

INCREASING WALKING AT THE C&O CANAL NATIONAL HISTORICAL PARK: AN INTERVENTION FOCUSED ON LOCAL EMPLOYEES

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Abstract.—This study sought to increase walking in the C&O Canal National Historical Park (NHP). C&O Canal NHP joined with Georgetown University, George Washington University, and the Georgetown Business Improvement District to target the employees of these businesses. The study was very similar to a multi-worksites employee wellness research program. Volunteer participants formed teams and competed in a 7-week walking challenge. Pre- and post-challenge surveys were used to measure the effects of the interventions, and were distributed to all participants (N = 183) online and through the mail. The program “interventions” consisted of: 1) message fliers delivered via email to half the participants (chosen randomly) every other week; and 2) social support development—through team formation, and the use of a website to track and compare their progress for all participants. Comparisons between these two groups—social support only and social support plus fliers—assessed the impacts from the interventions. Results indicated that the overall walking behavior did not change. Most participants were already active walkers, and overall, walking rates did not increase. However, results indicated that those participants receiving the fliers increased their walking rates by 1 day per week.

1.0 INTRODUCTION

Although numerous studies have shown that physical activity is a critical component of health (U.S. Department of Health and Human Services [HHS] 1996), the proportion of Americans meeting physical

activity standards remains low (U.S. HHS 1995). In fact, 55 percent of Americans do not meet the minimum physical activity recommendations for health, and almost 25 percent are sedentary (Pate et al. 1995).

As part of the increasing focus on improving individual health, the Healthier U.S. Initiative proposed in 2002 by President Bush promoted the use of public lands to improve personal health, by encouraging the use of these lands for physical activity. Based on the recommendations of the National Park System Advisory Board Subcommittee on Health and Recreation (2006), the C&O Canal National Historic Park (NHP) was chosen to participate in a pilot study (as one of seven NPS sites) to examine this link between health benefits and national parks. The purpose of this study was to use messages and social support to increase walking in the C&O Canal NHP by targeting employees who work in one specific area of the park, the Georgetown area of Washington, DC.

2.0 LITERATURE REVIEW

One avenue to address improving health focuses on the use of outdoor recreation resources, such as state and federally managed parks, forests, and other sites, to encourage physical activity. Surprisingly, information is lacking in regards to the empirical relationships between leisure behaviors, natural parks, and physical health, although more researchers have begun to explore these areas during the last decade (Hodges and Henderson 1999, Iwasaki et al. 2001, Ho 2003, Oresaga-Smith 2004). While a great deal is known about the demographics of trail and park users (Giles-Corti and Donovan 2002, Addy et al. 2004, Gordon et al. 2004, Libbrett et al. 2006), as well as the restorative benefits of outdoor recreation (Kaplan 1995), less research has focused on promoting the healthy physical benefits of outdoor recreation areas and the effects of interventions to increase use (Gobster 2005).

2.1 Strategies to Promote Physical Activity

Nonetheless, a variety of strategies have been implemented to promote physical activity in general, and walking in particular. While numerous theories and approaches—including the Health Belief Model, the Transtheoretical Model, Social Cognitive Theory, and Social Marketing—have been used to address factors that predict the intention, implementation, or maintenance of a variety of health-related behaviors, one of the most widely used is the Theory of Planned Behavior (TPB). According to the TPB, a specific behavior is based on a series of connected beliefs. Therefore, in order to attempt to modify or change a person's behavior, it is critical to understand the beliefs related to that specific behavior (Ajzen 1991).

The TPB has been used in many studies that addressed a variety of health behaviors (Stradling and Parker 1996, Povey et al. 2000, Courneya et al. 2001, Reger et al. 2002, Stead et al. 2005). In regards to physical activity specifically, numerous studies have consistently found strong relationships between TPB constructs and physical activity (Goden 1993, Blue 1995, Hausenblaus et al. 1997, Rosen 2000, Hagger et al. 2002). In addition, social support has been noted as an important factor in determining physical activity (Duncan et al. 1993, Carron et al. 1996, Giles-Corti and Donovan 2002, Trost et al. 2002). Developing and providing opportunities for social support in community settings has been recommended as an effective method to promote physical activity (Kahn et al. 2002).

2.2 Study Purpose

This study sought to use theoretically derived messages and social support to increase walking behavior at the C&O Canal NHP (measured using self-report mail-back and online surveys).

3.0 METHODS

3.1 Study Area

The C&O Canal NHP is a 185-mile-long linear park running from Washington, DC to Cumberland, MD. It receives 3 million visitors every year, making it one of the most visited national park areas. With so many

people working and residing near the park, the primary visitation pattern is repeated, short visits. This pattern was an important factor in selecting the audience for this project.

The geographic area of focus for the project was the trail/towpath along the Canal within and just outside the Georgetown area of Washington, DC. Walking was chosen because it is the most widespread outdoor physical activity due to its ease, accessibility, and acceptability (Siegel et al. 1995, Brownson et al. 2004). The overall goals of the project were: 1) to increase park users' awareness of the health benefits derived from recreation in the park; and 2) to increase their use of the park for walking. This study reports only the outcomes related to goal 2—increasing walking in the park.

The park worked with the Georgetown Business Improvement District (GBID) to target the employees of those businesses, as well as Georgetown University and George Washington University employees. The GBID has a membership of about 1,000 businesses in Georgetown, and seeks to collectively market and enhance the Georgetown area as a place for business and a destination for visitors (similar to a Chamber of Commerce). The volunteer participants were the recipients of a multi-component program—derived from using social support, TBP, and the Elaboration Likelihood Model (ELM)—to encourage walking, both in the C&O Canal NHP and elsewhere. This project was very similar to a community or employee wellness program, but more complex because it involved numerous jobsites.

3.2 Data Collection

Onsite interviews and a focus group of GBID employees were first used to elicit beliefs of the target sample regarding walking in the C&O Canal NHP, and the results were used to develop the targeted messages used to motivate participants during the Challenge (Middlestadt et al. 1996, Ham et al. 2007). The program “interventions” consisted of: 1) targeted messages delivered via email fliers to half the participants (chosen randomly) every other

week; and 2) social support development—through team formation, and the use of a website to track and compare their progress for all participants. Comparisons between these two groups, 1) social support only; and 2) social support plus message fliers, assessed the impact from the interventions.

3.3 Focus Groups

During the focus group (held in May 2007), all participants were given a series of questions to be answered individually, followed by a group discussion of the same questions. Using the TPB (Middlestadt et al. 1996, Lackey and Ham 2003, Ham et al. 2007) to guide this phase of the research, interviewers asked participants specific questions related to their: 1) salient personal beliefs and attitudes; 2) salient normative beliefs; and 3) salient perceived behavioral control beliefs. In this study, the specific targeted behavior addressed in the questions was “walking for at least 30 minutes a day, 5 days a week on the C&O Canal NHP trails.”

In addition, nine onsite interviews were conducted in May 2007 with C&O Canal NHP visitors. A convenience sample of individual visitors was approached, and respondents were asked the same series of questions used in the focus groups. The interviewers wrote down the responses verbatim.

Results of the focus group and interviews were combined, analyzed for content, and coded for common themes centered on the three main types of beliefs noted above (Ham et al. 2007). A comparison of the beliefs of both “walkers” (those currently using the C&O Canal NHP towpath to walk for exercise or health improvement) and “nonwalkers” found that the most salient beliefs that should be addressed were: 1) enjoying the view/scenery on the towpath (behavioral belief, which more walkers than nonwalkers mentioned); 2) safety on the towpath (behavioral belief, noted by both groups); 3) having a walking buddy for motivation (a control belief, which more nonwalkers than walkers stated); and 4) lack of time to walk (a control belief, which more nonwalkers mentioned). Four fliers were then developed and sent during the 7-week challenge. These message fliers

targeted the positive and/or negative beliefs associated with raising awareness and encouraging walking for 30 minutes a day on the C&O Canal NHP trails and elsewhere (Ham et al. 2007). Principles from the ELM were also used to help design these targeted messages—specifically by using humor, attempting to make the messages novel and relevant, and targeting both peripheral and central routes to persuasion (Petty et al. 1992).

3.4 Description of the Challenge and Interventions

As noted, the study used social support and team competition, in conjunction with theoretically derived messages, as the two main strategies to encourage the participants to walk. Volunteer teams were organized from the groups noted above and competed against each other to complete the overall goal/challenge: to walk 185 miles (the length of the Canal) in 7 weeks as a team. (If each team member walked 5 miles per week, it would take an average of 7 weeks for the team to reach 185 miles.) Individuals were also encouraged to participate. Teams were encouraged to have five members, which would be the optimal number to ensure that each person walked at least 30 minutes a day in order to reach 185 miles. In reality, teams formed of varying sizes, and competed by comparing average miles per team. In order to track miles, this study used 20 minutes of walking as a measure for 1 mile, based on findings in a variety of studies (Welk et al. 2000, Tudor-Locke and Bassett 2004).

A website and web-log were set up and maintained as a major source of feedback for the participants. They uploaded their miles to chart their progress and compare it against other teams (similar to the Walk Across Texas program). All teams or individuals were required to register online, and throughout the course of the study were reminded to upload their miles and track their progress on a weekly basis. The website was modeled after the President’s Council on Physical Fitness and Sports site, “The President’s Challenge Physical Activity and Fitness Awards Program,” as well as the “Walk Across Texas” program’s website (Texas AgriLife Extension 1996). As additional incentives, the three teams and individuals with the

most number of average miles walked by the end of the Challenge received gift certificates, and all participants who completed the Challenge received small prizes.

3.5 Data Collection Procedures

This study used a pre- and post-intervention survey to measure changes in self-reported walking rates before and after the program. Both surveys were distributed to all participants (N = 183) online and through the mail. All registered participants were asked to fill out a survey at the start of the challenge in early September 2007, and again at the end in early November. Modifying Dillman's method (Dillman 2007), reminder emails were sent approximately 1 week, and again 2 weeks, after the start of each survey. A second paper copy was sent to nonrespondents after 3 weeks. These survey instruments included questions related to respondents' demographics, awareness and knowledge of importance of health benefits related to walking, self-reported walking behaviors (using separate questions to differentiate between walking in the park and outside the park), and awareness and impact of targeted messages and social support on walking (only on post-intervention survey).

4.0 ANALYSIS

This project used a quasi-experimental research design (pre-test, post-test) to evaluate the results. No control group was feasible to use for this project, so two intervention groups were used. All participants received the social support intervention (teams, weblog, etc.), but only half the participants also received the targeted messages. The data from all online surveys were collected using a Microsoft Access database, converted to Excel, and then imported into the SPSS software package. Mailed-

back surveys were entered directly into the SPSS database.

5.0 RESULTS

The total number of participants was 183, with 39 teams made up of varying numbers of people, and 29 individuals. Ninety-nine participants (including individuals and those on a team) completed the challenge. Ninety-nine respondents returned the pre-challenge survey, for a 54-percent response rate, and 58 participants returned the post-survey, for a response rate of only 32 percent. Forty-one individuals (22 percent) returned both surveys, and most of the paired analyses were conducted on only these 41 participants (except as noted).

The majority of participants (N = 99) were female (77 percent) and the participants' average age was 43 years. The majority were college graduates (73 percent), with 38 percent having a graduate or professional degree. Most participants were white (65 percent) or African American (23 percent).

At the start of the Challenge, most participants were already active walkers, with 86 percent walking 5 or more days per week for at least 10 minutes ($M=5.9$ days); and 85 percent reported they walked for at least 30 minutes on those days ($M=58$ minutes). However, only 44 percent reported walking on the C&O Canal NHP towpath specifically (19 percent reported walking only 1 day per week on the towpath, while 25 percent reported walking 2 or more days per week in the park). Sixty-five percent of the C&O Canal NHP walkers spent at least 30 minutes walking ($M=52$ minutes). At the end of the challenge (N = 58), those figures remained roughly the same (see Table 1).

Table 1.—Walking results, based on all survey respondents

Variable	Pre-Challenge (N=99; Means)	Post-Challenge (N=58; Means)
Number of days walked in general	5.9 days	5.6 days
Number of days walked at the C&O	1 day	1 day
Number of minutes walked per day in general	58 minutes	54 minutes
Number of minutes walked per day at C&O	52 minutes	46 minutes
Percentage walking for at least 30 minutes (each day they walked)	85%	86%

Analysis using paired t-tests (N = 41) found no significant differences pre- and post-challenge between: 1) the number of days walked in general; 2) the number of days walked specifically at the C&O Canal NHP; 3) the number of minutes walked per day in general; or 4) the number of minutes walked per day (Table 2). Thus, the walking challenge did not appear to increase walking rates. The critical p-value for determining significant differences in all statistical tests was $p < 0.05$.

However, analysis using independent t-tests to test for differences between the “fliers and social support” group and the “social support only” group, found that the group receiving the fliers walked approximately 1 more day per week in general, 6 days versus 5 days ($t = 2.646$, $p < .011$). Therefore, the fliers may have increased the number of days the participants walked in general. No differences were found in regards to

the number of days walked specifically at the C&O Canal NHP, the number of minutes walked per day in general, or the number of minutes walked per day at the C&O Canal NHP.

Participants were also asked about their beliefs regarding the motivation effect of the various interventions, as well as the Challenge in general. Overall, it appears that being part of a team and being able to track their progress online provided the most motivation to walk (see Table 3).

Two different questions specifically addressed beliefs regarding whether the challenge increased their use of the C&O Canal NHP towpath. The first asked, “In general, did participating in the ‘Your Towpath to Healthy Living Challenge’ increase your use of the C&O Canal NHP for walking?” and 42 percent responded “Yes,” while 54 percent reported “No.”

Table 2.—Walking results, paired t-tests (N = 41)

Variable	Pre-Challenge (means)	Post-Challenge (means)	t value, level of significance
Number of days walked in general	6 days	6 days	$t = .608$, $p < .547$
Number of days walked at the C&O	1.25 days	1.27 days	$t = .086$, $p < .932$
Number of minutes walked per day in general	64 minutes	60 minutes	$t = .396$, $p < .695$
Number of minutes walked per day at C&O	75 minutes	48 minutes	$t = 2.058$, $p < .079$

Table 3.—Beliefs about motivation and the interventions

	Means (N = 58)	% that “strongly agreed” or “agreed” *
During the past 2 months, just knowing I was part of a team participating in the “Your Towpath to Healthy Living Challenge” motivated me to walk.	3.87	77%
During the past 2 months, being able to track my individual and team progress online motivated me to walk.	3.74	72%
During the past 2 months, actually walking with my team members motivated me to walk.	3.37	54%
During the past 2 months, receiving email fliers about walking in the “Your Towpath to Healthy Living Challenge” motivated me to walk.	2.98	37%
During the past 2 months, participating in the ranger-led walks motivated me to walk.	2.43	9% (agreed, 4 people)
During the past 2 months, listening to C&O Canal NHP podcasts motivated me to walk.	2.24	2% (agreed, 1 person)

*Note: Response scale was a 5-point Likert scale, from 1 = “strongly disagree,” to 5 = “strongly agree.”

The second question asked, “In the last 2 months, has the number of times you walk/run on the C&O NHP towpath increased, and why?” The answer percentages were similar to the first question, with 37 percent reporting an increase, 14 percent reporting a decrease, 33 percent reporting no change, and 12 percent saying they “did not know.” In regards to the open-ended comments (N = 22) that addressed why their walking had increased, 73 percent noted social support related to the team challenge as the reason.

Thus, just over one-third (between 37 and 42 percent) of respondents reported that the Challenge increased their use of the park for walking. Although no statistical significance was found in walking rates in the C&O Canal NHP (Table 2), the results of the two questions above show that about 40 percent believed it did increase their use of the park. Therefore, regardless of actual behavior change, many perceived that their behavior (walking in the park) had changed. In answer to the open-ended question that asked, “What was the most important thing that motivated you to walk...?”, the two most frequently reported comments (N=41) were social support related to the team challenge (34 percent), and the physical health benefits from walking (39 percent). Barriers to walking that were reported in response to an open-ended question (N=49) were lack of time (39 percent), physical limitations or injuries (27 percent), and bad weather (10 percent).

6.0 DISCUSSION

Insufficient evidence was found for the effectiveness of the C&O Canal NHP’s program to increase walking in the park. However, evidence was found that the message fliers may have had a statistically significant impact on walking in general, increasing the average days walked per week from 5 to 6 days. Interestingly, although no significant difference was found in walking rates in the C&O Canal NHP, about 40 percent of the respondents reported that they thought it did increase their use of the park. Social support through the use of teams for the Challenge was reported as the primary motivator to walk. Encouraging people to join teams and engaging in friendly team competition may be an effective way to motivate, and even sustain, walking behavior.

Although this study targeted individuals working near the park, most still chose to walk elsewhere. Unfortunately, the reasons for this preference are not known. Merely providing a place to walk is clearly not enough to get participants to alter their walking behavior, and decisions to walk are generally made by considering numerous factors (e.g., time of day, time allowed/needed to walk, walking buddies, family considerations, having clean/appropriate clothing).

In addition, this Challenge sought to attract and encourage nonwalkers; however, it attracted only participants who were already walking. Thus, little change would likely be noted, since the challenge was not planned for active walkers. However, it did appear to give walkers a new avenue or outlet (the social aspect of the team challenge) and to motivate them in new ways to keep walking. Many noted that just being on a team was the part of this program that motivated them the most. Finally, future research should carefully consider the recruitment methods, in order to attract the most appropriate sample (nonwalkers versus walkers).

Several limitations were associated with this study, particularly the analysis of the paired surveys. The response rate for those completing both surveys was quite low. The small initial sample size and the low response rate on the paired surveys make it inappropriate to generalize the results to other worksites or parks. However, a brief phone survey of a random sample of nonrespondents (N=13) was used to assess potential nonresponse bias, and no systematic bias was indicated. In addition, this project was unable to measure long-term outcomes to see whether the increase in walking due to the fliers was maintained. Future research should attempt to measure both short- and long-term outcomes. This study also encountered a number of problems due to the heavy reliance on the website, including participants’ creating multiple accounts, and surveys that were incomplete due to participant confusion, computer error, or other limitations. Relying on email to contact participants was convenient, but this project may have overused that avenue of communication (i.e., frequent emails may have caused people to disregard them).

One finding from the nonresponse bias check was that participants just wanted to join their team and then walk, and not be bothered with getting frequent emails, or filling out mileage logs or surveys. Similar walking challenges (e.g., “Walk Across Texas”) have found that having an active and committed team captain is critical to the success of logging miles, and that addition might have helped this project as well.

7.0 CONCLUSIONS

In conclusion, this study did not find evidence of the effectiveness of the C&O Canal NHP’s program in regards to increasing active visits to the C&O Canal NHP. However, the message flier intervention had a statistically significant impact on walking. Problems related to low response rates on the surveys limit the ability to make specific recommendations based on the findings. Interestingly, while no significant differences were found in walking rates based on the challenge, about 40 percent of the respondents perceived that it did increase their use of the park. Other lessons learned included: 1) the importance of social support through teams as a motivator; 2) the need to form partnerships with well established or large organizations who can aid in recruitment; and 3) recognizing participants’ needs regarding the use of technology.

8.0 CITATIONS

Addy, C.L., Wilson, D.K., Kirtland, K.A., Ainsworth, B.E., Sharpe, B. and Kimsey, D. (2004).

Associations of perceived social and physical environmental supports with physical activity and walking behavior. American Journal of Public Health, 94(3), 440-443.

Ajzen, I. (1991). **The theory of planned behavior.** Organizational and Human Decision Processes, 50, 179-211.

Blue, C.L. (1995). **The predictive capacity of the theory of reasoned action and the theory of planned behavior in exercise research: An integrated literature review.** Research in Nursing and Health, 18, 105-121.

Brownson, R.C., Baker, E.A., Boyd, R.L., Caito, N.M., Duggan, K., Housemann, R.A., Kreuter, M.W., Mitchell, T., Motton, F., Pulley, C., Schmid, T.L., and Walton, D. (2004). **A community-based approach to promoting walking in rural areas.** American Journal of Preventive Medicine, 27(1), 28-32.

Carron, A.V., Hausenblas, H.A., & Mack, D. (1996). **Social influences and exercise: A meta-analysis.** Journal of Sport and Exercise Psychology, 18(1), 1-16.

Courneya, K.S., Plotnikoff, R.C., Hotz, S.B., and Birkett, N.J. (2001). **Predicting exercise stage transitions over two consecutive 6-month periods: A test of the theory of planned behavior in a population-based sample.** British Journal of Health Psychology, 6, 135-150.

Dillman, D. (2007). **Mail and Internet Surveys: The Tailored Design Method.** New Jersey: John Wiley & Sons, Inc.

Duncan, T.E., McAuley, E., Stollmiller, M., and Duncan, S.C. (1993). **Serial fluctuations in exercise behavior as a function of social support and efficacy conditions.** Journal of Applied Social Psychology, 23(18), 1498-1522.

Giles-Corti, B., & Donovan, R.J. (2002). **The relative influence of individual, social, and physical environment determinants of physical activity.** Social Science and Medicine, 54, 1793-1812.

Gobster, P.H. (2005). **Recreation and leisure research from an active living perspective: Taking a second look at urban trail use data.** Leisure Sciences, 27(5), 367-383.

Godin, G. (1993). **The theories of reasoned action and planned behavior: Overview of findings, emerging research problems and usefulness for exercise promotion.** Journal of Applied Sport Psychology, 5, 141-157.

- Gordon, P.M., Zizzi, S.J., and Pauline, J. (2004). **Use of a community trail among new and habitual exercisers: A preliminary assessment.** *Preventing Chronic Disease*, 1(4), 1-11.
- Hagger, M.S., Chatzisarantis, N.L., and Biddle, S.J.H. (2002). **Meta-analysis of the theories of reasoned action and planned behavior in physical activity: An examination of the predictive validity and the contribution of additional variables.** *Journal of Sport and Exercise Psychology*, 24, 3-32.
- Ham, S.H., and Krumpal, E.E. (1996). **Identifying audiences and messages for nonformal environmental education: A theoretical framework for interpreters.** *Journal of Interpretation Research*, 1(1), 11-23.
- Ham, S., Brown, T., Curtis, J., Weiler, B., Hughes, M., & Poll, M. (2007). **Promoting Persuasion in Protected Areas: A Guide for Managers.** Sustainable Tourism Cooperative Research Centre.
- Hausenblaus, H.A., Carron, A.V., and Mack, D.E. (1997). **Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis.** *Journal of Sport and Exercise Psychology*, 19, 36-51.
- Ho, C. (2003). **Parks, recreation and public health: parks and recreation improve the physical and mental health of our nation—Research update.** *Parks and Recreation*, 38(4), April, 18-23.
- Hodges, J.S., and Henderson, K.A. (1999). **Promoting the physical activity objectives in the Surgeon General's report: A summary.** *Journal of Physical Education, Recreation, & Dance*, 70(3), 40-41.
- Iwasaki, Y., Zuzanek, J., and Mannell, R. C. (2001). **The Effects of Physically Active Leisure on Stress-Health Relationships.** *Revue Canadienne de Santé Publique* 92(3), 214-218.
- Kahn, E.B., Ramsey, L.T., Brownson, R.C., Heath, G.W., Howze, E.H., Powell, K.E., Stone, E.J., Rajab, M.W., Corso, P., and the Task Force on Community Preventive Services. (2002). **The effectiveness of interventions to increase physical activity: A systematic review.** *American Journal of Preventive Medicine*, 22(4S), 73-107.
- Kaplan, S. (1995). **The restorative benefits of nature: Toward an integrated framework.** *Journal of Environmental Psychology*, 15, 169-182.
- Lackey, B.K., and Ham, S.H. (2003). **Contextual analysis of interpretation focused on human-black bear conflicts in Yosemite National Park.** *Applied Environmental Education and Communication*, 2, 11-21.
- Libbrett, J.J., Yore, M.M., and Schmid, T.L. (2006). **Characteristics of physical activity levels among trail users in a U.S. national sample.** *American Journal of Preventive Medicine*, 31(5), 399-405.
- Middlestadt, S.E., Bhattacharyya, K., Rosenbaum, J., Fishbein, M., and Sheperd, M. (1996). **The use of theory based semi structured elicitation questionnaires: Formative research for CDC's prevention marketing initiative.** *Public Health Reports*, 3(1), 18-27.
- Oresaga-Smith, E., Mowen, A., Payne, L., & Godbey, G. (2004). **Interaction of stress and park use on psycho-physiological health in older adults.** *Journal of Leisure Research*, 36, 232-257.
- Pate, R., Pratt, M., Blair, S., Haskell, W., Macera, et. al. (1995). **Physical activity and public health: A recommendation from the centers for disease control and prevention and the American college of sports medicine.** *Journal of the American Medical Association*, 273(5), 402-407.

- Petty, R., McMichael, S., and Brannon, L. (1992). **The elaboration likelihood model of persuasion: Applications in Recreation and Tourism.** In, M. Manfredo (Ed.), *Influencing Human Behavior*. (pp. 77-102). Champaign, IL: Sagamore.
- Povey, R. Conner, M., Sparks, P., James, R, and Shepherd, R. (2000). **Application of the Theory of Planned Behavior to two dietary behaviors: roles of perceived control and self-efficacy.** *British Journal of Health Psychology*, 5, 121-139.
- Reger, B., Cooper, L., Booth-Butterfield, S., Smith, H., Bauman, A., Wootan, M., Middlestadt, S., Marcus, B., and Greer, F. (2002). **Wheeling Walks: A community campaign using paid media to encourage walking among sedentary older adults.** *Preventive Medicine*, 35, 285-292.
- Rosen, C.L. (2000). **Integrating stage and continuum models to explain processing of exercise messages and exercise initiation among sedentary college students.** *Health Psychology*, 19, 172-180.
- Siegel, P., Brackbill, R., and Heath, G. (1995). **The epidemiology of walking for exercise: implications for promoting activity among sedentary groups.** *American Journal of Public Health*, 85, 706-10.
- Stead, M., Tagg, S., MacKintosh, A.M., and Eadie, D. (2005). **Development and evaluation of a mass media Theory of Planned Behavior intervention to reduce speeding.** *Health Education Research*, 20, 36-41.
- Stradling, S.G., and Parker, D. (1996). **Extending the theory of planned behavior: the role of personal norms, instrumental beliefs and affective beliefs in predicting driving violations.** Presented at the International Conference on Traffic and Transport Psychology, Valencia, Spain.
- Texas AgriLife Extension. (1996). **Walk Across Texas.** Retrieved 3 March 2007 from <<http://walkacrosstexas.tamu.edu/index.htm>>.
- Trost, S.G., Owen, N., Bauman, A.E., Sallis, J.F., and Brown, W. (2002). **Correlates of adults' participation in physical activity: Review and update.** *Medicine and Science in Sports and Exercise*, 34(2), 1996-2001.
- Tudor-Locke, C., and Bassett, D. (2004). **How many steps/day are enough? Preliminary pedometer indices for public health.** *Sports Medicine*, 34(1), 1-8.
- U.S. Department of Health and Human Services (HHS). (1995). **Healthy People 2000: Midcourse Review and 1995 Revisions.** Washington, D.C.: Government Printing Office.
- U.S. Department of Health and Human Services (HHS). (1996). **Physical activity and health: a report of the Surgeon General executive summary.** Atlanta, (GA): Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, The President's Council on Physical Fitness and Sports.
- Welk, G.J., Differding, J.A., Thompson, R.W. (2000). **The utility of the Digi-walker step counter to assess daily physical activity patterns.** *Medical & Science in Sports & Exercise*, 32(9), S481-S8.