

# Walking to Meet Health Guidelines: The Effect of Prompting Frequency and Prompt Structure

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This study assessed the effects of frequency of prompting (phone calls once a week versus once every 3 weeks) and structure of prompting (high versus low structure) in 135 participants (132 women and 3 men) in a walking program designed to meet the American College of Sports Medicine's cardiovascular exercise goals. Survival analysis using 6 months of data points and using the criteria of walking at least 20 min a day for at least 3 times per week indicated an effect for more frequent versus less frequent prompting (46% and 13%) but not for high- versus low-structure prompting (30% and 31%). The results suggested the efficacy of frequent prompting delivered in inexpensive ways as a means to increase exercise adherence and the further parametric study of other basic behavior change strategies.

*Key words:* physical activity promotion, prompting, survival analysis

The evidence of the importance of regular physical activity for disease prevention continues to mount. Researchers have found physical activity is important for the prevention and management of coronary heart disease (Sandvik et al., 1993); hypertension (Gordon, Scott, Wilkinson, Duncan, & Blair, 1990); noninsulin-dependent diabetes mellitus (Helmrick, Ragland, Leung, & Paffenbarger, 1991); osteoporosis (Snow-Harter & Marcus, 1991); obesity, weight loss, and weight control (King, Frey-Hewitt, Dreon, & Wood, 1989); and some forms of cancer (Shephard, 1992). Not surprisingly, Paffenbarger et al. (1993) found individuals who are physically active live longer than those who are inactive. Blair et al. (1989) suggested that if sedentary adults engaged in light to moderate physical activity (e.g., walking) they would obtain significant health benefits. Furthermore, targeting light to moderate activity may result in higher adherence rates than targeting high-intensity exercise. The U.S. Department of Health and Human Services (1991), however, estimated only 22% of the U.S. adult population exercises at the level recommended by the American College of Sports Medicine (ACSM) to produce increases in fitness (three 20–30-min bouts of aerobic exercise each week; ACSM, 1990). Furthermore, Dishman (1988) estimated a 6-month adherence of 50% for the average exercise program (i.e., presumably a program without special behavioral procedures), meaning only 50% of the participants are still exercising after 6 months. The purpose of the present study (the NoonTime Walkers program) was to increase the 6-month adherence to the minimum ACSM goals for fre-

quency and duration (20 min a day 3 days per week) in a physical activity program by using frequent prompting, feedback, goal setting, self-monitoring, and social support.

Prompting is effective in increasing and maintaining physical activity as well as other health behaviors (Kazdin, 1989). King, Taylor, Haskell, and DeBusk (1988) found, for example, the addition of prompting (weekly phone calls) to a home-based intervention enhanced the adoption of physical activity and increased fitness levels. Wankel and Thompson (1977) found similar results using telephone prompts, and Acquista, Wachtel, Gomes, Salzillo, and Stockman (1988) found telephone prompts increased adherence to a home-based physical activity program. These studies did not vary the frequency of prompting; thus, it is not clear what is the most parsimonious prompting schedule to attain and maintain desired levels of physical activity.

Several researchers have used goal setting and feedback successfully in the physical activity area. Martin et al. (1984), Reid and Morgan (1979), and Rhodes and Dunwoody (1980) found goal setting increased adherence to physical activity programs. Martin et al. (1984) and Weber and Wertheim (1989) also found feedback effective in increasing physical activity. Questions arose from the prompting literature: Does the structure of the prompt affect resulting physical activity behavior change? Would a highly structured prompt using minimal feedback and goal setting be more effective than a low-structured "touching base" prompt? Thus, the present study compared a highly structured prompt using minimal feedback and goal setting to a low-structured prompt (touching base) of a telephone call asking "How's your walking program going?"

Overall, the NoonTime Walkers program was designed to answer two questions: (a) Does frequency of prompting affect program adherence? and (b) Does the structure of the prompt affect adherence? There were two dependent variables in this study: (a) the number of participants who walked at least 20 min in a week and (b) the number of participants who met the ACSM goals for frequency and duration of activity.

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## Method

### Participants

Newspaper advertisements and fliers posted on campus were used to recruit 135 (132 women and 3 men; mean age = 40) participants from a population of approximately 5,000 staff and faculty members at a large southeastern university. All participants received a 15-min initial training session in which David N. Lombard or Tamara N. Lombard reviewed the purpose of the study, conducted initial screening including a stages of exercise behavior change questionnaire (used only for stratified random assignment to groups), explained how to fill out weekly walking logs, and explained how to begin a walking group. The Physical Activity Readiness Questionnaire (PAR-Q; Blair, 1991) was used to screen participants for possible exclusionary medical conditions. Only one participant failed the exclusionary criteria on the PAR-Q, and she received a waiver from her personal physician to participate in the study.

After the initial training session, participants were assigned equally to five prompt conditions using stratified random assignment by stage of exercise behavior change. The five prompt conditions were (a) a control condition with no prompting, (b) a high-frequency/low-structure prompt, (c) a high-frequency/high-structure prompt, (d) a low-frequency/low-structure prompt, and (e) a low-frequency/high-structure prompt. Over the course of the study (24 weeks), 13 participants indicated they were no longer willing to send in their weekly walking logs, regardless of whether they walked or not (controls,  $n = 7$ ; intervention participants,  $n = 6$ ). The median week for which participants indicated this was Week 4 for control participants and Week 3 for intervention participants. From the week a participant stopped returning a weekly log his or her data were entered as 0, but these participants were not eliminated from the final data set. Thus, the final sample ( $N = 135$ ) was the same as the recruited sample size.

### Design

The study used a  $2 \times 2$  design plus a control group with the two independent variables *frequency* of telephone prompt (once a week versus once every 3 weeks) and *structure* of the prompt (highly structured versus touching base). The control condition received no intervention strategies after being recruited beyond the minimal informational program offered to all participants. Control subjects were told to send in weekly data and use the maps they were given and that they would be contacted once at follow-up.

The study consisted of three data collection phases. The first phase was the intervention and lasted 12 weeks with data collected each week from each participant. The second phase, Follow-up 1, consisted of 1 week of data collected 1 month after the completion of the intervention period (i.e., Week 16). The third phase, Follow-up 2, consisted of 2 weeks of data collected 3 months after the intervention period (i.e., Weeks 23 and 24). At the end of Week 12, all phone contacts and prompting ceased. Thus, Weeks 16, 23, and 24 were used to assess short-term maintenance. Overall, 15 sets of weekly data were collected for each participant over a 6-month period.

### Procedures

Participants attended a 15-min initial training session from which they received walking maps detailing various walking routes with distances noted and handouts on how to enlist walking partners, how to enlist support for walking, and basic strategies for starting (i.e., start slowly and work it into your daily routine). Each participant was also given the ACSM-related goal to walk at least three times each week for at least 20 min each day with a partner. Participants were asked to organize a walking group or at least walk with a partner on a regular

basis to create social support for walking. During the initial training session, the researcher gave participants handouts on how to begin a walking group.<sup>1</sup>

The study involved 14 undergraduate research assistants who were randomly assigned to make telephone contact with the participants. All assistants attended three 1-hr training sessions in which they were given specific scripts for each type of telephone contact. During the fourth training session, and three times during the intervention, quality control assessments were conducted (manipulation checks) of the assistants' telephone call behavior. By using staged calls, the researcher noted whether the assistant was covering the nine items from the high-structure telephone calls or the three items from the low-structure call. The quality control measure was calculated as the number of items correctly reviewed divided by the number that were supposed to be reviewed. The quality control estimate before the intervention began was .98, ranging from .96–1.0. The three quality control estimates conducted during the intervention were all 1.0.

Although the quality control estimate was high, there are still potential research assistant confounds if the same assistant called the same participants each week. To avoid this problem, the assistants were randomly rotated each week for the participants they called. Thus, each participant was contacted by several different assistants over the course of the study, reducing possible research assistant by participant confounds.

### Intervention Elements

Research assistants prompted all participants in the four experimental conditions by telephone. The telephone contacts began in Week 1 for all subjects. The assistants telephoned half the participants once each week (frequent) and the other half once every 3 weeks (infrequent) during the initial 8 weeks of the intervention. During the last 4 weeks of the intervention, the assistants called the participants in the frequent condition once every 2nd week and the participants in the infrequent condition only once to fade the telephone prompting.

The study used two different types of prompting structure: feedback and goal setting (high structure) versus touching base (low structure). In the high-structure condition, research assistants gave the participants specific feedback on frequency, time, and distance walked based on the weekly walking data the participants had sent in to the project. If the participant had walked, the feedback was supportive of the amount of walking the individual had accomplished. If the participant had not walked, the feedback was supportive of future attempts. Also, the assistants set walking goals with the participants for the subsequent week or weeks using a highly structured protocol.<sup>2</sup> The mean time for these telephone prompts was 3 min.

For the low-structure condition, during the telephone contact, the research assistants simply asked the participant "How's your walking program going?" They did not give feedback or conduct goal setting during these calls. The average duration of these contacts was 1 min.

Control participants received no feedback or goal setting or any other type of telephone prompting after the initial training session. Participants in this condition simply received the information and weekly walking logs during their initial training, then sent in their logs each week with no other contact with the program staff.

### Measures

Each week all participants were asked to fill out and mail in to the project a weekly walking log. Ainsworth, Jacobs, and Leon (1992)

<sup>1</sup> Reprints of these handouts can be obtained from David N. Lombard on request.

<sup>2</sup> The reader can obtain the feedback protocol from David N. Lombard on request.

Table 1  
*Characteristics of the Participants in the Intervention*

Measure	Control	Treatment condition			
		Frequent feedback and goal setting	Frequent touching base	Infrequent feedback and goal setting	Infrequent touching base
<i>N</i>	27	27	27	27	27
Age (years)					
M	40.1	36.7	41	39.5	42.3
s <sup>2</sup>	13	10.6	7.3	8.2	9.7
Weight (lbs)					
M	146	150	145	154	155
s <sup>2</sup>	30	21	20	35	32
BMI					
M	19.97	18.75	18.67	20.44	19.96
Stage of readiness					
M	3.6	3.9	3.5	3.8	3.6
s <sup>2</sup>	2.6	1.1	1.7	1.0	1.3
Smokers					
M	3	3	6	2	2

Note. BMI = Weight (kg)/height (meter)<sup>2</sup>

\*For stage of readiness, 1 = precontemplation, 2 = contemplation, 3 = preparation, 4 = action, and 5 = maintenance.

assessed the validity and reliability of self-reported physical activity status and found their subjects' self-reports were reliable ( $r = .85-.88$ ) and valid (self-report correlated with  $VO_{2\max}^2$ ,  $r^2 = .25-.29$ ). Even though activity self-reporting may be reliable and valid, some conservative steps were taken in this study to increase this data's accuracy. First, during the initial training session, participants reviewed instructions on how to fill out the logs. On the logs, the participants indicated for each day of the week how many minutes they walked, how many miles they walked, what time of day they walked, where they walked, and the name and daytime telephone number of the person they walked with on each occasion. Second, study participants filled out the self-report measure daily to further reduce the probability of recall errors. Third, participants exercised with another person, and permission was obtained to periodically contact a participant's exercise partner to corroborate his or her self-report. These steps helped increase the validity and reliability of the self-monitoring as an outcome measure.

There were two main outcome measures in this study: (a) number of participants walking at least 1 day for at least 20 min in a given week in each condition, and (b) number in each condition walking on at least 3 days and for at least 20 min on each day (or meeting the ACSM goal). For each of these outcome measures, nonwalking participants in each condition were included as well as walkers, and their data values were entered as 0. Also, any missing data for a participant were entered as 0. Given that 91% of the logs were sent in, there was little missing data.

### Reliability

The researcher conducted a reliability assessment of the walking logs each week. Each week, 15% of the logs were randomly selected and the individuals listed as walking partners were called to conduct reliability checks. David N. Lombard and Tamara N. Lombard called and asked the participants' walking partners the place (must match exactly), time (must match within 2 hr), and duration (must match within 20 min) they had walked. Reliability of the individual log was the number of matches divided by 3. For example, if a partner correctly noted the place and time they had walked but not the duration, the reliability estimate for that log would be .67. The overall mean reliability estimate obtained by this method was .90, and the reliabil-

ties for each condition varied from .89-.92. Thus, the overall reliability estimate (.90) was acceptable for applied research (Kazdin, 1989).

### Results

Table 1 summarizes characteristics for the sample by treatment condition. There were no differences between conditions on any of the descriptive characteristics. The average participant's age was 40, ranging from 21-63 (slightly older than the area population average), and the average weight was 150 lb (68 kg), ranging from 105-225 lb (47.6-102 kg). At recruitment, about 97% indicated they were in the "action stage," not because they were already exercising, but because they were signing up for this program. The gender frequencies are not shown in Table 1 because almost all the participants were women despite efforts to recruit men and the fact that 54% of the population working at the southeastern university was male.

### Descriptive Data

Table 2 depicts the week-by-week values for the two main outcome variables by treatment conditions. Weeks 1-12 are the data corresponding to the 12-week intervention period, Week 16 is the 1-month follow-up, and Weeks 23 and 24 are the 3-month follow-up data points. An examination of the overall pattern of results across weeks clearly suggests the efficacy of prompt frequency. For example, during Week 24, 63% and 63% of the participants in the high-frequency prompting conditions (high-frequency/high-structure and high-frequency/low-structure, respectively) were still walking, whereas only 26% and 22% of those in the low-frequency prompting conditions (low-frequency/high-structure and low-frequency/low-structure, respectively) and only 4% in the control condition were still walking. Furthermore, even though there was a decline in values for the high frequency of prompt conditions over time, there was a much greater decline in the

Table 2  
A Review of the Two Major Outcome Variables Over the 24 Week by Treatment Condition

Variable	Weeks														
	1	2	3	4	5	6	7	8	9	10	11	12	16	23	24
<b>No. of participants walking</b>															
Control	7	5	5	2	6	4	6	2	2	4	4	2	2	2	1
Freq/Low	23	22	21	19	16	21	18	18	17	11	8	7	18	18	17
Freq/High	25	23	26	25	23	22	19	19	21	20	20	20	18	17	17
InFreq/Low	21	17	10	10	8	10	8	9	7	8	6	8	8	7	7
InFreq/High	19	14	11	12	12	12	12	9	6	6	4	2	7	6	6
<b>No. of participants meeting ACSM goal</b>															
Control	7	5	5	2	5	4	5	2	2	4	4	2	1	2	1
Freq/Low	8	16	10	4	6	15	10	12	12	3	8	7	13	13	14
Freq/High	11	20	16	19	17	17	17	11	16	15	13	12	11	11	11
InFreq/Low	13	10	8	6	6	9	5	8	6	5	5	5	4	3	3
InFreq/High	7	10	8	9	2	6	5	6	4	6	2	2	6	4	4

Note. For all conditions, the values noted are out of a possible  $N = 27$ . Freq = frequent contact; Infreq = infrequent contact; Low = low-structure prompt; High = high-structure prompt. ACSM = American College of Sports Medicine.

low frequency of prompt conditions. The data also suggested there was an interaction between the frequency of the prompt and the content of the prompt, with the high-frequency/high-structure condition outperforming the high-frequency/low-structure condition during the last 3 intervention weeks. Repeated measures analysis indicated this was a significant effect,  $F(1, 54) = 8.19, p < .006$ .

*Survival Analyses*

Statisticians originally designed survival analysis to compare the rates at which patients died across different medical treatment conditions (Cox, 1972). Recently, others have used survival analysis to assess how long it takes for a variety of different events to occur (e.g., dropping out of school; Singer & Willett, 1991). What the researcher must do is specifically define what is death or "right-censored." As long as this criterion is specific, observable, and codable in terms of duration (day, weeks, months, etc.), survival analysis can be used to compare the termination rate across groups.

In the present study, the primary target right-censored criterion was ACSM goals, defined as the week after the last week a participant's walking log indicated he or she met the ACSM goals for frequency (three times or more per week) and duration (20 min or more per exercise bout). For example, if a participant met the ACSM goal in Weeks 1-6 and in Weeks 9-11 but not in any subsequent weeks, the participant right-censored during Week 12. This participant would be assigned the value of 12 weeks for survival analyses. Thus, the survival analysis for this study fit the critical event of discontinuation of exercise meeting ACSM guidelines.

Once the survival values are calculated for each participant, survival analyses are calculated for survival distribution functions for each treatment condition. Last, the analysis conducts LEE-DESU (LD) statistics on the slopes of the different survival distribution functions to highlight any differences between conditions (Cox, 1972).

For this study, survival analyses were conducted using three stratifiers. A stratifier is any method used to delineate treatment groups for analysis. The three stratifiers were (a) treated (the combined four treatment conditions versus the control condition), (b) prompt frequency (once a week contact condi-

tions versus once every 3 weeks), and (c) prompt structure (highly structured conditions versus touching base conditions). Figure 1 depicts the survival distribution functions for each method of stratification. There are large differences between the survival distribution functions for treated conditions versus the control condition, with more participants in the treated conditions surviving beginning at Week 2 and this difference continuing to Week 24. The survival distribution functions for high-frequency versus low-frequency prompt conditions show a similar pattern, with the more frequently prompted participants surviving at higher rates. The content survival distribution functions, highly structured prompts versus touching base prompts, did not show any differences in rate of survival between the conditions over the weeks.

LD values for each set of survival curves indicate there was a significant effect for treated,  $LD(1) = 17.661, p < .0001$ , with higher values for the participants in the treated conditions versus those in the control condition. There was also a significant effect for the frequency of prompting,  $LD(1) = 17.719, p < .0001$ , with the more frequently prompted participants performing better than those prompted every 3rd week. Conversely, there was no significant difference between the prompt structure conditions,  $LD(1) = .007, p < .9349$ .

Further survival analyses were conducted using three different definitions of right-censored to see if a similar pattern of results would occur: (a) Miss1Wk = the first week a participant failed to walk at all, (b) Miss3Wk = the week concluding a period in which a participant failed to walk for 3 consecutive weeks, and (c) Stopped = the week after the last week a participant walked during at least 1 day. Subsequent survival analyses using these three definitions of right-censored reflected the same pattern of results indicated earlier with significant effects for treatment versus control and frequency of prompting, but not for the content of the prompt (see Table 3).

**Discussion**

Overall, this study yielded some significant findings for future research and service programs promoting physical

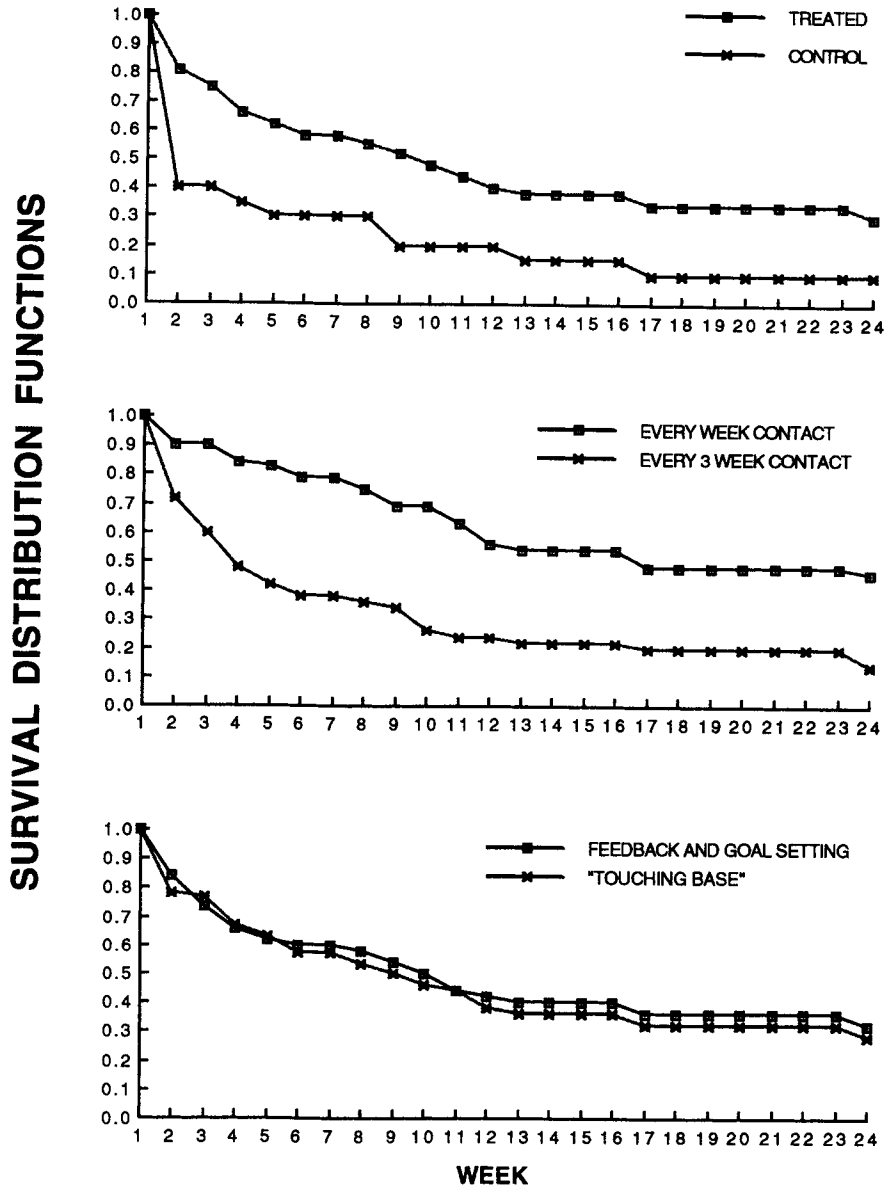


Figure 1. Survival distribution functions for each method of stratification.

activity. First, increasing the frequency of prompting from once every 3 weeks to once every week was a successful strategy for increasing the occurrence of the target behavior, walking. Second, the more frequent highly structured prompting was as equally effective as the frequent low-structure prompting at 6 months. This finding suggested that the feedback and goal setting used in the high-structure prompt were not successful in increasing the target behavior incrementally when added to frequent prompting. However, and perhaps most interesting, although there was no difference for the effect of prompt structure regardless of frequency of prompt at 6 months, there was a difference within the high-frequency conditions during the last 3 intervention weeks, with the high-structure condition outperforming the low-structure condition. This finding suggests the impact of the prompt structure may not be so simple.

The following sections will review specific aspects of this study's procedures, noting how these procedures may be used in other studies as well as some limitations of the present study.

*Why Prompting Appeared to Work*

Prompting may have worked as hypothesized, as a reminder to walk. Thus, the more frequent the reminder was given, the more frequent the behavior was performed. Frequent prompting also may have created negative reinforcement, that is, if participants had not walked during a given week, during the telephone prompt they might have felt (as one participant stated) they "let the program down." Therefore, to avoid the occurrence of negative affect during the telephone prompts,

Table 3  
*LEE-DESU (LD) Statistic Values From Survival Analyses  
 Performed Using Four Different Definitions of Right-Censored  
 With the Independent Variables Treated, Frequency, and Content*

Right-censored definition and stratifier	df	LD	p
Meeting ACSM goals			
Treated	1	17.661	.0001
Frequency	1	17.719	.0001
Content	1	.007	.9349
1st week failed to walk			
Treated	1	23.418	.0001
Frequency	1	17.445	.0001
Content	1	1.570	.2102
3rd week failed to walk			
Treated	1	24.273	.0001
Frequency	1	20.864	.0001
Content	1	2.110	.1463
Last week walked			
Treated	1	25.550	.0001
Frequency	1	24.548	.0001
Content	1	.171	.6795

Note. ACSM = American College of Sports Medicine.

the participants may have performed the prompted behavior, walking. However, regardless of which explanation is correct, the findings for frequency prompting suggest a relatively simple technique for increasing and maintaining physical activity.

The most effective part of this program, frequency of prompting, was easily deliverable through scheduled phone contacts. These contacts took a mean of 1.5 min and cost a mean of \$1. However, unlike other studies (e.g., King et al., 1989), people delivering the prompts were not experienced healthcare workers. Rather, they were undergraduate students who received brief but specific training with a script. The apparent efficacy of such brief training and contact suggests applications of this procedure in settings such as health maintenance organizations and other primary care centers. For example, a minimum program fee could be used to pay the costs of brief but frequent prompts.

#### *Did Structure of the Prompt Make a Difference?*

At 6 months, minimal feedback and goal setting were not significantly more effective in increasing the target behavior compared with simply asking the participants "How's your walking program going?" Yet, during the last 3 intervention weeks, there was a difference for the frequently prompted conditions, with the high-structure prompt condition performing better than the low-structure prompt condition. One possible explanation for differences found in the frequently contacted conditions during the intervention is that the feedback and goal setting were able to maintain the participants' physical activity while the intervention was being withdrawn. Recall that the prompts were reduced from once a week in the high-frequency condition to once every other week during the last 4 weeks of the intervention. Perhaps the minimal feedback and goal setting the participants received in the high-structure prompts were effective enough to counter the decrease in

prompting frequency during the intervention. But what explains the increase from 7 of 27 at Week 12 to 18 of 27 reporting being active at follow-up (Week 23). Presently, any possible explanation may not be possible as this may be a spurious finding. Possible explanations are presently being explored through further research by the authors.

#### *Minimal Treatment*

The control group represented a minimal treatment group. The only intervention these participants received was the recruitment information (consisting of handouts on how to get a walking group started, who to ask, and basic strategies on starting walking and walking maps with mileage estimates included) and the self-monitoring logs. The data for this treatment group indicated this intervention package had little to no effect. For example, the initiation rate was much lower in this group at Week 1 compared with the intervention conditions, and only 2 participants in this group were walking during the follow-up periods (see Table 2). Given the findings for the minimal treatment group, programs using these minimal types of interventions may be suspect because they appear insufficient to initiate and maintain physical activity or achieve any health benefits.

#### *Meeting ACSM Goals and Related Health Benefits*

Survival analyses indicated the more frequently prompted conditions were superior to the other conditions in meeting the minimum ACSM goals for frequency and duration of activity. The ACSM set these goals because they are related to increased health and disease prevention benefits (ACSM, 1990). In this study, 46% of participants in the high-frequency prompting conditions were still adhering to the ACSM goals at 6 months. This rate was much greater than for participants in the low-frequency prompting condition and, most importantly, this adherence rate potentially equates to a clinically significant health benefit impact (ACSM, 1990).

#### *Maintenance Effect*

Telephone prompting continued only through the initial 12 weeks of the program, thus making Weeks 16, 23, and 24 maintenance data points. The participants received no intervention during Weeks 16–24. Evidently, the initial prompts helped to make walking a habit. Then, without the prompts, the participants continued to walk, thus showing maintenance of the behavior. This finding suggests the importance of using effective procedures in the early acquisition stage for exercise, so that behaviors can develop and be consistently fitted into a person's weekly schedule.

#### *Gender*

By far, women were more inclined to respond to the recruitment information than men. Out of a potential population of more than 5,000 individuals (with about 50% each of men and women), only 3 men inquired about and joined the walking program, whereas more than 150 women inquired

about the program. To better understand why the program did not appeal to men, an informal interview was conducted with 22 men from the targeted community. The majority of the men surveyed ( $n = 21$ ) indicated they did not believe walking was exercise. Furthermore, most ( $n = 15$ ) believed walking offered no health benefits. Given these findings and the name of this program (NoonTime Walkers), it was concluded men did not join because they did not believe they would benefit from a walking exercise program. Therefore, to target men for recruitment, future programs need to promote physical activities men believe are exercise and offer them health benefits or start with information and education for men about the benefits of walking.

### Future Research Directions

The results from this study suggest several different future research inquiries. Questions generated by the present study include the following: What level of frequency of prompting maximizes its effectiveness based on both short-term and long-term adherence to ACSM guidelines? Was the interaction between the participant and the research assistant during the telephone prompt important, or would a voice mail- or electronic mail-delivered prompt be equally as effective as the personally delivered prompts (thus offering an effective delivery system at minimal cost)? and Would the procedures used in this study be successful for other target populations (e.g., men) and other target physical activities (e.g., running, biking, and aerobics)?

Finally, given the findings for the behavioral techniques used in this study, future physical activity promotion researchers may want to conduct more studies applying and analyzing the efficacy of specific behavioral techniques (Kazdin, 1989). A number of past physical activity researchers have used behavior change strategies in a less than optimal "apply it and see if it works" manner. If a strategy did not work, it was concluded the strategy was ineffective and another strategy was tried. If a strategy did work, it was then recommended that all programs use it. The present study suggests a more fine-grained factorial design approach to studying intervention strategies for promoting adherence, an approach that has proved effective in other areas of behavior change (Kazdin, 1989).

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