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A pilot study evaluating a peer led and professional led physical activity intervention with blue-collar employees

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Abstract. *Objective:* To measure the effect of a physical activity intervention, based on social cognitive theory, delivered by a peer and a professional leader.
Design: Quasi-experimental.
Setting: Three locations at a large Mid-Western railroad.
Subjects: One hundred and forty-eight skilled labor employees participated: one hundred and twenty completed the study.
Measures: Self-reported energy expenditure, self-efficacy and stages of change.
Results: ANOVA and categorical analysis using rates and proportions were used for evaluation. The peer group had a non-significant short-term increase in energy expenditure of 3%, which returned to baseline post intervention. The professional and control groups showed a non-significant decrease in energy expenditure of 5% and 9%, respectively.
The peer ($p < 0.002$) and professional groups ($p < 0.004$) showed significant increases in average stages scores. The peer group maintained increases over time ($p < 0.001$). The peer and professional led groups showed a 54% and 24% increase in the number of employees reporting regular physical activity over time, respectively. The peer group also showed positive trends in self-efficacy.
Conclusions: The peer intervention enhanced self-efficacy and self-reported physical activity. A job layoff at the professional led site confounded comparisons between locations. Employees reported high energy expenditure and high BMI values, suggesting that a weight management intervention may be more appropriate and appealing in this population.

Keywords: Physical activity, intervention, peer, professional, self-efficacy

1. Introduction

Effective worksite interventions are needed to improve employee health, reduce health care costs, and justify program investment. Clearly, there is a link between modifiable health habits, health risks and health care expenditures at the worksite [7], and physical inactivity is one of the habits linked to increased health-related costs. Progress has been made in improving physical activity at the worksite [18]; however, there remains a need to find additional intervention methods capable of reaching blue-collar employees. This is especially true in highly unionized workforces where environmental (e.g., lack of facilities) and cultural barriers (e.g., real and perceived pressures by union members not to participate) may hinder participation in health

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promotion programs.

Although the effectiveness of peer led interventions has been studied in schools [22], the agricultural industry [23] and prisons [24], there is limited research evaluating the efficacy of peer led interventions at the industrial worksite. Recently, research has shown that peer led interventions utilizing social networks are effective at improving employees' fruit and vegetable consumption at the industrial worksite [20,21]. Still, few industrial worksite studies have evaluated peer leader effectiveness compared to professional leaders, or the efficacy of utilizing peer leaders as instructors for behavior change courses. At least one study, though, has made this evaluation; in 1985, Brownell, Stunkard and McKeon [4] utilized a peer and a professional leader to instruct weight management courses with unionized store workers and found the peer led program was equally effective at helping employees lose weight, and maintain weight loss over time compared to the professionally led program; the peer led program, though, cost one-third less.

2. Objectives

The purpose of this study was to measure the effect of a physical activity intervention, based on social cognitive theory, delivered by a peer leader and a professional leader. Social cognitive theory proposes that an individual's behavior is determined by a reciprocal relationship between a person's characteristics (i.e., cognitive thought processes), a person's behavior, and the environment where the behavior is performed [2]. According to Bandura [2], individual self-efficacy (i.e., one's confidence in performing a particular behavior, including overcoming any barriers to performing the behavior) is the most powerful personal characteristic that determines behavior change, and Dzewaltowski [25] proposes that the reciprocal interaction between the environment and individual cognitive thought processes (i.e. self efficacy, outcome expectations and expectancies) are what influence participation in physical activity. Dzewalaltowski has found that individuals who are exposed to a positive environment, place a positive value on physical activity (i.e., expectancies), and are able to set and achieve realistic goals related to overcoming physical activity barriers (i.e., negative expectations) will have greater self-efficacy, and in turn greater satisfaction and participation in physical activity [25]. Bandura [1] has identified four ways to influence self-efficacy: 1) vicarious experience (i.e., observational learning), 2) verbal persuasion (e.g., encouragement to begin and maintain physical activity), 3) emotional arousal (e.g., activities designed to decrease avoidance behavior due to anticipated physical activity barriers), and 4) performance accomplishments (i.e., actual performance of the behavior in question). Bandura [1] further theorizes that self-efficacy, learning and behavior may be enhanced by using credible role models, especially models that are similar in age, lifestyle or occupation to observers. In this study, we utilized social cognitive theory principles and research to develop a physical activity educational program aimed at enhancing self-efficacy and physical activity, and utilized credible role models as program facilitators.

3. Methods

3.1. Design

The study was quasi-experimental with a nonequivalent test and control group. Outcomes were measured using a pre-test, post-test, and 30 day's post-test. Three worksites were included in the study: a professional led intervention site, a peer led intervention site, and a control site receiving only the pre-test and post-test surveys. The purpose of the control site was to help determine if ongoing health promotion efforts available to all employees were responsible for any effects seen during the study period, opposed to an intervention effect. Study locations were assigned based on the willingness of management to allow employee participation, the availability of a qualified peer leader and professional leader, and travel convenience for the primary investigator. The peer led site was in Northern California, the professional led site was in Idaho and the control site was in Utah.

3.2. Study population

Two hundred skilled labor employees at a large mid-Western railroad company were eligible to participate in the study. All employees were laborers at rail-car repair facilities, and were eligible for the intervention based on their voluntary interest in participating. One hundred and forty-eight participated and one hundred and twenty completed the study.

3.3. Survey instrument

Participants were surveyed at baseline for demographics, energy expenditure, self-efficacy and readiness to change. Excluding demographics, the same survey was administered at four and eight weeks. Additional attendance questions were asked at week four. The primary investigator administered all baseline, four and eight weeks surveys on Thursdays prior to the employee's 7:00am, 3:00pm and 11:00pm shifts.

Energy expenditure was measured with the Seven Day Physical Activity Recall [15], which was modified to be administered in a group format opposed to an individual interview format. Standard instructions for completing the recall were given to each study group. Total hours of activity were converted to total energy expenditure and represented as kilocalories per day. This measure has been shown to be a reliable energy expenditure estimate [3].

Stages of change was measured using a previously validated algorithm [9]. The stages of change model has demonstrated that behavior change is a process that occurs in a series of stages over time; as individuals progress from one stage to another, they become more "ready" to change their behavior [26]. The stages of change are defined as:

- *Pre-contemplation:* the individual is not currently physically active, and does not intend to start in the next six months.
- *Contemplation:* the individual is not currently physically active, but is thinking about starting physical activity in the next six months.
- *Preparation:* the individual currently engages in some physical activity, but not *regularly**.
- *Action:* the individual currently engages in physical activity *regularly**, and has begun doing so within the last six months.
- *Maintenance:* the individual currently engages in physical activity *regularly**, and has done so for longer than six months.

* *Regular* physical activity was defined as VIGOROUS activity performed 3 or more times per week for at least 20 minutes, or MODERATE activity performed 5 or more times per week for at least 30 minutes [18].

Although stages of change is not a component of social cognitive theory, it was added due to its relationship to self-efficacy (i.e., as one's confidence increases, there is a corresponding increase in one's readiness to make a behavior change, and visa-versa) [10]. The investigators also anticipated that the measure would aid in explaining the results of the study.

Self-efficacy was measured using a 12-item questionnaire designed to determine confidence in one's ability to be physically active when facing various barriers [16]. The questionnaire measured two main factors: 1) Making time: confidence in one's ability to make time for physical activity, and 2) Sticking with it: confidence in one's ability to stick with physical activity over time. The questionnaire used a confidence rating from 1 to 5 (1 = "I know I cannot", and 5 = "I know I can").

3.4. Intervention design and materials

Employees voluntarily attended educational courses twice per week, taught by either a peer or a professional educator, for three and one-half weeks; overall, seven courses were held at each location. Each course lasted between twenty-five and forty minutes, and was held during established safety meetings to ensure the program didn't interfere with daily operations, and that employees could attend during paid work time. Multiple courses per week were utilized to reduce attrition rates, since prior research has shown that recidivism is reduced when educational courses are held more frequently over shorter time-periods [4]. Employees were encouraged to attend all sessions, and to make up any missed material by meeting with the course leader and utilizing the self-study materials supplied for the course. Employees not interested in participating in the intervention went to work at their regularly scheduled jobs.

The intervention was designed to increase self-efficacy by emphasizing the value of physical activity (i.e., expectancies), by utilizing activities designed to help employees' recognize and overcome barriers to starting and staying with physical activity (i.e., expectations), and by teaching the basic principles for safe and effective physical activity. Course topics and subject matter are outlined in Table 1. The intervention was further designed to increase self-efficacy by utilizing three efficacy sources: 1) vicarious experience (i.e., use of credible role models to enhance learning), 2) verbal persuasion (i.e., ongoing encouragement by role models), and 3) emotional arousal (i.e., course activities designed to decrease avoidance behavior due to anticipated physical activity barriers). The fourth efficacy source, performance accomplishments (e.g., physical activity such as walking or strengthening ex-

Table 1
Session titles and subject matter

Session one:	The Benefits of Physical Activity – group activities and self-study materials emphasizing the benefits and value of physical activity
Session two:	Making a Plan to Get Fit – group activities designed to help individuals develop personal activity plans; initial discussion and activities regarding barriers
Session three:	Gaining Flexibility and Strength – discussion about stretching and strengthening benefits; guidelines for safety and effectiveness; presentation of sample exercises
Session four:	Getting Aerobically Fit – guidelines for safety and effectiveness; group discussion about the benefits of aerobic activity
Session five:	Managing Priorities, Time and Goal Setting – discussion regarding the importance of prioritizing, time management and goal setting; goal setting activities
Session six:	Breaking Through Physical Activity Barriers – group activities to solve common barriers to starting and staying with physical activity
Session seven:	Sticking with Physical Activity for a Lifetime – completion of a relapse prevention skill assessment; group discussion about relapse prevention strategies

ercises) was not utilized due to liability concerns by the company's management.

A combination of video, group activities, classroom instruction and self-study materials were utilized by the peer and professional leaders to facilitate learning. Self-study workbooks for participants were purchased from commercial vendors and utilized for sessions one through six. Additional self-study materials for session five and session seven were obtained and customized with the vendor's permission.

Peer and professional training and course materials were developed and standardized by the primary investigator, who had a background in health education, and experience designing and implementing worksite health interventions. A standardized leader's kit containing all session materials including course outlines was provided to both the peer and the professional course leader. Managers and supervisors were briefed about the intervention prior to implementation, and agreed to support it.

3.5. Peer leader selection and training

The peer leader was a forty-nine year old laborer at the intervention site, had prior experience in employee training and was a past Union representative. He was selected by management based on the following criteria: 1) voluntarily interested in facilitating the courses, 2) considered a group opinion leader, 3) considered credible and respected by a broad range of employees, 4) physically active or interested in becoming physically active, 5) proven ability to take on responsibility, 6) good facilitation skills, and 7) good listening/empathy skills.

Peer leader training was conducted in a four-hour training session. Weekly conference calls were also used to provide additional training, discuss upcoming session materials, answer questions, address concerns and debrief from prior sessions. The peer leader was trained in the following areas: adult learning principles/techniques (i.e., small group discussions and the use of discussion questions), a basic introduction to the theoretical model, the proper use of course materials, basic presentation skills, and basic physical activity principles. In addition, the peer leader was updated on physical activity resources available at the worksite. Successful peer education programs have used similar selection processes, selection criteria, training topics and formats [4,14,19].

3.6. Professional leader selection and training

The professional leader was a physical activity professor at a university in Idaho, located in the city where the study was conducted, who was thirty-five years old. He was trained in a two-hour training session that included an orientation to the worksite (i.e., site logistics and an introduction to management), an introduction to course materials, and an overview of physical activity resources available to employees at the worksite. Weekly conference calls were also used to provide additional training, brief the leader on upcoming session materials, answer questions, address concerns and debrief from previous sessions. Compensation was provided for each course taught.

4. Results

A total of 120 employees completed the baseline, four and eight week's surveys. The professional led group started with 71 employees and ended with 55 for a completion rate of 78%. The peer led group started with 49 and ended with 37 for a completion rate of 76%.

Table 2
Demographic variables by site

	Site 1 $n = 55$ Professional	Site 2 $n = 37$ Peer	Site 3 $n = 28$ Control
Continuous Data	Mean (SD)	Mean (SD)	Mean (SD)
*Age	40.9 (10.8)	48.2 (6.0)	42.0 (11.0)
*Body Mass Index	27.7 (4.54)	30.0 (4.9)	27.7 (4.5)
Weight	193.8 (40.3)	207.5 (34.1)	196.0 (34.7)
Kilocalories per Day	3505 (826.8)	3533 (913.9)	3487 (1172.3)
Self-efficacy			
Stick to it	3.7 (0.92)	3.8 (0.94)	3.6 (0.99)
*Make Time	3.98 (0.87)	4.1 (0.90)	3.96 (0.79)
Categorical Data	Percent	Percent	Percent
Education			
$<$ than High School	0.0%	2.7%	3.6%
High School	57.1	67.6	46.4
Some College	42.9	29.7	50.0
Marital Status			
Married	87.5%	75.7%	78.6%
Not Married	12.5	24.3	21.4
Smoking status			
Current Smoker	16.1%	22.9%	35.7%
Non Smoker	83.9	77.1	64.3
Stage of change			
Precontemplation	3.6%	5.4%	0.0%
Contemplation	8.9	24.3	10.7
Preparation	69.6	40.6	60.7
Action	3.6	2.7	7.2
Maintenance	14.3	27.0	21.4

*Significant main effects: age, $F(2, 118) = 6.81$, $p < 0.002$; body mass index $F(2, 118) = 3.14$, $p < 0.05$; making time for physical activity (self efficacy), $F(2, 118) = 3.86$, $p < 0.02$.

All 28 employees in the control group completed all surveys. All but one of the 120 participants was male, the average weight was 198 pounds and the average age was 43.4 years. At least 98% of participants had at least a high school education, 82% were married, and cigarette use was reported by 23%.

Statistical analyses were conducted using the SAS/STAT Software (SAS Institute Inc; 1999, Cary, NC). Control variables were used to determine baseline differences between groups. Using multi-variate analysis on the continuous control variables, and chi-square analyses on the categorical control variables, it was determined that there were no significant differences at baseline among the three groups on the following measures: education level, marital status, smoking, stages of change, kilocalories per day, and body weight. However, there were significant differences in age $F(2, 118) = 6.81$, $p < 0.002$, body mass index $F(2, 118) = 3.14$, $p < 0.05$, and in the making time component of the self-efficacy measure $F(2, 118) = 3.86$, $p < 0.02$. Table 2 shows the group means and percentages for each of the control variables by site.

Using a two-way factorial ANOVA with repeated measures, the main group, time (i.e., baseline, four and eight weeks) and group by time interaction effect was evaluated. When evaluating energy expenditure, there was no significant difference between groups at baseline, four or eight weeks. The professional and control groups experienced a non-significant decrease in energy expenditure of 5% and 9% from baseline to eight weeks, respectively. The peer led group experienced a non-significant increase of 3% from baseline to four weeks, followed by a return to baseline at eight weeks (Fig. 1).

Both the peer led and professional led groups showed a small, non-significant increase in flexibility activity of approximately one minute and two minutes per day from baseline to four weeks, respectively. However, the time spent doing flexibility activity in the professional led group decreased below baseline at eight weeks, while the peer led group continued to increase.

The five stages of change (i.e., precontemplation, contemplation, preparation, action, and maintenance) were assigned the following values: 1, 2, 3, 4, and 5 respectively. The stages scores were then averaged and

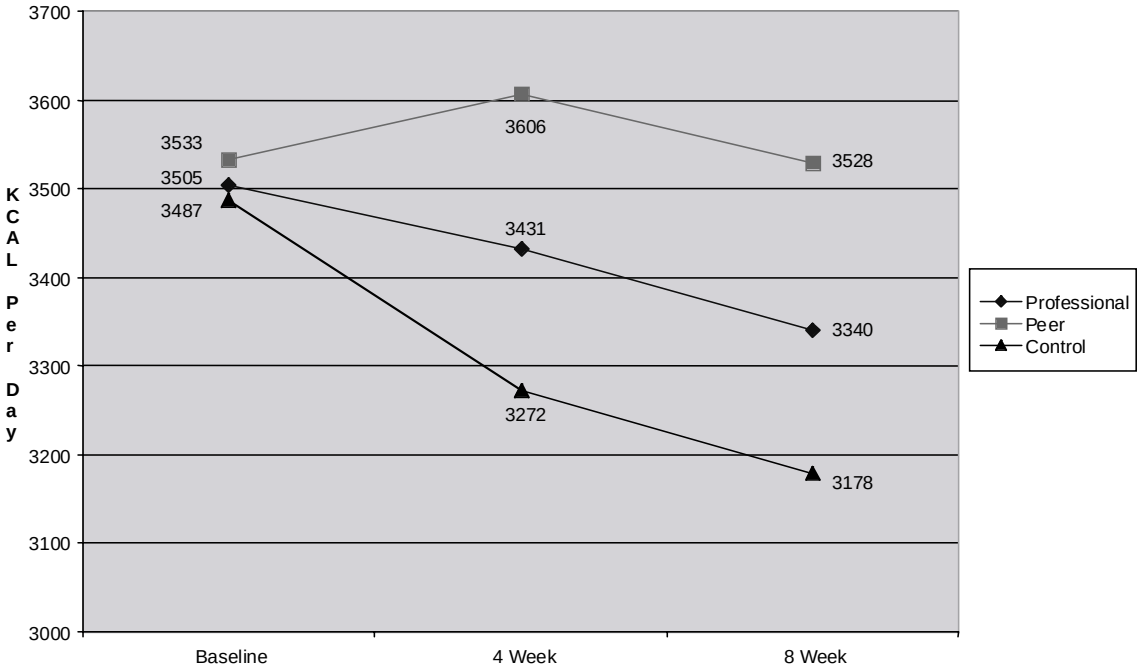

Fig. 1. Total energy expenditure mean kilocalories per day.

evaluated. As shown in Fig. 2, both the peer and professional led groups had higher average stages scores across time compared to the control group. A simple effects analysis demonstrated that the peer led group had a significant increase in stages scores with the four week and eight week scores being higher than baseline $F(1, 36) = 16.56$, $p < 0.0002$ and $F(1, 36) = 21.91$, $p < 0.0001$, respectively. The professional led group had a significantly higher average stages score at four weeks vs. baseline, $F(1, 54) = 9.22$, $p < 0.004$, but not at eight weeks.

Figure 3 represents stage movement for employees who began the intervention in either the precontemplation, contemplation or preparation stages. At baseline, the number of employees in these three stages for the professional, peer and control groups was 45, 26 and 20, respectively. The professional led group experienced a 27% increase in the number of employees in action or maintenance at four weeks, which decreased to 24% at eight weeks. The peer led group experienced a 32% increase in the number of employees in action or maintenance at four weeks, which increased to 54% at eight weeks. The control group had a 12% increase in employees in action or maintenance at four weeks, with all of these employees relapsing to baseline at eight weeks.

Individuals who reported beginning regular physical activity post intervention were evaluated further to determine energy expenditure before and after the intervention. There was a 6% decrease in energy expenditure in the professional led group and a 1% decrease in the peer led group. Additional analysis revealed that individuals in the professional and control groups who reported regular physical activity pre and post intervention experienced a 12% and 8% decrease in energy expenditure, respectively; however, individuals in the peer led group experienced a 5% increase.

The two main components of the 12-item self-efficacy measure, "stick to physical activity" and "make time for physical activity", were compared between groups and across time (Fig. 4). Within the stick to it measure, there was no significant group, time or group by time interaction effect. There was, however, an increasing group and time trend in the peer led group. Within the make time for physical activity measure, there was a significant group effect $F(2, 114) = 3.17$, $p < 0.04$, with the peer led group having higher scores than either the professional led or control group at all points in time. There was not a significant time effect within the make time measure; however, the measure approached significance at four weeks $F(1, 36) = 1.79$, $p < 0.07$, and at eight weeks $F(1, 36) = 1.01$, $p < 0.06$.

Self-reported attendance data showed that 70% of employees in the peer and professional led groups at-

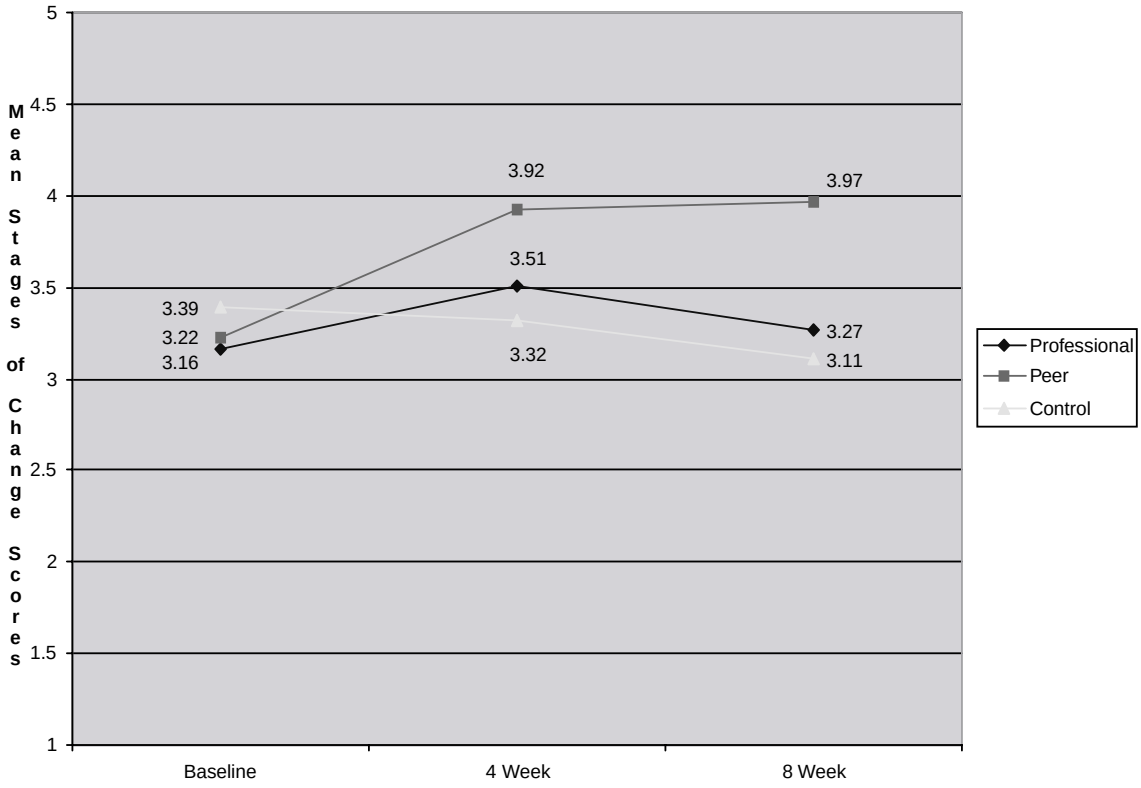

Fig. 2. Mean stages of change.

tended six out of seven sessions. In the peer led group, more than 70% of employees who missed a session reported making up the missed material. The most common way material was made up was to meet with the peer leader to make up the class and/or obtain self-study materials. Only 15% of employees at the professional led site made up missed material.

5. Discussion

The purpose of this study was to measure the effect of a physical activity intervention, based on social cognitive theory, delivered by a peer and a professional leader. The original hypothesis was that there would be no difference in the intervention effect between the peer led, professional led and control groups.

Study locations were assigned and separated geographically, which introduced potential site biases. In addition, the study at the professional led site was confounded by an unforeseen job layoff announcement. Before the four-week survey, there was a rumor of a potential layoff. One week later the job layoff was confirmed, and two months later more than 80% of the workforce was reduced. All data were examined for confounding by age, education and smoking; there was no indication of confounding by these variables in the intervention groups. It is possible, though, that energy expenditure in the control group was a function of age. However, this result was in an unexpected direction with older employees expending more energy than younger employees. This result is a function of a greater number of employees forty years of age and older reporting at least some physical activity at eight weeks versus baseline, compared to employees under forty years of age who reported less physical activity at eight weeks compared to baseline. The reason for this increase in physical activity in the older employees compared to the younger employees is unknown, and beyond the scope of this study.

Seasonality may have affected energy expenditure at eight weeks in all groups. The baseline survey was administered in October, one week before the intervention. Post-test surveys were administered in early November and December. Seasonality research has demonstrated that both exercisers and non-exercisers experience decreases in energy expenditure during the winter months [5], and that peak activity phases occur

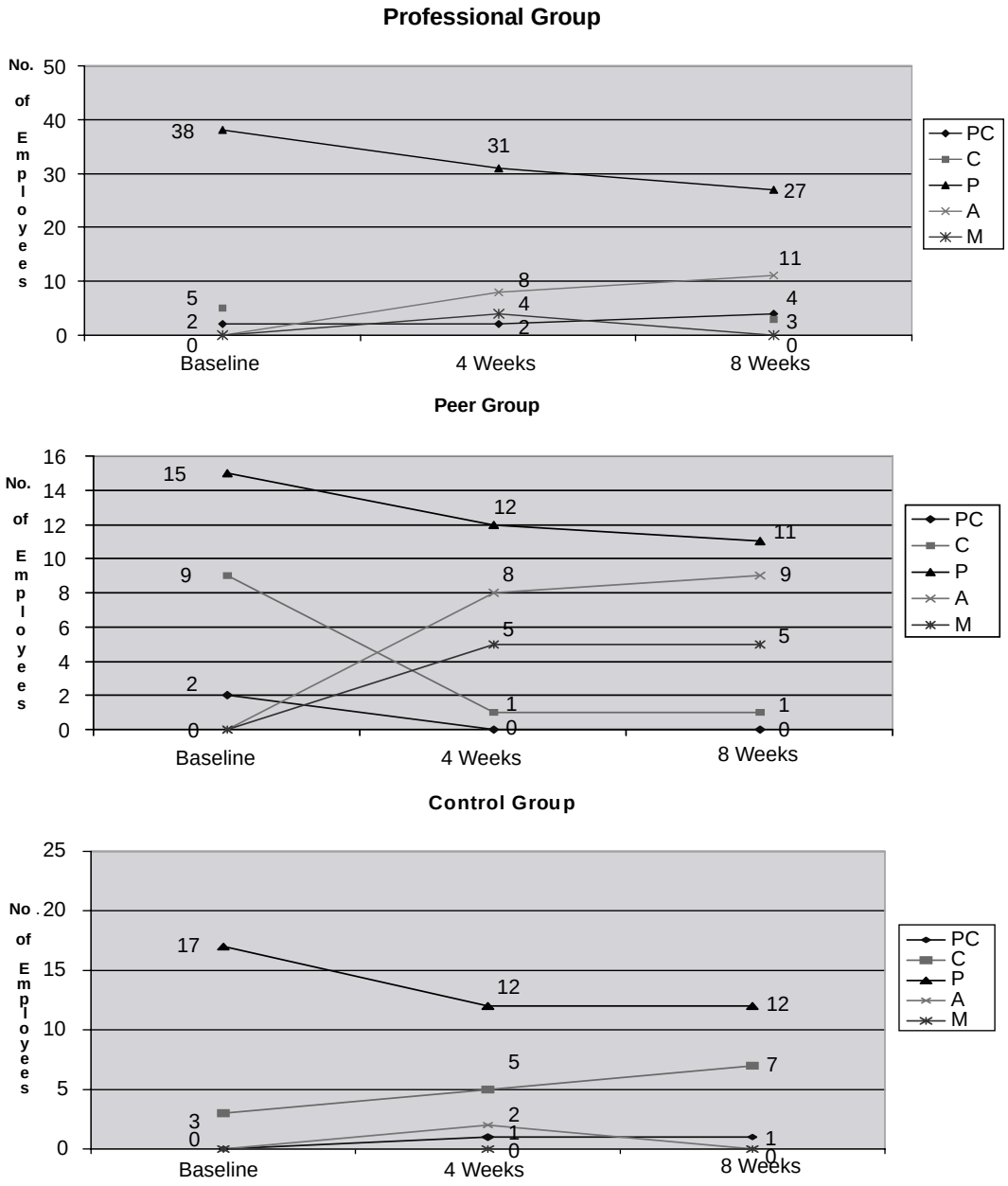

Fig. 3. Number of employees in precontemplation, contemplation and preparation at baseline, 4 weeks and 8 weeks. PC = Precontemplation; C = Contemplation; P = Preparation; A = Action; M = Maintenance.

in late summer [17]. Ideally, the study would have been implemented during the spring or summer months. However, the study was financed by the company where the study was conducted, and finances could not be guaranteed after the start of the new-year; therefore, the study was conducted in the fall.

The energy expenditure results for each group in this study tend to agree with the seasonality research cited above. For example, individuals who reported regular physical activity after the intervention showed a small decrease in energy expenditure. Interestingly, though, the peer group had a smaller decrease than the professional group, which isn't unusual considering there is less seasonal variation in Northern California compared to Idaho. Individuals in the professional and control groups who categorized themselves as regularly

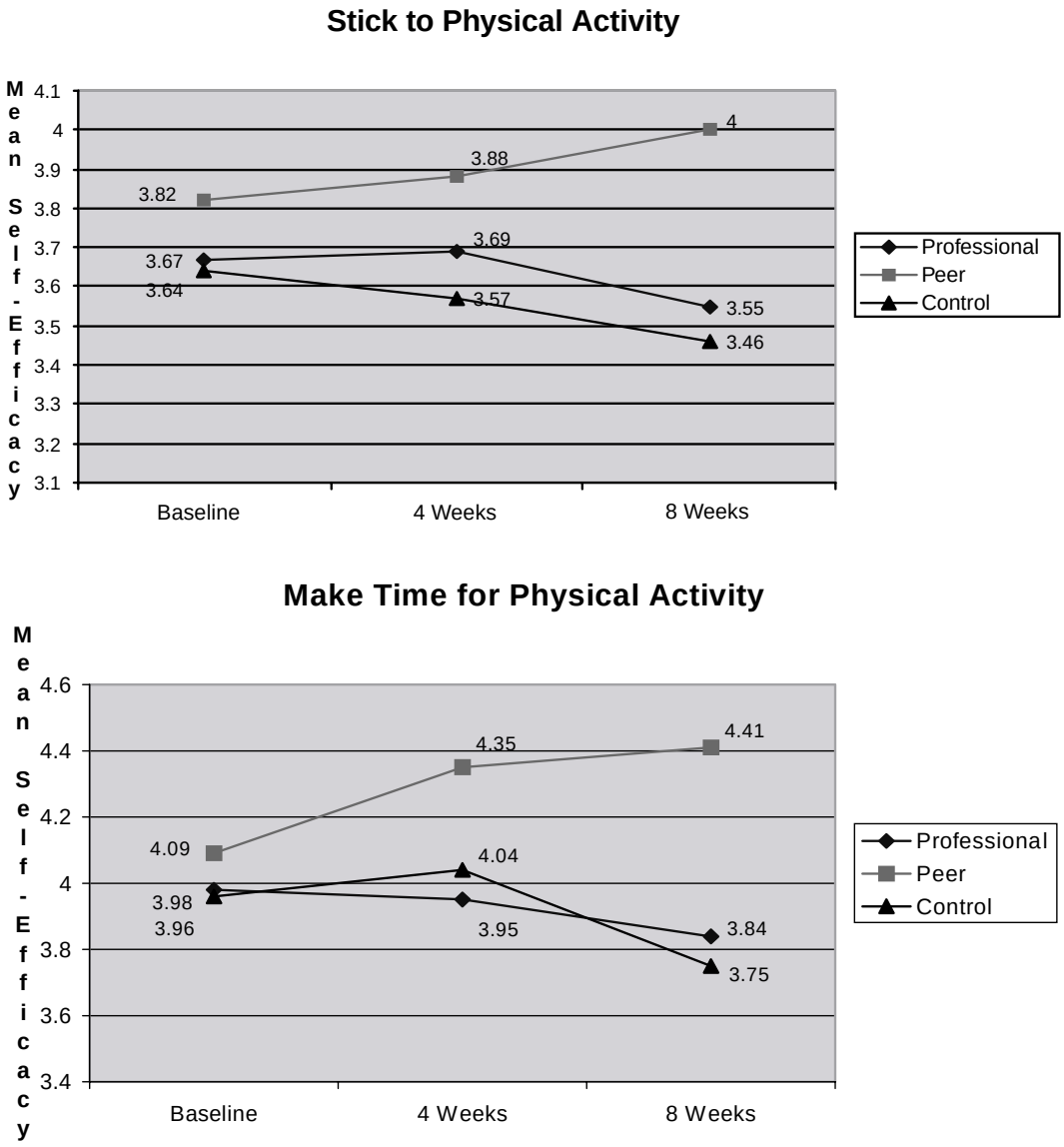

Fig. 4. "Stick-To" and "Make-Time-For" physical activity score.

physically active before and after the intervention also showed decreases in energy expenditure. Conversely, the peer group reported a small increase, which suggests that the intervention may have provided a buffering effect against seasonality for these employees. An additional buffering effect may have occurred in the professional led group, which reported a less rapid decrease in energy expenditure than the control group. Considering the similarity in seasons between the two groups, this hypothesis is not unreasonable. However, the differences between the sites could also represent natural differences in the activity preferences of employees in Utah and Idaho.

Despite seasonality, there was a significant increase in average stages of change scores in both the peer and professional led groups. Both intervention sites had an increase in the number of employees who categorized themselves as physically active at eight weeks. This is an encouraging intervention effect, and suggests that there was an increase in physical activity, although it did not result in increased energy expenditure. This result isn't unusual given the potential effects of seasonality discussed earlier. Still, we expected more employees to initiate physical activity post intervention. There are at least two plausible explanations why this did not occur: First, the intervention was purely vicarious-

based (i.e., based on observational learning methods only). Bandura [1] has stated that performance-based interventions are far superior to vicarious-based, and McAuley and coworkers have demonstrated this in a recent physical activity study [12]. Although walks or other physical activity could have served as performance accomplishments, this was not feasible due to liability concerns by the company's management. Second, there may be an inherent challenge in motivating skilled labor employees to adopt leisure time physical activity. The mean energy expenditure for the peer led group at eight weeks was 3528 kilocalories. In the Stanford Five City Project [15], skilled labor employees reported expending 3557 kilocalories, while white-collar managers reported expending 3112. To meet the energy expenditure level reported by the peer led group, a white-collar manager in the five city study would have had to expend an additional four hundred and sixteen kilocalories per day. Viewed another way, a white-collar manager weighing ninety kilograms would have had to do approximately twenty-eight minutes of vigorous physical activity per day at 10 METs to reach an equivalent energy expenditure level. This is more than three times as much vigorous physical activity as recommended by the Surgeon General (i.e., 20 minutes, three days per week) [18]. Considering the high level of energy expended by skilled labor employees during occupational activities, it is possible that they have little extra energy for leisure time physical activity.

Despite the high energy expenditure levels in the present study, mean Body Mass Index values were in the overweight and obese categories (i.e., > 25, and > 30, respectively) as classified by the National Institutes of Health [13]. This suggests that a weight management program with an emphasis on proper nutrition and eating habits is needed in this population. Skilled labor employees may also be more receptive to this type of program given their high level of occupational energy expenditure.

On an optimistic note, there was an increasing trend in flexibility activity in both intervention groups at four weeks, which continued to increase at eight weeks in the peer led group. Although these increases were insignificant, skilled labor employees may be receptive to programs emphasizing light activity given their high energy output at work. Employees in this company were required to do pre shift stretching activities (e.g., low-back and leg stretches) and the increase in flexibility activity may represent improved compliance to this requirement, which was a desired outcome by management. In the professional led group, a decrease in flexibility activity occurred after the announcement of the job layoff, which likely represents reluctance by employees to participate in required stretching.

Additional optimism is warranted given the positive trends in both of the self-efficacy measures in the peer led group, with the make time measure approaching significance at four and eight weeks. This result is very encouraging considering a lack of time has been identified as the most common barrier to a physically active lifestyle [6]. In a larger study population this trend may have reached significance. More encouraging is the fact that both self-efficacy measures, the average stages of change scores and the number of employees categorizing themselves as regularly physically active continued to increase at eight weeks in the peer led group; one month after the intervention ended. One advantage of peer leaders is their ability to provide ongoing support in the work-social environment, and the continued increase in confidence and physical activity may be the result of this support.

On a less encouraging note, there was a decreasing trend in both self-efficacy measures in the professional led group. It is possible that occupational and age dissimilarities between the leader and the group contributed to the decreasing trend in self-efficacy, which would agree with Bandura's assertions that self-efficacy is enhanced by similar models [1]. The decreasing trend in self-efficacy may also be related, though, to the threat of job loss. Although it is known that general self-efficacy is affected by stressful life transitions [8], less is known about how the threat of job loss affects physical activity self-efficacy or behavior. Social cognitive theory asserts that perceived inefficacy to cope with an aversive threat leads to avoidance behavior [2]. In this study, individuals may have been attempting to cope with two aversive threats: 1) initiating physical activity and 2) job loss. It is likely that the majority of individuals placed a higher priority on coping with the job loss opposed to initiating physical activity. Maslow [11] has suggested that individuals strive to meet lower-level survival needs before devoting energy to higher level personal needs. Conceivably, a higher-level need such as physical activity may have become a lower priority for the group by the time the second post-test was administered.

6. Study limitations

First, all data were self-reported. Although the energy expenditure results in this study agree with the

seasonality research, there was considerable variability between surveys. This variability may represent actual activity patterns, but could also represent reporting error.

Second, the format of the Seven Day Physical Activity Recall introduced limitations since occupational activities and aerobic activity at home, at work or in a fitness center were grouped together to form one category. Consequently, it was impossible to determine the contribution of each to increases or decreases in energy expenditure

Third, the effect of the intervention on the environment was not measured. Consequently, we could not determine if the intervention affected social support.

Finally, the study was voluntary and self-selection was possible. However, more than 70% of employees who completed the study were in the precontemplation, contemplation or preparation stages of readiness at baseline, which suggests the course attracted individuals who were in need of additional physical activity education.

7. Conclusions, implications and recommendations

The results of this study suggest that the peer led intervention increased physical activity and enhanced self-efficacy slightly more than the professional led intervention. Although these results imply that the peer led intervention was more effective than the professional led, more controlled research is needed considering the biases and confounders present in this study.

Based on the energy expenditure and body mass index values, weight management interventions may be more appropriate for skilled labor employees at this worksite opposed to physical activity interventions alone. These interventions may also be more appealing considering the high occupational energy expenditure reported by these employees.

When designing similar interventions, researchers and practitioners are encouraged to include performance accomplishments (e.g., walking) if feasible, which may have improved self-efficacy and behavior, to target interventions during warmer months to avoid seasonality effects, and to include a measure of social support. When using the Seven Day Physical Activity Recall in blue-collar populations, researchers are encouraged to separate occupational and aerobic activity.

The professional led study is an example of the challenges faced by worksite health promotion researchers and practitioners. Layoffs can dramatically impact health promotion initiatives, and may affect an individual's self-efficacy, and the priority placed on physical activity. More research is needed to understand how downsizing affects health behaviors.

A success worth noting was the high participation rate in pre shift safety meetings. The use of these meetings attracted non-exercisers, did not interfere with worksite operations, and allowed employees to attend the course during work time.

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