Over time, as familiarity increases and/or as the seasons change, outdoor settings can become less appealing

and feel more commonplace. Engagement strategies, however, may help combat these feelings by drawing attention to subtle, yet interesting aspects of the everyday environment and allow one to see a familiar environment in new ways.

Despite these potential advantages, there are surprisingly few physical activity interventions that attempt to actively manipulate perceptions of environmental attributes. Therefore, the purpose of the present study is to investigate whether encouraging more active engagement in, and interaction with, the environment can have positive influences on physical activity levels and feelings of satisfaction with the environment. Individuals may also find this engagement-based approach appealing because it takes advantage of a number of cognitive processes that people often find rewarding, namely recognizing objects, inferring what has happened in the past, predicting what could happen in the future, and evaluating different aspects of the world around us (Kaplan & Kaplan, 1982).

In order to investigate the effectiveness of this engagement-based approach, a walking intervention which used engagement strategies is compared to a more traditional intervention which relies on creating and committing to a walking schedule. The primary goal of this research is to determine whether, and under what conditions, engagement strategies can be used to increase outdoor walking behavior and improve environmental satisfactions.

METHODS

Participants

One hundred and seventeen adults were recruited during late spring and summer by posting flyers in various locations around the community and placing announcements in two local newspapers. The flyers and announcements invited adults interested in starting or restarting an outdoor walking routine to participate. Eligible participants were at least 18 years of age and free of existing health conditions that could interfere with walking regularly outdoors. Participants were predominately female (88%) and between 40-69 years of age (64%). A majority of these individuals (86%) indicated that they had in the past made multiple attempts to initiate a regular walking routine. Thirteen participants withdrew from the study before completing the intervention and 66 individuals returned the final follow-up survey (63% return rate).

Treatment Conditions

Participants were randomly assigned to one of two treatment conditions, Standard Care or Engagement, at the start of the study. Prior to beginning either intervention, participants met with the researcher, completed a pretest survey, and were given the goal of taking at least three 30-minute outdoor walks during each of the subsequent two weeks. Each participant received a binder containing walking logs, a short step-by-step guide of how to carry out the intervention and a list of walking safety tips. At the end of the two week intervention participants (*n*=104) completed a survey and returned all study materials. Four weeks later participants completed a follow-up survey.

Standard Care

In addition to the materials described above, participants assigned to the Standard Care condition (*n*=58) worked with the researcher to create a personalized walking schedule. Once participants identified the days and times they intended to walk they signed a pledge stating that they agreed to walk during the times specified. Participants were free to take walks alone or with another person.

Engagement

Instead of a walking schedule, participants in the Engagement condition (*n*=59) received a list of awareness plans (Table 4.1) designed to influence how they engaged in and interacted with the physical environment (Leff, 1984; Leff & Gordon, 1979; Leff, et al., 2002). Participants were asked to use one of the awareness plans as the focus of each walk during the treatment period and were free to experiment with different awareness plans, create their own plans, or use the same plan multiple times. Participants in this condition were also free to walk alone or with others. If participants decided to walk with another person, however, they were instructed to share the awareness plan(s) with their walking partner and work with their partner to focus on the awareness plan(s) they selected.

TABLE 4.1 Sample awareness plans

Plan Category	Example
Focus on your senses	Focus on sounds. If the area is quiet, listen to the silence. If the area is full of sounds, focus on each one and notice how they differ.
Take on a new job or role	Imagine you're an artist looking for beauty in everyday things.
Make guesses or inferences	How would this area be different if everyone had to grow their own food?
Use magic	If you could cast spells that changed the environment what would you change?

Measures

Total time spent walking

Total time walking was measured using surveys, walking logs, and accelerometers. The survey instrument was used to assess the total time spent walking during the preceding week. Surveys were administered before the start of the intervention, at the end of the two week treatment period, and at follow-up. During the two week intervention period time spent walking was also assessed using walking logs which recorded the date of each walk as well as the time each walk started and ended. A waist-mounted Actical accelerometer (Phillips Respironics, Bend, OR USA) was also used to obtain an objective measure of total time spent walking during the treatment period. The Actical device contains an omni-directional sensor, allowing one to measure acceleration in multiple planes and provides a reliable and valid measure of physical activity (Esliger & Tremblay, 2006; Pfeiffer, et al., 2006).

Satisfaction with the Walking Environment

Participants were asked to rate their satisfaction with each of 14 aspects of their walking environment, using a 5-point scale (*not at all* to *extremely*). The ratings were repeated three times: as part of the pretest (completed at the initial meeting), at end of treatment, and at the follow-up four weeks afterwards. The items represented the environmental attributes that are closely related to the accessibility, safety, and aesthetics quality of the setting discussed earlier. A complete set of items included in the satisfaction measure is presented in Appendix C.

Demographic information

The pretest survey instrument, also included demographic information (e.g., age, gender) and prior history of walking behavior, including previous experience initiating and maintaining a walking routine. Self-efficacy was also measured on the pretest survey using a modified version of the New General Self-Efficacy Scale (Chen, et al., 2001), which is intended to evaluate one's overall confidence in the ability to achieve goals and deal with adversity.

Analysis

In order to ensure construct validity and identify common themes a factor analysis was conducted using participant ratings of the 14 satisfaction items at pretest. Principal-axis factoring with Varimax rotation was used. Factor structure was based on item loadings

of at least .45, Eigenvalues greater than 1.0, and alpha coefficients of at least .65. Items loading on more than one factor above the .45 level were excluded.

Linear mixed models were used to examine interactions within and between treatment conditions and walking behavior. This method was chosen because it allows one to analyze correlated observations that are measured repeatedly, under different conditions (West, et al., 2006). The linear mixed model also allows one to include subjects which have missing data, giving it an distinct advantage over more traditional repeated-measures analysis methods which removes subjects who do not have data present at all time points (West, et al., 2006).

A liner mixed model based on an unstructured covariate matrix was used to investigate survey, walking log, and accelerometer data related to total time walking. To evaluate data related to participants' satisfaction with the walking environment a model based on a compound symmetry covariate matrix was employed. In all cases a top-down model building strategy was used, which involves starting with the fixed effects of all possible covariates and interactions and removing non-significant fixed effects until the best overall fit is achieved (West, et al., 2006). As a result, self-efficacy and participants' prior experience maintaining a walking routine were controlled for in the mixed model examining total time walking. The model used to investigate satisfaction controlled for the presence of a walking partner during the treatment period. Once an appropriate fit was determined, the mixed model analysis was used to examine all within and between

group interactions by conducting a series of pairwise comparisons based on estimated marginal means.

Three individuals were excluded from the analysis of total time walking because their walking behavior far exceeded that of all other participants, as well as what seemed a reasonable upper limit during the treatment and follow-up periods. The linear mixed model investigating changes in satisfaction only included participants who could be clearly classified as either solitary or social walkers. This resulted in thirty four individuals who reported walking with their dog or taking an equal number of solitary and social walks being excluded from further analysis.

RESULTS

Development of satisfaction measures

Factor analysis identified four distinct categories of environmental features (Table 4.2). The first group of items related to the presence of nature in the walking environment and includes items associated with the richness of natural features in the setting. Interestingly, this category also included "nature sounds," suggesting that participants' assessments were not only based on obvious visual signs of nature, but also on auditory signals as well. Distinct from this nature category was a cluster of two items related to the presence of shade and tree cover. The emergence of this as a distinct category is perhaps understandable since the outdoor walking intervention took place during the summer months when shade and tree cover are most desirable. The third category was

related to the sense of security in their walking environment. While this category included items addressing general feelings of safety, it also included more specific items associated with the ease of wayfinding and feelings of social comfort and inclusion. The final category included items related to the presence and condition of walking paths. Correlations among the four categories ranged between .11 and .44; given their high internal consistency and focus on different aspects of the physical environment they were used as separate measures.

TABLE 4.2 Features of the walking environment

Category name and items included	Pretest Mean	Alpha*
AMOUNT & VARIETY OF NATURE	3.83	.87
amount of nature variety of things to look at nature sounds		
SHADE TREES	3.60	.79
amount of shade tree cover		
SENSE OF SECURITY	4.20	.72
friendliness of residents sense of community ease of finding your way around safety		
WALKING PATHS	3.81	.66
Availability of sidewalks/trails Condition of sidewalks/trails		

*Alpha values represent the reliability of each cluster of items

Time spent walking

Individuals in both treatment conditions showed improvements in walking behavior (Table 4.3), with the Engagement (mean difference = 85.50, $p \leq .001$) and the Standard

Care group (mean difference = 80.54, p≤.001) reporting a significant increase in total time walking. At follow-up, a significant decline was experienced by individuals in both the Engagement (mean difference = -55.56, p≤.001) and Standard Care conditions (mean difference = -53.91, p≤.001) when compared with the end of treatment. In spite of this decline, there was a significant overall increase in total time walking from start of treatment to follow-up for participants in both the Engagement (mean difference = 29.94, p=.023) and Standard Care conditions (mean difference = 26.63, p=.042).

Walking log and accelerometer data confirm that participants were successful in achieving the goal of walking for at least 90 minutes each week (three 30-minutes walks). It is also interesting to note that time spent walking did not differ significantly between the two conditions during the treatment period and that within each treatment condition walking behavior stayed relatively stable throughout the two week intervention.

TABLE 4.3 Total time spent walking per week based on treatment condition

	Total Time Walking (minutes)							
	Start of Treatment		Mid Treatment		End of Treatment		Follow-up	
	n	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)
Engagement								
Survey	54	44.3 (8.04)[a]			51	129.8 (11.49)[b]	31	74.3 (13.82)[c]
Walking Log			50	132.6 (9.73)[a]	50	135.4 (13.54)[a]		
Accelerometer			47	124.2 (11.36)[a]	47	119.2 (12.35)[a]		
Standard Care								
Survey	54	57.7 (8.04)[a]			50	138.3 (11.49)[b]	32	84.3 (13.75)[c]
Walking Log			49	144.6 (9.71)[a]	49	141.2 (13.52)[a]		
Accelerometer			42	145.7 (11.90)[a]	42	141.5 (12.94)[a]		

Notes: Total time walking is based on estimated marginal means from the linear mixed model. Estimated marginal means sharing an alphabetic superscript in the same row are not different from one another at $p \leq .05$. The differences in total time walking for participants in the treatment conditions are based on mixed model results of pairwise comparisons between estimated marginal means.

Satisfaction with the Walking Environment

As shown in Table 4.4, participants in the Engagement condition rated satisfaction with environmental features significantly higher at the end of treatment in comparison to their baseline level. In particular, during the treatment period the Engagement group reported significant increases in their satisfaction with the amount and variety of nature, shade trees, and walking paths. Satisfaction with the amount and variety of nature declined significantly from the end of treatment to follow-up, returning to a level statistically indistinguishable from the baseline. Participants' satisfaction with shade trees and walking paths, however, did not change from the end of treatment to follow-up, resulting in a significant overall increase in satisfaction from the start of treatment to follow-up. Sense of security remained relatively stable throughout the treatment and follow-up periods.

In contrast, individuals in the Standard Care condition experienced no significant changes in satisfaction with the walking environment. Throughout the treatment and follow-up period satisfaction scores for the amount and variety of nature, shade trees, sense of security, and walking paths all stayed statistically constant.

TABLE 4.4 Satisfaction with walking environment based on treatment condition

	Mean satisfaction						Change in satisfaction					
	Start of Treatment		End of Treatment		Follow-up		Start to End of Treatment		End of Treatment to Follow up		Start of Treatment to Follow-up	
	n	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	Mean Difference	*p*	Mean Difference	*p*	Mean Difference	*p*
Amount & Variety of Nature												
Engagement	40	3.68 (.13)	42	4.10 (.13)	28	3.80 (.15)	.42	.000	-.31	.022	.11	.407
Standard Care	40	3.94 (.14)	40	4.15 (.14)	29	4.11 (.15)	.19	.076	-.04	.756	.17	.205
Shade Trees												
Engagement	40	3.47 (.14)	42	3.78 (.14)	28	3.81 (.16)	.31	.006	.03	.854	.34	.023
Standard Care	40	3.76 (.14)	40	3.88 (.14)	29	3.97 (.16)	.12	.349	.09	.526	.22	.144
Sense of Security												
Engagement	40	4.15 (.09)	42	4.21 (.09)	28	4.20 (.11)	.06	.562	-.01	.938	.05	.695
Standard Care	40	4.27 (.09)	40	4.32 (.09)	29	4.11 (.11)	.05	.619	-.21	.075	-.26	.180
Walking Paths												
Engagement	40	3.76 (.16)	42	4.12 (.16)	28	4.16 (.18)	.37	.015	.04	.823	.40	.022
Standard Care	40	3.96 (.16)	40	3.84 (.16)	29	3.87 (.18)	-.12	.433	.03	.866	-.09	.596

Notes: Mean satisfaction scores are based on estimated marginal means from the linear mixed model. Changes in satisfaction are based on mixed model results of pairwise comparisons between estimated marginal means.

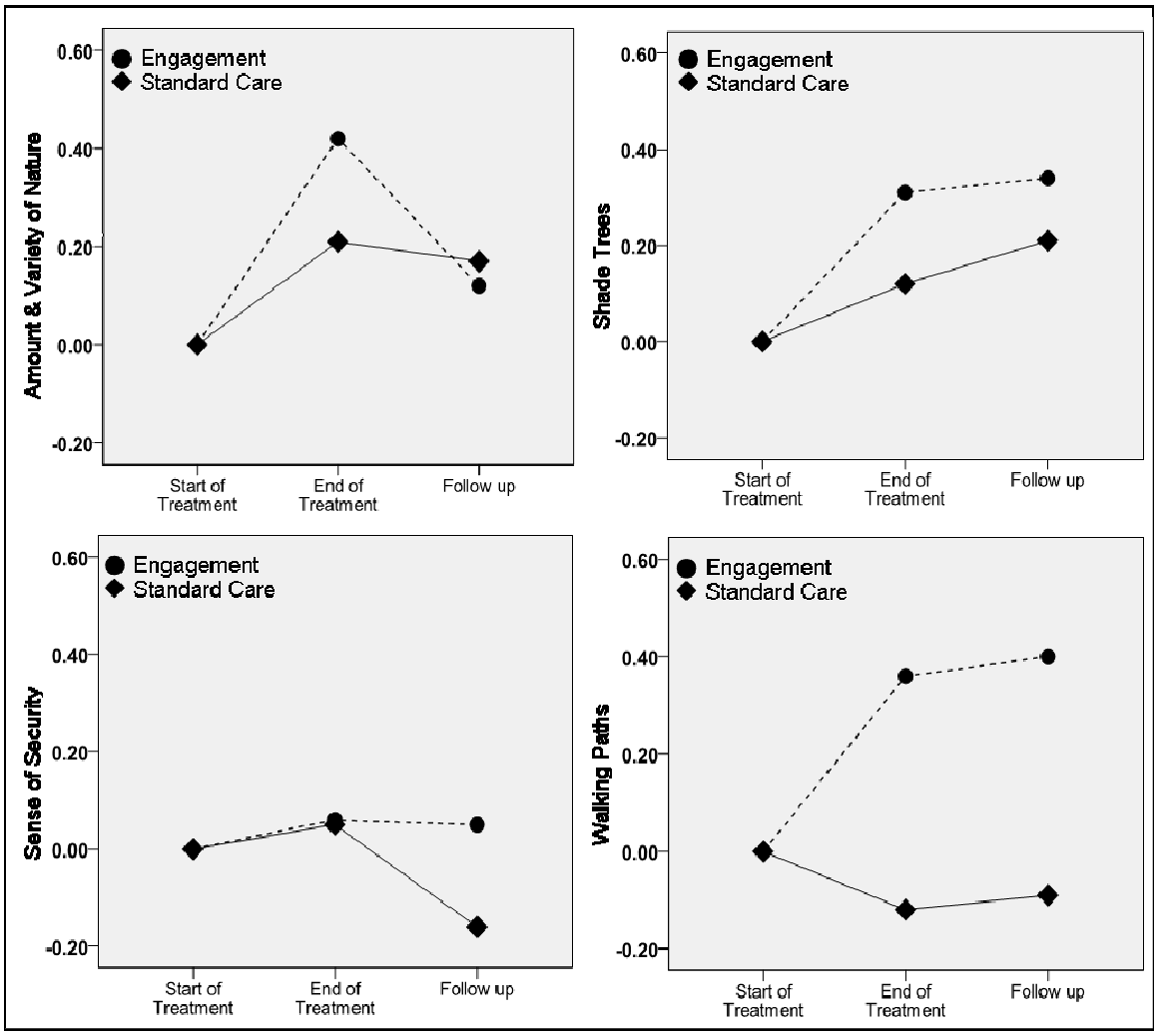

FIGURE 4.1 Change in satisfaction with the walking environment based on treatment

Figure 4.1 provides a graphic analysis of the changes in satisfaction ratings within and between the two treatment conditions for both the end of treatment and follow-up measurements. The difference between the two conditions is particularly dramatic with regard to walking paths, where satisfaction of the Engagement group increased substantially while satisfaction of the Standard Care group showed some decline. A similar, but perhaps less striking, pattern is also evident regarding satisfaction with both

shade trees and the amount and variety of nature, where the Engagement group shows a sharper increase in satisfaction from the start to the end of the treatment period.

Solitary vs. Social Walking

In addition to the effect of treatment, the mixed model analysis indicated that satisfaction with aspects of the walking environment was also influenced by whether participants walked alone or with another person. Using information reported in the weekly walking logs, participants were classified as either solitary or social walkers based on their pattern for the majority of their walks.

As shown in Table 4.5 and Figure 4.2 the treatment conditions influenced the satisfaction ratings of solitary and social walkers differentially. For the Standard Care condition there were no significant differences in satisfaction for any of the environmental factors for the social walkers and only one factor – shade trees – showed a significant increase for the solitary walkers. It is interesting to note, however, that the satisfaction ratings were generally high at the start of treatment for social walkers in the Standard Care condition.

Conversely, for the Engagement condition whether participants walked alone or with another person affected their satisfaction with the environment. As was true for the Standard Care condition, the solitary walkers showed a significant increase only with respect to shade trees. The social walkers, however, showed the most dramatic

increases in satisfaction. Mean ratings for these participants increased by more than half a scale point for the amount and variety of nature and nearly three-fourths of a point for walking paths.

TABLE 4.5 Satisfaction with walking environment based on the presence of a walking partner

	Mean satisfaction				Change in satisfaction	
	Start of Treatment		End of Treatment		Start to End of Treatment	
	n	Est. Marginal Mean (SE)	*n*	Est. Marginal Mean (SE)	Mean Difference	*p*
ENGAGEMENT						
Amount & Variety of Nature						
Solitary Walkers	19	3.84 (.19)	20	4.08 (.19)	.24	.151
Social Walkers	21	3.53 (.18)	22	4.12 (.18)	.59	.000
Shade Trees						
Solitary Walkers	19	3.50 (.20)	20	3.93 (.20)	.43	.022
Social Walkers	21	3.44 (.19)	22	3.64 (.19)	.20	.266
Sense of Security						
Solitary Walkers	19	4.26 (.13)	20	4.47 (.13)	.21	.171
Social Walkers	21	4.04 (.13)	22	3.94 (.13)	-.10	.507
Walking Paths						
Solitary Walkers	19	4.16 (.23)	20	4.18 (.23)	.02	.928
Social Walkers	20	3.36 (.22)	22	4.07 (.22)	.71	.001
STANDARD CARE						
Amount & Variety of Nature						
Solitary Walkers	23	3.91 (.18)	23	4.07 (.18)	.17	.281
Social Walkers	17	3.98 (.20)	17	4.24 (.20)	.26	.157
Shade Trees						
Solitary Walkers	23	3.37 (.19)	23	3.76 (.19)	.39	.022
Social Walkers	17	4.15 (.22)	17	4.00 (.22)	-.15	.456
Sense of Security						
Solitary Walkers	23	4.09 (.12)	23	4.15 (.12)	.05	.712
Social Walkers	17	4.45 (.14)	17	4.50 (.14)	.05	.736
Walking Paths						
Solitary Walkers	23	3.96 (.21)	23	3.94 (.21)	-.02	.912
Social Walkers	16	3.96 (.25)	16	3.74 (.25)	-.22	.353

Notes: Changes in satisfaction are based on mixed model results of pairwise comparisons between estimated marginal means.

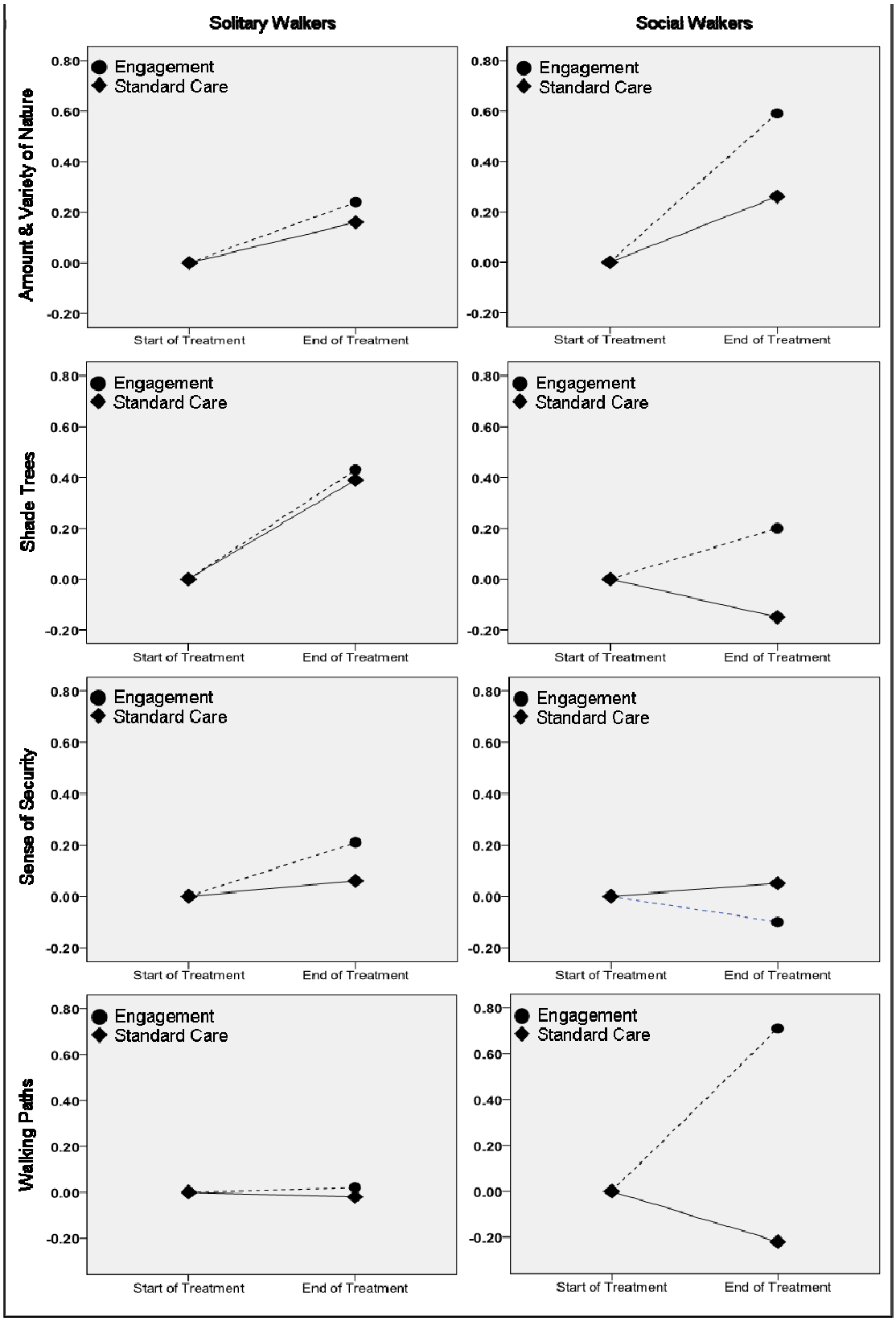

FIGURE 4.2 Change in satisfaction with walking environment based on treatment and presence of a walking partner

DISCUSSION

Interventions designed to increase outdoor physical activity typically rely on behavioral initiation strategies, such as schedule setting. Rarely is guidance offered regarding interactions with the physical environment. The findings of this study indicate that this omission is unfortunate. The results presented here suggest that strategies designed to encourage engagement in the outdoor environment can be at least as effective at increasing walking behavior as more traditional approaches. In addition, it appears these engagement-based strategies may offer the special benefit of creating more positive perceptions of the walking environment, an outcome which could increase the likelihood of future activity.

The fact that satisfactions with the walking environment did not change for participants in the Standard Care condition is not surprising given the short intervention period (2 weeks) and the relatively high satisfaction levels of this group at baseline. This makes it even more remarkable that, despite similar constraints, participants in the Engagement condition were able to experience significant changes in three of the four satisfaction measures and that in two instances (i.e., satisfaction with shade trees, satisfaction with walking paths) these levels remained elevated at follow-up.

The changes in satisfaction reported by the Engagement group appear to be directly related to issues of aesthetics and accessibility, two factors previously identified as strongly affecting physical activity participation (Humpel, et al., 2002). The ability of the

Engagement condition to influence these satisfactions may be due to increased exploration of the walking setting. Strategies that encourage individuals to take a slightly different perspective and to become more aware of the walking environment can increase both the desire to explore and the sense that the setting has more richness and complexity than otherwise would have been noticed. This approach may be particularly valuable given research findings that suggest that the presence of "microfeatures," such as vegetation, light, and water, can positively influence one's experience and willingness to walk (B. B. Brown, et al., 2007; Giles-Corti, Timperio, et al., 2005). Increased exploration may have also led participants to discover new walking routes and develop more positive feelings regarding the accessibility of walking paths.

The differences between solitary and social walkers may seem somewhat counterintuitive since one might expect that the presence of another person could be a competing source of engagement and thus diminish the effectiveness of the Engagement condition. The results of this study point to a different outcome and suggest the need for further research. For individuals in the engagement condition, walking with a partner positively influenced perceptions related to some environmental attributes. This suggests that sharing the experience of observing and noticing with another person may enhance the benefits. As a consequence, it seems plausible to assume that walking interventions which currently utilize social support could be made more effective by incorporating engagement-based strategies.

Although the short nature of this intervention makes it difficult to determine how effective these engagement-based strategies would be if used regularly over an extended time period, it does seem reasonable to conclude that engagement may be useful for initiation of an outdoor walking routine, given the improvements in walking behavior and satisfaction. Clearly, however, more research is needed to substantiate the potential short and long term benefits of this approach.

CONCLUSION

Overall, this study suggests that strategies designed to encourage more active engagement with the walking environment can lead to increased satisfaction making existing nearby settings more acceptable for physical activity. These findings also raise the possibility that it may be advantageous to incorporate engagement strategies into existing interventions, since these results indicate engagement can be used effectively in combination with other behavior change techniques, such as social support. Finally, the engagement-based approach offers a practical alternative to large scale redesign projects. Engagement strategies may be a useful tool in situations where it is difficult or impossible to alter aspects of the physical environment itself or in situations where activity levels are low, despite access to highly walkable settings.

CHAPTER 5

DELIBERATE ENGAGEMENT AS AN APPROACH TO BEHAVIOR CHANGE

BACKGROUND

Good intentions are often not enough to help one initiate, act on, or sustain new behaviors. One only needs to think about New Year's resolutions to get a rich source of examples and some clues about the strategies people frequently employ when trying to change their behavior. One popular strategy is to call on willpower to tough it out, buckle down, and resist temptations. This approach, however, tends to have little staying power since it requires continuous mental effort and demands that one overcome the many obstacles and distractions that get in the way of making a change.

Another strategy is to make the outcomes associated with a behavior more salient. This may involve emphasizing the benefits that result from doing the activity (or the consequences of not doing it) or providing incentives for performance. While reminding oneself of potential positive or negative outcomes and giving oneself rewards may be sufficient in some cases, both the anecdotal and research literature suggest that such approaches are unlikely to help one maintain behaviors in the long-term (Abrahamse, et al., 2005; De Young, 2000; Ingledew, et al., 1998; Morgan & Dishman, 2001). Why do

these conventional approaches so often lead to disappointment and, more importantly, are there other strategies that might fare better?

This chapter focuses on coping with these recalcitrant behaviors by calling upon mechanisms that are more likely to succeed because they are engaging. While this might seem straightforward, an obstacle here is that people would not be having trouble carrying out these behaviors if they were currently perceived as interesting and engaging. The challenge thus becomes one of learning how to engage, or what can be called *deliberate engagement*. Once these normally uninteresting activities are made more engaging it is possible that they could be sustained more easily. Before this can occur, however, one must learn how to activate the engagement process.

As a result we start by exploring the different ways to intentionally become more engaged and involved in an activity. This is followed by a section which considers how deliberative engagement differs from traditional behavior change strategies. We then turn our attention to a theoretical framework, the Reasonable Person Model (R. Kaplan & Kaplan, 2008; S. Kaplan & Kaplan, 2003, 2009), to help understand why an engagement-based approach might be effective. The chapter concludes by examining how strategies that facilitate deliberate engagement could be used to address a variety of difficult behavioral issues.

LEARNING HOW TO BECOME ENGAGED

Attempts to actively and intentionally become more engaged in an activity are relatively rare. More frequently, the engagement process is initiated by the salient features and affordances present in the environment. There are many everyday experiences where one depends on the setting to offer fascinating content or to support one's pursuit of personally interesting and meaningful events.

Seeking and staying in these naturally engaging environments is useful since the interactions that result often cause one to experience an increase in attentional focus, cognitive processing, and positive affect (Blumenfeld, Kempler, & Krajcik, 2006; Hidi, 2000; Hidi & Renninger, 2006; Wild, Kuiken, & Schopflocher, 1995). Unfortunately, most of us are regularly confronted with a variety of important, but fairly tedious activities which take place in environments that neither contain engaging content nor fully support our plans and intentions. Maintaining behavior under these all too common conditions can be difficult at best; the things we must do often lack sufficient interest and the settings are unexciting.

That is not to say, however, that such activities cannot be made engaging. Instead it suggests that the responsibility for initiating and maintaining engagement may need to shift from the environment to the individual. One may in fact be able to transform these normally uninteresting situations into more fascinating and enlightening experiences if one learns to use techniques that foster engagement. A number of techniques, which

could be thought of as engagement strategies, may be particularly useful in this regard. This collection of engagement strategies involves learning how to use one's sense modalities to experience the environment differently in an effort to:

- Become more aware of the external environment

  While many activities take place in what we consider to be well-known settings, numerous features of these familiar environments often go unnoticed. This suggests that one strategy for facilitating engagement may involve finding ways to better exploit existing environmental stimuli (Suedfeld, 1981). Leff (1984) has proposed this could be done through the use of "awareness plans," deliberate strategies for how to select and process information in the environment (Leff & Gordon, 1979; Leff, et al., 2002). These awareness plans attempt to influence engagement by encouraging a more detailed investigation of the environment or adopting a more playful, curious orientation.

  Conducting a more detailed investigation of a setting can be a useful strategy since the environment may not always provide a large number of obviously compelling stimuli. Awareness plans encourage a more active search within the setting and allow one to pick up on the subtle, but fascinating details that could easily be overlooked. Adopting a more playful, curious orientation toward experience is valuable as well because it allows one to reinterpret the environment and experience it in new ways. Awareness plans support this process by asking one to

experience the environment from a different perspective and use this new outlook to evaluate or make predictions about various aspects of the setting.

- Become more sensitive to unanticipated outcomes

  Ones' willingness to continue performing an activity is often influenced by how quickly one gains an expected benefit. If these benefits are perceived as small or too difficult to obtain one may be tempted to stop participating. Focusing on one specific outcome can, however, cause one to ignore other positive, but less obvious consequences. For instance, one might start an outdoor walking routine to lose weight, but may find that this activity also provides opportunities to get to know one's neighbors or to gain time to clear one's head.

  Strategies that encourage keeping track of short and long-term physical, psychological, social, and environmental outcomes are likely to make performing an activity more engaging and meaningful. Reflecting on one's experiences may also help one to learn new things about oneself and discover more reasons to continue taking action.

- Create small experiments

  Small experiments are an engagement strategy that encourage one to try things out and see what happens (R. Kaplan, 1996). Although people often undertake an activity without knowing exactly how it will turn out, it is unusual to think of these

efforts as experiments. As a consequence, one is unlikely to make a conscious effort to test different options and track the results of these actions (S. Kaplan, 1990). This means that many times one is relatively unaware as to why a particular course of action resulted in success or failure.

Efforts to become more actively engaged in a task by creating small experiments require trying out different ways of performing an activity and tracking the results of these efforts so one can determine what works (R. Kaplan, 1996; S. Kaplan, 1990). In addition to encouraging deliberate engagement, this approach may also make it easier to deal with potential challenges since the emphasis here is on testing things for a short time and seeing what happens, rather than on making big, dramatic changes.

Recent research on interest and self-regulation supports the notion that one can employ specific techniques to make performing boring tasks more enjoyable (Sansone & Harackiewicz, 1996; Sansone & Smith, 2000; Sansone & Thoman, 2005; Sansone, et al., 1992). This research, however, has tended to focus on using strategies that either enhance task-related competence or introduce a source of interest that is unrelated to the activity. For instance, this might involve turning an activity into a game to improve performance (e.g., racing against the clock) or becoming engaged in some new stimuli while doing the behavior (e.g., listening to music). While these interest-enhancing strategies may be useful in some situations, the engagement-based approach offers a

number of distinctive advantages. Here are some differences between the two approaches:

Interest-enhancing strategies that attempt to turn an activity into a game place the burden of initiating and maintaining engagement entirely on the individual. As a consequence, performance can become highly dependent on the amount of effort one is willing and able to put forth. By contrast, engagement strategies such as awareness plans place the burden more evenly between the individual and the environment. This is not to say that actively attending to the environment is effortless; however, this process should become less demanding as one detects interesting stimulus patterns or gains familiarity with a specific awareness plan. Furthermore, through the small experiments approach, one can identify those engagement strategies that better leverage features of a behavior setting. Initial creation and testing of many plans may take some effort but later use of the more successful plans may be less burdensome.

Some interest-enhancing strategies can also be problematic because they may not allow one to gain new insights about the activity. Listening to music or talking with a friend may temporarily make an activity less tedious, but these strategies are unlikely to help one learn how to deal with current or future obstacles. Engagement strategies are more likely to help one discover multiple reasons for doing a behavior and explore a wider variety of ways to support its performance. The feedback one receives from these

efforts can provide important information about how to sustain a behavior or more easily restart it in the future.

Finally, interest-enhancing strategies tend to be fairly structured and novel. While these strategies may initially be motivating, their effectiveness may diminish over time due to the highly predictable nature of how one interacts with the environment. Engagement strategies, such as awareness plans and small experiments may be less susceptible to this problem. Since the environment is constantly changing an awareness plan may be experienced differently from one day to the next. Likewise, changes in the environment or in ones' current situation may generate new opportunities for small experiments.

Although interest-enhancing strategies can serve to promote engagement, they lack some of the advantages of the engagement strategies proposed here. These advantages suggest that engagement strategies may be more flexible and durable than the many approaches typically used to enhancing interest.

TRADITIONAL APPROACHES AND THEIR LIMITATIONS

There are also reasons to believe that engagement strategies could help make many traditional behavior change interventions more effective. Standard approaches for changing behavior have, for the most part, assumed that people lack the knowledge, skills, and motivation necessary to take action. As a result, behavioral interventions typically place major focus on providing information regarding the benefits of taking

action or the consequences of not acting and may offer procedural guidance on how to carry out the behavior. In some cases, these interventions also supply incentives (or disincentives) to encourage performance. Implicit in this approach to behavior change is the idea that humans are rational actors – carefully weighing the costs and benefits of a situation before deciding to take action. As a result, traditional interventions are typically focused on helping individuals initiate behavior. In some respects this approach is attractive; nonetheless it is important to recognize a number of significant limitations that such standard approaches entail. Engagement strategies may allow us to deal with these shortcomings.

Limitation 1: Standard approaches only attempt to influence ones' initial cognitive assessment.

By and large, traditional approaches presume that cognition plays a rather narrow role in behavior change. According to this view, a person determines whether or not to take action by considering the value of possible outcomes and the probability of achieving these outcomes. Consequently, the goal of most interventions is to influence the initial cognitive assessment by giving people more facts about potential good and bad outcomes. This implies that cognition is only important at the start, when one is contemplating whether or not to take action. Cognition, however, does not cease once a decision is made. People are in fact continuously perceiving and evaluating what is going on around them and their evaluations of the current experience often have a powerful influence on whether they choose to maintain the behavior or to take similar

actions in the future, regardless of the potential costs or benefits (S. Kaplan, 1991). This suggests that we also should be concerned about what happens while one is involved in carrying out the behavior.

Engagement strategies are well-equipped to address this concern since they are intended to promote greater mental involvement in the ongoing current experience and generate feelings of interest, enjoyment, curiosity, and playfulness (Agarwal & Karahanna, 2000; Fredricks, Blumenfeld, & Paris, 2004; Webster & Ho, 1997). These feelings of positive affect are important since behaviors which are experienced as pleasurable and enjoyable are more likely to be maintained over time (Frederick & Morrison, 1996; Maltby & Day, 2001). Becoming more cognitively involved in an activity also means that one is more sensitive to features of the activity and the surrounding context. This gives one the chance to learn things about an activity as well as explore different ways of performing a behavior, both making the activity easier to sustain and easier to restart later.

Limitation 2: Standard approaches depend largely on extrinsic motives.

Many traditional behavior change approaches focus on manipulating the extrinsic motives that result from achieving some personally valued outcome, such as improved health or monetary reward. However, the assumption that increasing the value of expected outcomes will make one more likely to take action needs to be examined more closely. The literature suggests that the focus on extrinsic motivations has not

worked as well as once hoped for at encouraging long-lasting behavior change (Abrahamse, et al., 2005; De Young, 1993, 2000; Ingledew, et al., 1998; Morgan & Dishman, 2001). Once again, the focus in standard interventions on initiating the behavior comes at the expense of considering what happens while one is performing a behavior.

Research indicates that the intrinsic motives which result from experiences that are fun, challenging, or interesting may in fact be essential for sustaining behavior (Buckworth, Lee, Regan, Schneider, & DiClemente, 2007; Curry, Wagner, & Grothaus, 1990; De Young, 1986; Gottfried, Marcoulides, Gottfried, & Oliver, 2009; Wankel, 1993). Other studies indicate that engagement strategies may be capable of making an experience more intrinsically motivating. For instance, Sansone and colleagues (Sansone & Smith, 2000; Sansone & Thoman, 2005, 2006; Sansone, et al., 1992; Sansone, et al., 1999) have found that altering a behavior to make it more engaging can transform a relatively boring task into a more enjoyable experience. These findings also indicate that continued use of these strategies can cause one to redefine an activity more positively; thereby increasing the likelihood one will stick with the task and carry it out again in the future. This idea closely parallels the work of Hidi and colleagues (Hidi, 2000; Hidi & Harackiewicz, 2000; Hidi & Renninger, 2006) who have proposed that, over time, engagement can cause a task to become more personally interesting and meaningful.

Limitation 3: Standard approaches fail to recognize the importance of the environment

The role of the physical environment has largely been ignored by traditional approaches to behavior change (Sallis & Owen, 2002). This oversight seems curious since the structure and condition of the environment often provide one with important information about whether a particular course of action is appropriate or effective. Furthermore many behaviors need to be performed in settings which are not highly supportive. Interventions that attempt to cope with these unsupportive aspects of the environment may be more effective at getting individuals to adopt and maintain new behaviors.

Rather than ignore the environment, engagement strategies take advantage of the features and affordances provided by the behavior setting. It is the interaction between the person and the environment that drives the engagement process. Awareness plans are particularly sensitive to this issue since they encourage looking more closely at different aspects of the behavior setting. This in turn may lead to changed perceptions of the environment, potentially making it more supportive of future behavior. Small experiments can also take the surrounding context into account by helping one to try out various ways of using the setting or coping with unappealing features of the environment.

Deliberate engagement strategies thus offer some distinct contrasts both to standard approaches to behavior change and to interest-enhancing techniques. To understand these contrasts more fully the next section considers how engagement might help people fulfill some basic informational needs.

AN INFORMATIONAL PERSPECTIVE ON ENGAGEMENT

Recent work from the fields of environmental and cognitive psychology allows us to understand engagement more broadly by examining the person-environment interaction. More specifically, this framework proposes that human behavior is deeply influenced by how well a setting meets our informational needs (S. Kaplan, 1972). The idea that information could play such a central role in human behavior is particularly appealing when one considers the special challenges faced by humans throughout their evolutionary history.

When our ancestors stepped onto the savanna they were clearly not the strongest, fastest, nor most intimidating creatures present, yet by using their wits they figured out how to compete and thrive. It would seem that the ability to handle information, to seek it, store it, share it, hide it and act on it played a significant role in their success (R. Kaplan & Kaplan, 2008; S. Kaplan, 1992). Over time these patterns for selecting and processing information appear to have left an indelible mark on our species, supplying us with a collection of inherited inclinations that guide our behavior and influence how we see the world. These innate preferences tell us among other things whether a

situation or environment is compatible with our information processing needs and our goals. They draw us to situations where we can be effective and steer us away from situations that are beyond our capabilities. According to this approach, efforts which work with these inherited inclinations are likely to be more effective at helping people behave in ways that are reasonable and effective.

The Reasonable Person Model

The Reasonable Person Model (RPM) is a framework that takes these information processing needs into account and in doing so provides us with clues about the types of environments that are most likely to bring out the best in people. RPM proposes that people have three major categories of information processing needs. The first, model building refers to our need to make sense of the world around us. The second, being effective is related to our need to act with competence and clear-headedness. Finally, meaningful action deals with our desire to do things that make a difference. While standard approaches to behavior change are sometimes sensitive to a few of these needs, the use of engagement strategies may be more effective at addressing all of them.

Model building

Functioning successfully in the world depends largely on one's ability to anticipate problems, predict what is likely to happen next, and decide among many possible courses of action (S. Kaplan, 1973). Addressing these challenges depends on having a

simplified model of reality stored in our head so that we can run it ahead of real time, mentally testing an action before committing to it in the world (Craik, 1943). Given the tremendous advantages of such a system, it should come as no surprise that we are intrinsically motivated to build and maintain these mental models.

Standard behavior change interventions often attempt to help build a mental model of a particular behavior by providing declarative or procedural information. While useful as efforts to enhance familiarity, such approaches fail to recognize certain important dimensions of how humans learn. In many situations people prefer to explore at their own pace rather than be forced to follow a prescribed process (S. Kaplan & Kaplan, 2009). This preference makes sense when one considers that it takes both time and effort to integrate new information into one's existing knowledge structure. Engagement strategies are able to support this gradual exploration of new information because they allow the individual to have more choices regarding how they carry out the behavior and interact with the environment. Efforts to encourage deeper levels of engagement may also help individuals to learn new things about themselves and gain insights about situations that are compatible with their interests and abilities.

In some situations promoting exploration may take priority over efforts to enhance familiarity. Table 5.1 shows how familiarity and exploration might interact. The matrix shows that unfamiliar situations, which offer limited opportunities for exploration, are likely to cause one to withdraw. Under these conditions one is not only unable to make

predictions, but also incapable of figuring out how to make progress, potentially resulting in feelings of helplessness. Increasing the opportunities for exploration can improve this situation. When familiarity is lacking, engagement strategies that allow one to experiment and try things out slowly can facilitate becoming more curious and are more likely to lead to sustained involvement.

TABLE 5.1 Familiarity by Exploration

	LOW EXPLORATION	HIGH EXPLORATION
LOW FAMILIARITY	(−) Withdrawn I don't know about this and I can't figure it out.	(+) Curious I'm not sure about this. I want to learn more.
HIGH FAMILIARITY	(−) Bored This old stuff again.	(+) Resourceful/Creative This is a chance to use/test what I know in a new way.

Adapted from S. Kaplan & Kaplan, 1982

The need for exploration may also be important in familiar situations. Under such conditions one may have the knowledge and skills required to function effectively, but lack the opportunity to test these skills or apply knowledge in new ways. The result may be feelings of boredom. Once again, efforts to enhance engagement can make a difference. Situations that present one with chances to use talents and test skills in different ways are likely to encourage resourcefulness and creativity.

Being effective

Having an appropriate mental model is less useful if one is mentally fatigued or feels incompetent. Situations where one knows what needs to be done, but lacks the skills or clear-headedness necessary to take action are likely to leave one feeling discouraged and frustrated. Although many standard behavior change interventions are concerned with increasing competence, fewer are sensitive to the consequence of mental fatigue. Efforts to encourage deliberate engagement may help one deal with this issue.

Let's take a moment to examine what mental fatigue entails. Dealing effectively with informational challenges, such as learning how to carry out a new behavior or trying to monitor one's performance requires focus and effort. Eventually, this capacity to direct one's attention wears down and effectiveness begins to decline (S Kaplan, 1995). In other words, mental fatigue is the result of declining capacity to focus one's attention. One way to manage this finite attentional resource is to spend time in environments that are sufficiently fascinating to effortlessly hold our attention and are highly compatible with our goals and intentions.

The factors that contribute to this effortless or involuntary form of attention share a great deal in common with the types of interactions that facilitate engagement. Awareness plans for instance can help one to notice subtle content that could be quite fascinating. This strategy can also help one to make more sense of the environment – a process that is often both extremely interesting and highly motivating (S. Kaplan, 1982).

Awareness plans that encourage one to explore and discover new things by evaluating various aspects of a setting or making predictions about what has happened in the past (or could happen in the future) have the potential to effortlessly capture and hold our attention. Likewise, small experiments may allow one to more easily recognize environments that are compatible with one's goals and intentions. Being able to find supportive settings or cope with unsupportive ones should ease the burden on attentional resources and enable one to be more effective. Thus while learning to engage in the environment requires some effort, it also draws on many features that can offset mental fatigue.

Engagement strategies may also complement many standard techniques aimed at enhancing competence. Interventions that focus on providing procedural guidance about how to carry out a specific behavior are often only concerned with helping individuals learn basic skills. However, individuals may want opportunities to refine, sharpen, and expand on these skills. Engagement strategies can facilitate this process by encouraging one to try a variety of different ways to carry out a behavior. Developing this broader range of behavioral options may make it easier to make adjustments when circumstances change or new challenges arise.

Meaningful action

The meaningful action component of RPM asserts that people want opportunities to participate and do things that matter. Behavior change efforts which ignore this strong

desire to be involved and make a difference can leave one feeling helpless and unneeded. For the most part, standard interventions have attempted to make behavior more personally meaningful by highlighting a few specific positive outcomes. However, these efforts often fail to explore a wide variety of potential reasons for performing a behavior and underestimate the importance of participation. Standard approaches often regard people as passive recipients of information and treatment rather than active participants in the behavior change process.

Engagement strategies offer an interesting alternative to this approach. Strategies that help one see beyond a narrow set of expected benefits and explore a broader range of less obvious physical, psychological, social, and environmental outcomes have the potential to make performing a particular behavior more important and meaningful. Recognizing these multiple reasons for performing a behavior may be a critical factor in determining whether one continues to take action in the future (Clary & Snyder, 1999; De Young, 1993, 2000; Frederick & Morrison, 1996; Lepper & Henderlong, 2000; Sansone & Smith, 2000).

Engagement strategies that encourage testing different ways of performing a behavior or interacting with the environment may allow one to become more actively involved in decision-making. Such efforts to facilitate participation may contribute to meaningful action by reducing feelings of helplessness and creating an atmosphere of respect. Both awareness plans and small experiments provide modest, flexible ways to become more

involved in carrying out a behavior. Rather than prescribe a specific course of action, these strategies are sensitive to the fact that what works for one person or in one setting may not work for another. This of course means that one must try things out in order to see what works. The results of these efforts can also prompt one to reflect and share insights with others, both strong indicators that one's involvement matters (S. Kaplan, 1990).

APPLICATIONS AND FUTURE DIRECTIONS

While engagement strategies appear to offer a number of advantages over traditional behavior change interventions and make sense from a theoretical perspective, the real usefulness of this approach is whether it turns out to have practical value. In order to explore this question of practicality it's appropriate to examine how deliberate engagement strategies might be used to help in adopting and maintaining a number of normally challenging health and conservation behaviors.

Health Behavior

The present study investigated how one type of engagement strategy - awareness plans – could be used to help people initiate and sustain an outdoor walking routine. This health behavior is of considerable interest for several reasons. First, increasing physical activity through walking is seen as one way to combat trends in obesity and inactivity (Barnes, 2007; CDC, 2005, 2008). Second, though outdoor walking is a relatively simple

approach, it is often seen as uninteresting since it must be performed in settings that, for a variety of reasons, are often not highly supportive.

In order to determine whether awareness plans could be effective, individuals interested in starting an outdoor walking routine were asked to take at least three, 30 minute walks each week for two weeks. Study participants were divided into two groups. The first group experienced a more traditional intervention involving a written commitment and a walking schedule. The second group was given a collection of awareness plans (see Appendix A) and instructed to use these plans as much as possible while walking.

Results of the study indicated that awareness plans were as effective at influencing walking behavior as the standard approach (Chapter 2). But beyond comparable behavioral outcomes, participants who used the awareness plans were more likely to experience increases in well-being (Chapter 3). Furthermore, this group also reported becoming significantly more satisfied with the walking environment over the course of the two week intervention period (Chapters 4). Taken together, these findings suggest that strategies that encourage more active engagement with the environment can not only enhance the walking experience, but also enhance one's perception of the setting.

Although limited to a short intervention period, the study's findings raise the possibility that engagement strategies may be useful not only for encouraging physical activity but

also for addressing other health behaviors, such as altering eating habits. In fact, studies suggest that strategies which help one to be mindful of unexpected outcomes, such as improvements to psychological well-being or body-related attitudes, may be more effective than interventions which focus on more common outcomes, such as weight loss (Nauta, Hospers, & Jansen, 2001; Wardle, 1995). Small experiments may also be a useful strategy since many individuals who have trouble sustaining healthy eating habits experience feelings of helplessness (Carmody, Brunner, & St. Jeor, 1995). Strategies which encourage becoming engaged by making small, temporary changes and tracking the results of one's efforts may be more appealing to these individuals than interventions targeting significant lifestyle changes.

Conservation Behavior

Engagement strategies may also be useful to address conservation behaviors, such as reducing personal vehicle use. Thus far traditional efforts focused on increasing the use of public transportation, encouraging more active modes of transportation (i.e., walking, biking), and changing driving behavior (e.g., carpooling, consolidating car trips) have not been particularly effective (Katzev, 2003; Ogilvie, Egan, Hamilton, & Petticrew, 2007). Introducing strategies which allow people to become more actively involved and engaged in these behaviors offers an interesting way forward. Awareness plans like the ones used to encourage outdoor walking could be useful in such situations. Choosing to walk or bike rather than drive gives one many more opportunities to notice and

reinterpret features of the local environment, potentially resulting in a much more interesting and rewarding transportation experience.

Efforts to reflect and track positive outcomes may also be useful. For instance, using alternative modes of transportation or changing driving habits may help reduce feelings of stress and anxiety that can often be associated with commuting (Novaco, Stokols, & Milanesi, 1990; Schaeffer, Street, Singer, & Baum, 1988). Engagement strategies that encourage taking notice of how these stressful feelings impact job performance or social interactions may help individuals recognize the unanticipated benefits of altering their transportation behavior. Likewise, they may notice that using alternative modes of transportation results in improved fitness or more familiarity with their neighborhood. In addition, small experiments could be valuable since changing well established habits associated with car use can be challenging. Encouraging people to try out different alternatives may make them more willing to take action in spite of these obstacles.

A variety of other conservation behaviors may also be amenable to these engagement strategies. Small experiments could be used to help try out different ways to reduce water consumption. For example, efforts to identify unexpected outcomes may allow one to realize that working to reduce household energy use can be a chance to spend more time with family. One could even imagine using awareness plans to help individuals come up with creative ways to reuse objects that would normally be thrown away.

Enriching Everyday Experience

Although using engagement strategies to address the health and conservation behaviors discussed above may take priority, it is also important to recognize that this approach can be applied to many typically unexciting everyday behaviors. Activities such as cleaning the house, washing the dishes, going grocery shopping, or weeding the garden can seem quite unappealing and onerous. However, each of these tasks could be made more interesting and enjoyable if one decided to become more actively engaged. This suggests that learning how to become engaged may not only have positive social and environmental impacts, but it may also enrich everyday experiences.

CONCLUSION

Using engagement strategies to help people initiate and sustain important but uninteresting behaviors may offer considerable benefits. Efforts which encourage becoming more engaged and involved in either the task itself or in the behavior setting appear capable of facilitating the type of exploratory and self-paced learning that humans often find appealing. Strategies which support this deliberate form of engagement may offer a fairly simple, flexible, and inexpensive way to make existing interventions more effective.

Although many questions remain about its usefulness and ability to sustain desired efforts, the deliberate engagement notion appears to be a highly adaptable tool for behavior change. Future research that examines how engagement strategies might be

used to address a range of problematic health and conservation behaviors could provide even more clues about the advantages of this underutilized, but potentially powerful approach.

APPENDICIES

IRB Application # - HUM00016118

Awareness Plan Worksheet

This worksheet is designed to help you experiment with awareness plans. You will use these awareness plans (or ones of your own creation) during at least 3 separate, 30 minutes walks over the next week.

Sample Awareness Plans	Invent Your Own
Focus on your senses: Use each of your senses (sight, hearing, smell, taste, touch) to experience the environment in a new way. Examples: Focus on sounds. If the area is quiet, listen carefully to the silence. If the area is full of sounds try to focus on each one and notice how they differ. Notice the wind. Which direction is it coming from? How does it feel on your skin? How does the wind sound? Find reflections in puddles, wet pavement, or windows. Notice the quality of the reflection. Is it clear or distorted? Stop at different points along your walk, notice everything around you. Then take five steps and notice how things change. What can you see now that you could not before?	
Take on a new job or role: . How might adopting a new job or taking on a new role change how you experience the environment? Examples: Imagine you're... A spy that needs to hide secret documents. A daredevil looking for dead-defying stunts. An artist looking for beauty in everyday things. An animal that is a predator or its' prey .	
Make an inference or evaluation: Imagine how things could be different or use clues from the environment to make predictions. Examples: Use the outside of a home to help you make inferences about the appearance of the people who live there, their political affiliation, or what it's like inside. How would this area be different if the population doubled? How would this area be different if everyone had to grow their own food?	
Look into the past or future: Think about how things might have been different in the past or how they might change in the future. Examples: What sort of people might have lived here 500 years ago and how might they have made their living? If human disappeared tomorrow, how would things change in 1 year, 100 years, 1000 years?	
Use magic: What if you or things around you had magical powers? Examples: Imagine you could cast spells that changed the environment. What might you make more (or less) attractive? What if inanimate objects around you came to life? How would they behave?	

IRB Application # - HUM00016118

Participant # _____

Week 1 Walking Log

YOUR GOAL: Take at least 3 separate, 30 minutes walks during the next week.

Start Date: _____

WALK 1 Date: _____	**WALK 2** Date: _____	**WALK 3** Date: _____
What time did you leave? _____	What time did you leave? _____	What time did you leave? _____
What time did you return? _____	What time did you return? _____	What time did you return? _____
Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High	Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High	Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High
Did you walk by yourself? ☐ Yes ☐ No, I walked with another person ☐ No, I walked with my dog	Did you walk by yourself? ☐ Yes ☐ No, I walked with another person ☐ No, I walked with my dog	Did you walk by yourself? ☐ Yes ☐ No, I walked with another person ☐ No, I walked with my dog
Briefly describe the walk: _____ _____ _____ _____	Briefly describe the walk: _____ _____ _____ _____	Briefly describe the walk: _____ _____ _____ _____
Which awareness plan(s) did you try? _____ _____ _____ _____	Which awareness plan(s) did you try? _____ _____ _____ _____	Which awareness plan(s) did you try? _____ _____ _____ _____
How did the awareness plan(s) work? _____ _____ _____ _____	How did the awareness plan(s) work? _____ _____ _____ _____	How did the awareness plan(s) work? _____ _____ _____ _____

WALK 4 Date: _____	WALK 5 Date: _____	WALK 6 Date: _____	WALK 7 Date: _____
What time did you leave? _____	What time did you leave? _____	What time did you leave? _____	What time did you leave? _____
What time did you return? _____	What time did you return? _____	What time did you return? _____	What time did you return? _____
Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High	Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High	Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High	Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High
Did you walk by yourself? ☐ Yes ☐ No, I walked with another person ☐ No, I walked with my dog	Did you walk by yourself? ☐ Yes ☐ No, I walked with another person ☐ No, I walked with my dog	Did you walk by yourself? ☐ Yes ☐ No, I walked with another person ☐ No, I walked with my dog	Did you walk by yourself? ☐ Yes ☐ No, I walked with another person ☐ No, I walked with my dog
Briefly describe the walk:	Briefly describe the walk:	Briefly describe the walk:	Briefly describe the walk:
Which awareness plan(s) did you try?	Which awareness plan(s) did you try?	Which awareness plan(s) did you try?	Which awareness plan(s) did you try?
How did the plan(s) work?	How did the plan(s) work?	How did the plan(s) work?	How did the plan(s) work?

APPENDIX B: Standard Care Materials

IRB Application # - HUM00016118

Weekly Walking Schedule

YOUR GOAL: **Take at least 3 separate, 30 minutes walks during the next week.**

Instructions: **Select at least 3 days/times that you intend to walk over the course of next week . Then, if possible, select at least 2 alternative days/times that could also work.**

	What day/time can you walk?	How long will you walk?
SUNDAY		
MONDAY		
TUESDAY		
WEDNESDAY		
THURSDAY		
FRIDAY		
SATURDAY		

I agree to walk on the days/times I have selected above.

_____

Sign

IRB Application # - HUM00016118

Participant # _____

Week 1 Walking Log

YOUR GOAL: Take <u>at least 3 separate, 30 minutes walks</u> during the next week.

Start Date: _____

WALK 1 Date: _____	**WALK 2** Date: _____	**WALK 3** Date: _____
What time did you leave? _____	What time did you leave? _____	What time did you leave? _____
What time did you return? _____	What time did you return? _____	What time did you return? _____
Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High	Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High	Rate the physical intensity of the walk. Very Low 1 2 3 4 5 6 7 8 9 10 Very High
Did you walk by yourself? □ Yes □ No, I walked with another person □ No, I walked with my dog	Did you walk by yourself? □ Yes □ No, I walked with another person □ No, I walked with my dog	Did you walk by yourself? □ Yes □ No, I walked with another person □ No, I walked with my dog
Briefly describe the walk:	Briefly describe the walk:	Briefly describe the walk:

WALK 4 Date: _____

What time did you leave? _____

What time did you return? _____

Rate the physical intensity of the walk.

Very Low 1 2 3 4 5 6 7 8 9 10 Very High

Did you walk by yourself?
- ◻ Yes
- ◻ No, I walked with another person
- ◻ No, I walked with my dog

Briefly describe the walk:

WALK 5 Date: _____

What time did you leave? _____

What time did you return? _____

Rate the physical intensity of the walk.

Very Low 1 2 3 4 5 6 7 8 9 10 Very High

Did you walk by yourself?
- ◻ Yes
- ◻ No, I walked with another person
- ◻ No, I walked with my dog

Briefly describe the walk:

WALK 6 Date: _____

What time did you leave? _____

What time did you return? _____

Rate the physical intensity of the walk.

Very Low 1 2 3 4 5 6 7 8 9 10 Very High

Did you walk by yourself?
- ◻ Yes
- ◻ No, I walked with another person
- ◻ No, I walked with my dog

Briefly describe the walk:

WALK 7 Date: _____

What time did you leave? _____

What time did you return? _____

Rate the physical intensity of the walk.

Very Low 1 2 3 4 5 6 7 8 9 10 Very High

Did you walk by yourself?
- ◻ Yes
- ◻ No, I walked with another person
- ◻ No, I walked with my dog

Briefly describe the walk:

IRB Application # - HUM00016118 Participant # _____

Initiating and Maintaining Outdoor Walking: Initial Survey

Thank you for agreeing to participate in this study. This survey is about your recent history of physical activity, your attitudes about walking, and how well you are doing in general.

1. In the past few years, how many times have you tried to adopt a regular walking routine?

☐ None → Skip to Question #2
☐ A few times
☐ Many times

1a. If you have tried to adopt a walking routine, what is the longest you have been able to maintain it?

☐ A few days ☐ A few weeks ☐ A few months ☐ More than 6 months

2. In a typical week…

	TYPICAL AVERAGE	*WEEKLY RANGE*
How many separate walks do you take?	_____ */ week*	_____ *(minimum)* – _____ *(max)*
How much time do you spend walking during each outing?	_____ *minutes*	_____ *(minimum)* – _____ *(max)*

Do you engage in any other types of physical activity?

☐ No
☐ Yes → What type of activities? _____

How often do you engage in these activities	_____ */ week*	_____ *(minimum)* – _____ *(max)*
How much time do you spend doing these activities?	_____ *minutes*	_____ *(minimum)* – _____ *(max)*

3. In the last few days, how well have you been doing in each of the following areas?

1 = not very well	2=slightly well	3=moderately well	4=very well	5=extremely well

1 2 3 4 5 Deciding what is most important to do next
1 2 3 4 5 Planning my daily activities
1 2 3 4 5 Remembering to do all the things that I started
1 2 3 4 5 Keeping my mind on what I am doing
1 2 3 4 5 Being on time for appointments
1 2 3 4 5 Remembering to do important things
1 2 3 4 5 Pacing myself
1 2 3 4 5 Resisting distractions
1 2 3 4 5 Not interrupting other people
1 2 3 4 5 Finishing things that I started

4. In the last few days, how often have you had the following feelings?

1 = never	2 = rarely	3 = sometimes	4 = often	5 = always

1 2 3 4 5 Relaxed
1 2 3 4 5 Irritable
1 2 3 4 5 Interested
1 2 3 4 5 Alert
1 2 3 4 5 Distracted
1 2 3 4 5 Focused
1 2 3 4 5 Impatient
1 2 3 4 5 Satisfied
1 2 3 4 5 Excited
1 2 3 4 5 Content
1 2 3 4 5 Energized
1 2 3 4 5 Forgetful

5. To what extent do you feel the following statements are true?

1 = never	2=rarely	3=sometimes	4=often	5= always

1 2 3 4 5 I can achieve the goals I set for myself
1 2 3 4 5 When facing difficult tasks, I am confident I will accomplish them
1 2 3 4 5 In general, I can achieve goals that are important to me
1 2 3 4 5 When I set my mind to it, I can succeed
1 2 3 4 5 I can perform well on many different tasks
1 2 3 4 5 Even when things are tough, I can perform quite well

OVER →

IRB Application # - HUM00016118 Participant # _____

6. Below is a list of reasons to start and maintain a walking routine.
Please indicate how much each applies to you.

1 = not at all	2=a little	3=somewhat	4=very much	5=extremely

1 2 3 4 5 be physically fit
1 2 3 4 5 it's fun
1 2 3 4 5 it's challenging
1 2 3 4 5 manage weight
1 2 3 4 5 have more energy
1 2 3 4 5 be more clearheaded
1 2 3 4 5 improve mood
1 2 3 4 5 improve cardiovascular fitness
1 2 3 4 5 improve appearance
1 2 3 4 5 it's interesting
1 2 3 4 5 maintain physical strength
1 2 3 4 5 my friends/family want me to
1 2 3 4 5 spend time with others
1 2 3 4 5 time to reflect

7. To what extent do you feel the following statements about walking are true?

1 = not at all	2=rarely	3=sometimes	4=often	5=almost always	X=don't know

1 2 3 4 5 X When I get going I typically enjoy walking
1 2 3 4 5 X I have trouble motivating myself to walk
1 2 3 4 5 X After a walk I notice more aches and pains
1 2 3 4 5 X I look forward to taking walks
1 2 3 4 5 X I feel walking is a chore
1 2 3 4 5 X I feel bored while walking

8. At this time, how confident are you in your ability to do the following?

1= not at all	2=not very	3=moderately	4=very	5=extremely

1 2 3 4 5 Identify things that prevent me from walking
1 2 3 4 5 Try out strategies that might help me maintain a walking routine
1 2 3 4 5 Take a walk when I feel a little tired
1 2 3 4 5 Find time to walk outside several times a week
1 2 3 4 5 Take a walk when I have many other things to do
1 2 3 4 5 Maintain a regular outdoor walking routine
1 2 3 4 5 Deal with future barriers to walking regularly

9. Think about where you typically walk and consider how satisfied you are with the following.

1 = not at all	2 = slightly	3 = moderately	4 = very	5 = extremely	X=don't know

1 2 3 4 5 X Safety
1 2 3 4 5 X General appearance
1 2 3 4 5 X Friendliness of residents
1 2 3 4 5 X Amount of nature
1 2 3 4 5 X The variety of things to look at
1 2 3 4 5 X Nature sounds
1 2 3 4 5 X Availability of sidewalks and/or trails
1 2 3 4 5 X Tree cover
1 2 3 4 5 X Condition of sidewalks/trails
1 2 3 4 5 X Busyness at intersections
1 2 3 4 5 X Sense of community
1 2 3 4 5 X Ease of finding your way around
1 2 3 4 5 X Amount of shade
1 2 3 4 5 X Amount of noise

10. Background Information

Gender: ☐ male ☐ female

Age: ☐ 19 or under ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60-69 ☐ 70-79 ☐ 80 or older

Name: _____ Email: _____

Address: _____

City/State: _____ Zip: _____

IRB Application # - HUM00016118 Participant # _____

Initiating and Maintaining Outdoor Walking: Week 2 Survey

This survey is about your experience during your time in this study, as well as, your attitudes about walking, and how well you have been doing lately.

1. Please answer the following questions based on the last week.

How many separate outdoor walks did you take? _____ / week

On average, how much time did you spend walking during each outing? _____ (minutes)

In addition to the time spent walking, how often were you outdoors?

☐ Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very often

Did you engage in any other types of physical activity (besides walking)?

☐ No
☐ Yes → What type of activities? _____

How often did you engage in these activities? _____ / week

How much time did you spend doing these activities? _____ (minutes)

2.During the past week, how often were you aware of the following features while walking?

1 = never	2= rarely	3 = occasionally	4 = often	5 = always	X=not applicable

1 2 3 4 5 X Trees	1 2 3 4 5 X Water (stream, pond, river)	1 2 3 4 5 X Parks
1 2 3 4 5 X Wooded areas	1 2 3 4 5 X Residential areas	1 2 3 4 5 X Noisy areas
1 2 3 4 5 X Busy streets	1 2 3 4 5 X Paved walking paths	1 2 3 4 5 X Other people
1 2 3 4 5 X Wide open spaces	1 2 3 4 5 X Natural areas	1 2 3 4 5 X Gardens
1 2 3 4 5 X Trails or Paths	1 2 3 4 5 X Businesses/Shops	

3. In the last few days, how well have you been doing in each of the following areas?

1 = not very well	2=slightly well	3=moderately well	4=very well	5=extremely well

1 2 3 4 5 Deciding what is most important to do next	1 2 3 4 5 Remembering to do important things
1 2 3 4 5 Planning my daily activities	1 2 3 4 5 Pacing myself
1 2 3 4 5 Remembering to do all the things that I started	1 2 3 4 5 Resisting distractions
1 2 3 4 5 Keeping my mind on what I am doing	1 2 3 4 5 Not interrupting other people
1 2 3 4 5 Being on time for appointments	1 2 3 4 5 Finishing things that I started

4. In the last few days, how often have you had the following feelings?

1 = never	2 = rarely	3 = sometimes	4 = often	5 = always

1 2 3 4 5 Relaxed	1 2 3 4 5 Distracted	1 2 3 4 5 Excited
1 2 3 4 5 Irritable	1 2 3 4 5 Focused	1 2 3 4 5 Content
1 2 3 4 5 Interested	1 2 3 4 5 Impatient	1 2 3 4 5 Energized
1 2 3 4 5 Alert	1 2 3 4 5 Satisfied	1 2 3 4 5 Forgetful

OVER →

IRB Application # - HUM00016118 Participant # _____

5. Below is a list of reasons to start and maintain a walking routine.
Please indicate how much each applies to you.

1 = not at all	2=a little	3=somewhat	4=very much	5=extremely

1 2 3 4 5 be physically fit
1 2 3 4 5 it's fun
1 2 3 4 5 it's challenging
1 2 3 4 5 manage weight
1 2 3 4 5 have more energy
1 2 3 4 5 be more clearheaded
1 2 3 4 5 improve mood
1 2 3 4 5 improve cardiovascular fitness
1 2 3 4 5 improve appearance
1 2 3 4 5 it's interesting
1 2 3 4 5 maintain physical strength
1 2 3 4 5 my friends/family want me to
1 2 3 4 5 spend time with others
1 2 3 4 5 time to reflect

6. Please indicate the degree to which the following statements reflect your experience in the past week.

1 = strongly disagree	2=disagree	3=not sure	4=agree	5=strongly agree

1 2 3 4 5 Once I got going I typically enjoyed walking
1 2 3 4 5 I had trouble motivating myself to take a walk
1 2 3 4 5 My walks were interesting
1 2 3 4 5 After walking I noticed aches and pains
1 2 3 4 5 While walking, time seemed to pass quickly
1 2 3 4 5 It was difficult to stay focused on the awareness plans
1 2 3 4 5 I looked forward to taking walks
1 2 3 4 5 I felt walking was a burden or a chore
1 2 3 4 5 I noticed things that I hadn't seen before
1 2 3 4 5 After walking I felt relaxed and refreshed
1 2 3 4 5 I felt bored while walking
1 2 3 4 5 I plan to use some of these awareness plans in the future

7. At this time, how confident are you in your ability to do the following?

1= not at all	2=not very	3=moderately	4=very	5=extremely

1 2 3 4 5 Identify things that prevent me from walking
1 2 3 4 5 Try out strategies that might help me maintain a walking routine
1 2 3 4 5 Take a walk when I feel a little tired
1 2 3 4 5 Find time to walk outside several times a week
1 2 3 4 5 Take a walk when I have many other things to do
1 2 3 4 5 Maintain a regular outdoor walking routine
1 2 3 4 5 Deal with future barriers to walking regularly

8. Think about where you typically walk and consider how satisfied you are with the following.

1 = not at all	2 = slightly	3 = moderately	4 = very	5 = extremely	X=don't know

1 2 3 4 5 X Safety
1 2 3 4 5 X General appearance
1 2 3 4 5 X Friendliness of residents
1 2 3 4 5 X Amount of nature
1 2 3 4 5 X The variety of things to look at
1 2 3 4 5 X Nature sounds
1 2 3 4 5 X Availability of sidewalks and/or trails
1 2 3 4 5 X Tree cover
1 2 3 4 5 X Condition of sidewalks/trails
1 2 3 4 5 X Busyness at intersections
1 2 3 4 5 X Sense of community
1 2 3 4 5 X Ease of finding your way around
1 2 3 4 5 X Amount of shade
1 2 3 4 5 X Amount of noise

THANK YOU!

Comments:

IRB Application # - HUM00016118 Participant # _____

Initiating and Maintaining Outdoor Walking: Follow-Up Survey

Approximately six weeks ago you participated in a study about starting and sticking with an outdoor walking routine. This survey is about your currently level of physical activity, your attitudes about walking, and how well you have been doing in the last few weeks.

1. Please answer the following questions based on the last few weeks.

	TYPICAL AVERAGE	*WEEKLY RANGE*
How many separate outdoor walks have you been taking each week?	_____ */ week*	_____ *(minimum)* – _____ *(max)*
How much time do you spend walking during each outing?	_____ *minutes*	_____ *(minimum)* – _____ *(max)*

In addition to the time spent walking, how often were you outdoors?

☐ Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very often

Have you been engaging in any other types of physical activity (besides walking)?

☐ No
☐ Yes → What type of activities? _____

How often do you engage in these activities	_____ */ week*	_____ *(minimum)* – _____ *(max)*
How much time do you spend doing these activities?	_____ *minutes*	_____ *(minimum)* – _____ *(max)*

2. In the last few days, how well have you been doing in each of the following areas?

1 = not very well	2=slightly well	3=moderately well	4=very well	5=extremely well

1 2 3 4 5 Deciding what is most important to do next
1 2 3 4 5 Planning my daily activities
1 2 3 4 5 Remembering to do all the things that I started
1 2 3 4 5 Keeping my mind on what I am doing
1 2 3 4 5 Being on time for appointments
1 2 3 4 5 Remembering to do important things
1 2 3 4 5 Pacing myself
1 2 3 4 5 Resisting distractions
1 2 3 4 5 Not interrupting other people
1 2 3 4 5 Finishing things that I started

3. In the last few days, how often have you had the following feelings?

1 = never	2 = rarely	3 = sometimes	4 = often	5 = always

1 2 3 4 5 Relaxed	1 2 3 4 5 Distracted	1 2 3 4 5 Excited
1 2 3 4 5 Irritable	1 2 3 4 5 Focused	1 2 3 4 5 Content
1 2 3 4 5 Interested	1 2 3 4 5 Impatient	1 2 3 4 5 Energized
1 2 3 4 5 Alert	1 2 3 4 5 Satisfied	1 2 3 4 5 Forgetful

OVER →

IRB Application # - HUM00016118 Participant # _____

4. Below is a list of reasons to start and maintain a walking routine.
Please indicate how much each applies to you.

1 = not at all	2=a little	3=somewhat	4=very	5=extremely

1 2 3 4 5 be physically fit
1 2 3 4 5 it's fun
1 2 3 4 5 it's challenging
1 2 3 4 5 manage weight
1 2 3 4 5 have more energy
1 2 3 4 5 be more clearheaded
1 2 3 4 5 improve mood
1 2 3 4 5 improve cardiovascular fitness
1 2 3 4 5 improve appearance
1 2 3 4 5 it's interesting
1 2 3 4 5 maintain physical strength
1 2 3 4 5 my friends/family want me to
1 2 3 4 5 spend time with others
1 2 3 4 5 time to reflect

5. Please indicate the degree to which the following statements reflect your recent walking experience.

1 = strongly disagree	2=disagree	3=not sure	4=agree	5=strongly agree

1 2 3 4 5 Once I get going I typically enjoy walking
1 2 3 4 5 I have trouble motivating myself to take a walk
1 2 3 4 5 After walking I notice aches and pains
1 2 3 4 5 My walks are interesting
1 2 3 4 5 I often notice things that I hadn't seen before
1 2 3 4 5 I look forward to taking walks
1 2 3 4 5 I feel walking is a burden or a chore
1 2 3 4 5 I feel bored while walking
1 2 3 4 5 After walking I feel relaxed and refreshed
1 2 3 4 5 While walking, time seems to pass quickly

6. At this time, how confident are you in your ability to do the following?

1= not at all	2=not very	3=moderately	4=very	5=extremely

1 2 3 4 5 Identify things that prevent me from walking
1 2 3 4 5 Try out strategies that might help me maintain a walking routine
1 2 3 4 5 Take a walk when I feel a little tired
1 2 3 4 5 Find time to walk outside several times a week
1 2 3 4 5 Take a walk when I have many other things to do
1 2 3 4 5 Maintain a regular outdoor walking routine
1 2 3 4 5 Deal with future barriers to walking regularly

7. Think about where you typically walk and consider how satisfied you are with the following.

1 = not at all	2 = slightly	3 = moderately	4 = very	5 = extremely	X=not applicable

1 2 3 4 5 X Safety
1 2 3 4 5 X General appearance
1 2 3 4 5 X Friendliness of residents
1 2 3 4 5 X Amount of nature
1 2 3 4 5 X The variety of things to look at
1 2 3 4 5 X Nature sounds
1 2 3 4 5 X Availability of sidewalks and/or trails
1 2 3 4 5 X Tree cover
1 2 3 4 5 X Condition of sidewalks/trails
1 2 3 4 5 X Busyness at intersections
1 2 3 4 5 X Sense of community
1 2 3 4 5 X Ease of finding your way around
1 2 3 4 5 X Amount of shade
1 2 3 4 5 X Amount of noise

OVER →

IRB Application # - HUM00016118 Participant # _____

8. Have you continued to use any awareness plans while walking?

☐ No
☐ Yes → How often do you find yourself using these plans?

☐ Rarely ☐ Occasionally ☐ Often ☐ Very often

Which awareness plans do you use? _____

_____

_____

_____

9. Have you tried using an awareness plan while doing other activities (besides walking)?

☐ No
☐ Yes → How often do you find yourself using these plans?

☐ Rarely ☐ Occasionally ☐ Often ☐ Very often

Which awareness plans do you use? _____

_____

_____

_____

For what type of activities? _____

_____

_____

10. Have you experimented with any new awareness plans to use while walking?

☐ No
☐ Yes → How often have you experimented with new awareness plans?

☐ Rarely ☐ Occasionally ☐ Often ☐ Very often

Briefly describe the new plans you've tried _____

_____

_____

_____

11. Please share any additional thoughts or comments:

THANK YOU!

IRB Application # - HUM00016118 Participant # _____

Initiating and Maintaining Outdoor Walking: Week 2 Survey

This survey is about your experience during your time in this study, as well as, your attitudes about walking, and how well you have been doing lately.

1. Please answer the following questions based on the last week.

How many separate outdoor walks did you take? _____ /week

On average, how much time did you spend walking during each outing? _____ minutes

In addition to the time spent walking, how often were you outdoors?

☐ Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very often

Did you engage in any other types of physical activity (besides walking)?

☐ No
☐ Yes → What type of activities? _____

How often did you engage in these activities? _____ /week

How much time did you spend doing these activities? _____ minutes

2.During the past week, how often were you aware of the following features while walking?

1 = never	2= rarely	3 = occasionally	4 = often	5 = always	X=not applicable

1 2 3 4 5 X Trees	1 2 3 4 5 X Water (stream, pond, river)	1 2 3 4 5 X Parks
1 2 3 4 5 X Wooded areas	1 2 3 4 5 X Residential areas	1 2 3 4 5 X Noisy areas
1 2 3 4 5 X Busy streets	1 2 3 4 5 X Paved walking paths	1 2 3 4 5 X Other people
1 2 3 4 5 X Wide open spaces	1 2 3 4 5 X Natural areas	1 2 3 4 5 X Gardens
1 2 3 4 5 X Trails or Paths	1 2 3 4 5 X Businesses/Shops	

3. In the last few days, how well have you been doing in each of the following areas?

1 = not very well	2=slightly well	3=moderately well	4=very well	5=extremely well

1 2 3 4 5 Deciding what is most important to do next	1 2 3 4 5 Remembering to do important things
1 2 3 4 5 Planning my daily activities	1 2 3 4 5 Pacing myself
1 2 3 4 5 Remembering to do all the things that I started	1 2 3 4 5 Resisting distractions
1 2 3 4 5 Keeping my mind on what I am doing	1 2 3 4 5 Not interrupting other people
1 2 3 4 5 Being on time for appointments	1 2 3 4 5 Finishing things that I started

4. In the last few days, how often have you had the following feelings?

1 = never	2 = rarely	3 = sometimes	4 = often	5 = always

1 2 3 4 5 Relaxed	1 2 3 4 5 Distracted	1 2 3 4 5 Excited
1 2 3 4 5 Irritable	1 2 3 4 5 Focused	1 2 3 4 5 Content
1 2 3 4 5 Interested	1 2 3 4 5 Impatient	1 2 3 4 5 Energized
1 2 3 4 5 Alert	1 2 3 4 5 Satisfied	1 2 3 4 5 Forgetful

OVER →

5. Below is a list of reasons to start and maintain a walking routine.
Please indicate how much each applies to you.

1 = not at all	2=a little	3=somewhat	4=very much	5=extremely

1 2 3 4 5 be physically fit
1 2 3 4 5 it's fun
1 2 3 4 5 it's challenging
1 2 3 4 5 manage weight
1 2 3 4 5 have more energy
1 2 3 4 5 be more clearheaded
1 2 3 4 5 improve mood
2 3 4 5 improve cardiovascular fitness
1 2 3 4 5 improve appearance
1 2 3 4 5 it's interesting
1 2 3 4 5 maintain physical strength
1 2 3 4 5 my friends/family want me to
1 2 3 4 5 spend time with others
1 2 3 4 5 time to reflect

6. Please indicate the degree to which the following statements reflect your experience in the past week.

1 = strongly disagree	2=disagree	3=not sure	4=agree	5=strongly agree

1 2 3 4 5 Once I got going I typically enjoyed walking
1 2 3 4 5 I had trouble motivating myself to take a walk
1 2 3 4 5 My walks were interesting
1 2 3 4 5 After walking I noticed aches and pains
1 2 3 4 5 While walking, time seemed to pass quickly
1 2 3 4 5 I looked forward to taking walks
1 2 3 4 5 I felt walking was a burden or a chore
1 2 3 4 5 I noticed things that I hadn't seen before
1 2 3 4 5 After walking I felt relaxed and refreshed
1 2 3 4 5 I felt bored while walking

7. At this time, how confident are you in your ability to do the following?

1= not at all	2=not very	3=moderately	4=very	5=extremely

1 2 3 4 5 Identify things that prevent me from walking
1 2 3 4 5 Try out strategies that might help me maintain a walking routine
1 2 3 4 5 Take a walk when I feel a little tired
1 2 3 4 5 Find time to walk outside several times a week
1 2 3 4 5 Take a walk when I have many other things to do
1 2 3 4 5 Maintain a regular outdoor walking routine
1 2 3 4 5 Deal with future barriers to walking regularly

8. Think about where you typically walk and consider how satisfied you are with the following.

1 = not at all	2 = slightly	3 = moderately	4 = very	5 = extremely	X=don't know

1 2 3 4 5 X Safety
1 2 3 4 5 X General appearance
1 2 3 4 5 X Friendliness of residents
1 2 3 4 5 X Amount of nature
1 2 3 4 5 X The variety of things to look at
1 2 3 4 5 X Nature sounds
1 2 3 4 5 X Availability of sidewalks and/or trails
1 2 3 4 5 X Tree cover
1 2 3 4 5 X Condition of sidewalks/trails
1 2 3 4 5 X Busyness at intersections
1 2 3 4 5 X Sense of community
1 2 3 4 5 X Ease of finding your way around
1 2 3 4 5 X Amount of shade
1 2 3 4 5 X Amount of noise

THANK YOU!

Comments:

IRB Application # - HUM00016118 Participant # _____

Initiating and Maintaining Outdoor Walking: Follow-Up Survey

Approximately six weeks ago you participated in a study about starting and sticking with an outdoor walking routine. This survey is about your currently level of physical activity, your attitudes about walking, and how well you have been doing in the last few weeks.

1. Please answer the following questions based on the last few weeks.

	TYPICAL AVERAGE	*WEEKLY RANGE*
How many separate outdoor walks have you been taking each week?	_____ */ week*	_____ *(minimum)* – _____ *(max)*
How much time do you spend walking during each outing?	_____ *minutes*	_____ *(minimum)* – _____ *(max)*

In addition to the time spent walking, how often are you outdoors?

☐ Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very often

Have you been engaging in any other types of physical activity (besides walking)?

☐ No
☐ Yes → What type of activities? _____

How often do you engage in these activities	_____ */ week*	_____ *(minimum)* – _____ *(max)*
How much time do you spend doing these activities?	_____ *minutes*	_____ *(minimum)* – _____ *(max)*

2. In the last few days, how well have you been doing in each of the following areas?

1 = not very well	2=slightly well	3=moderately well	4=very well	5=extremely well

1 2 3 4 5 Deciding what is most important to do next
1 2 3 4 5 Planning my daily activities
1 2 3 4 5 Remembering to do all the things that I started
1 2 3 4 5 Keeping my mind on what I am doing
1 2 3 4 5 Being on time for appointments
1 2 3 4 5 Remembering to do important things
1 2 3 4 5 Pacing myself
1 2 3 4 5 Resisting distractions
1 2 3 4 5 Not interrupting other people
1 2 3 4 5 Finishing things that I started

3. In the last few days, how often have you had the following feelings?

1 = never	2 = rarely	3 = sometimes	4 = often	5 = always

1 2 3 4 5 Relaxed
1 2 3 4 5 Irritable
1 2 3 4 5 Interested
1 2 3 4 5 Alert
1 2 3 4 5 Distracted
1 2 3 4 5 Focused
1 2 3 4 5 Impatient
1 2 3 4 5 Satisfied
1 2 3 4 5 Excited
1 2 3 4 5 Content
1 2 3 4 5 Energized
1 2 3 4 5 Forgetful

4. Below is a list of reasons to start and maintain a walking routine.
Please indicate how much each applies to you.

1 = not at all	2=a little	3=somewhat	4=very	5=extremely

1 2 3 4 5 be physically fit
1 2 3 4 5 it's fun
1 2 3 4 5 it's challenging
1 2 3 4 5 manage weight
1 2 3 4 5 have more energy
1 2 3 4 5 be more clearheaded
1 2 3 4 5 improve mood
1 2 3 4 5 improve cardiovascular fitness
1 2 3 4 5 improve appearance
1 2 3 4 5 it's interesting
1 2 3 4 5 maintain physical strength
1 2 3 4 5 my friends/family want me to
1 2 3 4 5 spend time with others
1 2 3 4 5 time to reflect

OVER →

IRB Application # - HUM00016118 Participant # _____

5. Please indicate the degree to which the following statements reflect your recent walking experience.

1 = strongly disagree	2=disagree	3=not sure	4=agree	5=strongly agree

1 2 3 4 5 Once I got going I typically enjoyed walking
1 2 3 4 5 I had trouble motivating myself to take a walk
1 2 3 4 5 My walks were interesting
1 2 3 4 5 After walking I noticed aches and pains
1 2 3 4 5 While walking, time seemed to pass quickly
1 2 3 4 5 I looked forward to taking walks
1 2 3 4 5 I felt walking was a burden or a chore
1 2 3 4 5 I noticed things that I hadn't seen before
1 2 3 4 5 After walking I felt relaxed and refreshed
1 2 3 4 5 I felt bored while walking

6. At this time, how confident are you in your ability to do the following?

1= not at all	2=not very	3=moderately	4=very	5=extremely

1 2 3 4 5 Identify things that prevent me from walking
1 2 3 4 5 Try out strategies that might help me maintain a walking routine
1 2 3 4 5 Take a walk when I feel a little tired
1 2 3 4 5 Find time to walk outside several times a week
1 2 3 4 5 Take a walk when I have many other things to do
1 2 3 4 5 Maintain a regular outdoor walking routine
1 2 3 4 5 Deal with future barriers to walking regularly

7. Think about where you typically walk and consider how satisfied you are with the following.

1 = not at all	2 = slightly	3 = moderately	4 = very	5 = extremely	X=don't know

1 2 3 4 5 X Safety
1 2 3 4 5 X General appearance
1 2 3 4 5 X Friendliness of residents
1 2 3 4 5 X Amount of nature
1 2 3 4 5 X The variety of things to look at
1 2 3 4 5 X Nature sounds
1 2 3 4 5 X Availability of sidewalks and/or trails
1 2 3 4 5 X Tree cover
1 2 3 4 5 X Condition of sidewalks/trails
1 2 3 4 5 X Busyness at intersections
1 2 3 4 5 X Sense of community
1 2 3 4 5 X Ease of finding your way around
1 2 3 4 5 X Amount of shade
1 2 3 4 5 X Amount of noise

8. Please share any additional thoughts or comments:

THANK YOU!

IRB Application # - HUM00016118 Participant # _____

Initiating and Maintaining Outdoor Walking: Week 1 Survey

This survey is about your waking experience and how well you have been doing **over the last week**.

1. Please answer the following questions based on the last week.

How many separate outdoor walks did you take? _____ */ week*

On average, how much time did you spend walking during each outing? _____ *minutes*

In addition to the time spent walking, how often were you outdoors?

☐ Never ☐ Rarely ☐ Occasionally ☐ Often ☐ Very often

Did you engage in any other types of physical activity (besides walking)?

☐ No
☐ Yes → What type of activities? _____

How often did you engage in these activities? _____ */ week*

How much time did you spend doing these activities? _____ *minutes*

2. During the past week, how often were you aware of the following features while walking?

1 = never	2= rarely	3 = occasionally	4 = often	5 = always	X=not applicable

1 2 3 4 5 X Trees
1 2 3 4 5 X Wooded Areas
1 2 3 4 5 X Busy Streets
1 2 3 4 5 X Wide Open Spaces
1 2 3 4 5 X Trails or Paths
1 2 3 4 5 X Water (stream, pond, river)
1 2 3 4 5 X Residential Areas
1 2 3 4 5 X Paved Walking Paths
1 2 3 4 5 X Natural Areas
1 2 3 4 5 X Businesses/Shops
1 2 3 4 5 X Parks
1 2 3 4 5 X Noisy Areas
1 2 3 4 5 X Other People
1 2 3 4 5 X Gardens

3. In the last few days, how well do you feel you are doing in each of the following areas?

1 = not very well	2=slightly well	3=moderately well	4=very well	5=extremely well

1 2 3 4 5 Deciding what is most important to do next
1 2 3 4 5 Planning my daily activities
1 2 3 4 5 Remembering to do all the things that I started
1 2 3 4 5 Keeping my mind on what I am doing
1 2 3 4 5 Being on time for appointments
1 2 3 4 5 Remembering to do important things
1 2 3 4 5 Pacing myself
1 2 3 4 5 Resisting distractions
1 2 3 4 5 Not interrupting other people
1 2 3 4 5 Finishing things that I started

4. In the last few days, how often have you had the following feelings?

1 = never	2 = rarely	3 = sometimes	4 = often	5 = always

1 2 3 4 5 Relaxed
1 2 3 4 5 Irritable
1 2 3 4 5 Interested
1 2 3 4 5 Alert
1 2 3 4 5 Distracted
1 2 3 4 5 Focused
1 2 3 4 5 Impatient
1 2 3 4 5 Satisfied
1 2 3 4 5 Excited
1 2 3 4 5 Content
1 2 3 4 5 Energized
1 2 3 4 5 Forgetful

OVER →

IRB Application # - HUM00016118 Participant # _____

5. Please indicate the degree to which the following statements reflect your experience in the past week.

1 = strongly disagree	2=disagree	3=not sure	4=agree	5=strongly agree

1 2 3 4 5 Once I got going I typically enjoyed walking
1 2 3 4 5 I had trouble motivating myself to take a walk
1 2 3 4 5 My walks were interesting
1 2 3 4 5 After walking I noticed aches and pains
1 2 3 4 5 While walking, time seemed to pass quickly
1 2 3 4 5 I looked forward to taking walks
1 2 3 4 5 I felt walking was a burden or a chore
1 2 3 4 5 I noticed things that I hadn't seen before
1 2 3 4 5 After walking I felt relaxed and refreshed
1 2 3 4 5 I felt bored while walking

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