

FACTORS ASSOCIATED WITH PARTICIPATION IN A WORKSITE WELLNESS
PROGRAM TO PROMOTE PHYSICAL ACTIVITY

by

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Abstract

Background: Many adults spend a majority of their time at work engaging in primarily sedentary behaviors. Creating a health-promotion program can increase awareness of the importance of physical activity as well as provide benefits to the employee and employers.

The main purpose of this study was to compare physical activity, motivation and support levels between participants and non-participants of a workplace movement challenge. Additionally, we examined factors associated with average steps and reasons for participating and not participating in the challenge.

Methods: Information about the four-week movement challenge was sent by email to all employees. Steps were monitored by personal activity trackers (e.g. pedometer, Fitbit, etc.) and self-reported at the end of each week. Steps were averaged within departments and a departmental leader board was posted weekly to encourage competition across campus. All individuals who participated in the program were invited to complete a brief follow-up survey one month later. Non-participants of the program were invited to complete a similar survey at the same time. To analyze the data we used t-tests and correlation tests.

Results: Of the 6,798 employees who received an email about the Movement Challenge, 650 (9.6%) submitted at least one survey and 376 completed all four surveys. Results of the follow-up survey showed employees with a departmental team leader accumulated significantly more steps than employees without a team leader ($p = 0.03$). Additionally, average steps were significantly associated with both social support ($r = .21$; $p < .01$) and motivation subscales including identified regulation and intrinsic regulation. Those who enrolled in the program reported they liked the tracking/accountability and departmental competition best. Participants of the program reported greater total physical activity ($p < .001$), total social support ($p < .001$), introjected regulation ($p < .001$), identified regulation ($p < .002$) and intrinsic regulation ($p < .01$) levels compared to those who did not enroll in the program.

Conclusion: Worksite wellness campaigns can increase physical activity among employees, but additional strategies are needed to increase participation. The results of this study suggest future programs should increase competition and increase contribution from team leaders. They should also include team support across departments to build support within the program.

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Chapter 1: Introduction

Physical activity has been shown to have a number of positive associations with health. Higher physical activity participation can lead to a decrease in chronic diseases, obesity, bone and joint diseases and can enhance brain function (Warburton, Nicol & Bredin, 2006). The 2008 physical activity guidelines for Americans were established by the United States Department of Health and Human Services (USDHHS), and completed by the physical activity guidelines advisory committee. These guidelines were established to create healthier and more active behaviors in Americans. The recommendations include a minimum of 150 minutes aerobic activity with moderate intensity, or 75 minutes of vigorous aerobic activity each week. Muscle strengthening activities should be included a minimum of twice a week (USDHHS, 2008). Even when presented with the benefits, less than half of US adults were considered physically active by meeting their recommendations, in fact, a study by Carlson and associates (2010) found that only 28.4% of Americans were considered highly active, and 18.2% met both the aerobic and muscle strengthening recommendations (Carlson et al., 2010). Increasing physical activity is a serious concern for public health and walking is the most popular methods for achieving activity recommendations.

A growing trend in today's population is the relevance of step count in association with physical activity recommendations. In a study on the use of pedometers in daily exercise Hatano recommended an average of 10,000 steps each day (Hatano, 1993). Marshall and associates looked at daily average steps in association with meeting physical activity recommendations. Data from this study showed that walking at a rate of

more than a 100 steps per minute could account for moderate physical activity. This means walking a hundred steps per minute for a duration of 30 minutes could account for 30 minutes of moderate physical activity in one day. From this the study concluded that walking at least 3000 steps for a duration of 30 minutes or walking 1000 steps in ten minute bouts for five days a week would help meet the moderate intensity physical activity guidelines (Marshall et al., 2009). The use of pedometers can help increase activity and allow individuals to reach their physical activity recommendations.

Many adults spend a majority of their time in a sedentary work environment. However, the workplace can be an ideal location to promote physical activity and healthier lifestyles. Creating a health-promotion program can raise awareness of the importance of physical activity, as well as provide incentives for engaging in a physically active lifestyle. According to Baicker and associates (2010), a company will see various benefits from health promotion programs including reductions in medical cost, greater productivity, and a decrease in absentee days. After implementation of health-promotion programs, companies observed a drop of \$3.27 in medical costs for every dollar spent on the program. The companies also observed a drop in absentee days, which saved \$2.73 for every dollar spent on the program (Baicker, Cutler & Song, 2010). These numbers are associated with the fact that, in general, health programs promote healthier lifestyles and behaviors. The change in behaviors and choices decreased the number of medical visits and sick days employees took each year. This significantly reduced health care cost for companies involved in various worksite wellness programs (Baicker et al., 2010).

Worksites are an ideal location for wellness programs because they provide access to a wide range of people in a controlled environment without expending a lot of

money and time. A study done by Leahey and associates (2012) on effects of teammates and social support found a work environment to be conducive for creating social support and motivation within employees. This program found that colleagues have a strong impact on each other's activity levels and behaviors because they share similar circumstances. This connection allows colleagues to provide adequate support and motivation for one another. They also found that positive health trends grow between colleagues as well. Team-based programs can create more physically active behaviors, as well as smarter lifestyle choices like smoking cessation and healthier food consumption (Leahey et al., 2012). Worksite wellness programs are conducive to generating healthier lifestyle choices in employees by creating support and motivation within the workplace. The work environment can create positive perceptions of active behaviors and encourage individuals to engage in a healthier lifestyle.

Research was done on a worksite wellness challenge conducted in a university setting aimed to promote a more active lifestyle of faculty and staff. The first aim of this study was to examine factors associated with average steps participants of the program took throughout the movement challenge. We hypothesized that the presence of team leaders and colleagues would increase average step count of individuals involved in the program. The second aim of this study was to examine the most frequently reported reasons for participating and not participating in the worksite wellness movement challenge. The third aim of the study was to compare physical activity, motivation and support levels between participants and non-participants of the worksite wellness movement challenge. We hypothesized the individuals involved in the movement challenge would report higher levels of physical activity, motivation and support.

Chapter 2: Literature Review

In a typical work environment, individuals spend a majority of their day sitting at a desk. More than three quarters of a workday is spent inactive with extended sedentary sessions of greater than thirty minutes. With the long amounts of hours spent at work, it is becoming more important for work environments to be supportive of employee health. Increased activity can be accomplished by developing worksite wellness programs to encourage employees to engage in a more active lifestyle (Thorp et al., 2012).

Benefits

The implementation of a wellness program has resulted in many different benefits for worksites. These benefits vary from health improvements, improved cognitive function, and cost reduction. These benefits will affect each individual in the company as well as the company as a whole (Fletcher et al., 1996).

Health improvements stem from the increased physical activity levels facilitated by the worksite wellness program. Fletcher and associates (1996) looked at the effects and benefits of worksite wellness programs. They found wellness programs can alter activity levels by creating more physical activity opportunities and raising awareness. Increases in activity can improve the health of many employees and play a role in the prevention of primary and secondary diseases. Exercise improves health by increasing cardiovascular functional capacity and decreasing myocardial oxygen demand. This allows individuals to increase cardiac output allowing more blood to be delivered to the exercising muscles. This results in beneficial changes to hemodynamic, metabolic, neurological, and respiratory function. Improvements in cardiovascular functionality will decrease the chances of cardiovascular disease and mortality. Increases in activity also

help control blood lipid abnormalities, diabetes, and obesity. Exercise is significantly linked with lowering blood pressure in hypertensive individuals (Hagberg et al., 1990). Creating lower systolic and diastolic blood pressure will decrease the chances of blood clots lowering the likelihood of a stroke (Fletcher et al., 1996).

Physical activity also improves cognitive functioning. Improved cognitive functioning increases productivity and effectiveness within an organization. As an individual ages, the risk for cognitive impairment increases. Exercise is neuro protective; it has been positively correlated with influencing brain areas and behaviors (Spirduso, 1980). Aerobic exercise is sufficient for enhancing hippocampal volume and improved memory function (Erickson et al., 2010). This can greatly influence work efficiency and productivity. Along with brain volume, exercise affects psychological functioning as well. A highly active individual shows better cognitive functioning, reduced cardiovascular responses to stress, and fewer symptoms of anxiety and depression (Fletcher et al., 1996). Psychological improvements contribute to a more useful work environment. Employees will have better management of stress and anxiety, resulting in more efficient work and meeting deadlines. Better cognitive function allows individuals to produce better ideas and results in their work fields.

Additional benefits from a worksite wellness program include reductions in health care costs. A company can see positive health care returns within a short time after the implementation of the program. A study found that, on average, ninety percent of companies with a worksite wellness program found a savings of \$358 per employee per year, through reduced health care costs. The investment savings of these programs showed that for every dollar spent on the wellness program \$3.37 was saved (Baicker,

Cutler & Song, 2010). This demonstrates that a wellness program is a valuable investment and will likely achieve positive returns from a financial perspective. Health care savings will continue to improve the longer the program is active. A program implemented at least three years will see the greatest health care savings. These savings will come from the prevention of costly chronic diseases and lowered employee health risk (Aldana et al., 2005). Many companies would greatly benefit from a reduction in health care cost as a result of a worksite wellness program.

A short-term benefit that companies will see from a wellness program is a reduction in health-related absentee days. Results from several worksite wellness programs show a significant difference in absentee days between those who participate in the program and those who do not. There is a higher rate of missed days in individuals who did not participate in the wellness program. Studies on various programs showed that individuals who participated in wellness programs took twenty percent fewer absentee days than those who did not participate in the programs. This difference in absentee days had a large economic benefit and saved the company money (Aldana et al., 2005). Wellness programs can improve health and decrease company cost by decreasing absentee days taken by employees.

Worksite wellness programs have achieved many different benefits for companies. These programs have shown to improve health, improve cognitive functions and achieve cost reduction for the company. Implementation of a worksite wellness program can be worth the initial cost and show positive gains within a company.

Previous Research on Worksite Wellness Programs

Multiple wellness programs are being developed within communities, schools, and worksites to promote active behaviors. There are several programs finding success in creating healthier lifestyles and behaviors of their employees. For example, Polacsek and associates (2006) developed a “Move and Improve” program in Maine designed to motivate individuals to choose a healthier lifestyle and increase their physical activity. This wellness program was placed in schools and worksites throughout the community in eastern Maine. The program ran for twelve weeks. Baseline data showed that more than half of the participants of the program were involved in minimal or no regular physical activity. The program consisted of individuals tracking their activity and logging it. They received encouragement and tips for continued participation and physical activity throughout the program. After the completion of a twelve-week program, the post-test data found a significant increase in physical activity and only 5% of the participants in the program still remained inactive or had minimal activity levels. This program was able to motivate participants of the program to engage in more activity and had a large impact on their lifestyles and risk behaviors (Polacsek et al., 2006).

A similar program was developed at the University of Michigan to promote physical activity for faculty, staff, and graduate students. Buis and associates (2009) created an online program that offered a physical activity log, goal setting, motivational emails, and team competition to encourage physical activity. The program found after eight weeks that 11% of participants in program met their physical activity goals. The team competition aspect of the program was found to be the most effective in increasing physical activity in participants of the program. The individuals who participated in the

team competition were more likely to meet their goals because of social support and encouragement from others. Overall only 11% showed changes in their behavior, but this study's strengths were in the competition aspect where the greatest effect was seen on those who participated in the program. The program created competition within its employees which resulted in the most significant behavioral changes (Buis et al., 2009). While most worksite wellness programs have similar goals, programs can focus on different variables and outcomes.

A ten-week pedometer based worksite wellness program, developed by Faghri and associates (2008), aimed to increase activity levels during work hours by increasing amount of steps taken each day. The program's goal at the end of the ten week challenge was to achieve more activity in the day by motivating employees to take stairs, park further away, and use break times to get active. The results of the study showed an average increase in activity of employees as well as an increase in average calories burned each day. The walking program was also found successful in helping employees reduce their blood pressure levels. The results of the study showed that with more activity better stress control was reported as well. This study shows that using pedometers, offering online motivation tools, and providing social support throughout the worksite will improve many health aspects. This program was successful in decreasing sedentary times spent at work as well as obesity levels and health care costs (Faghri et al., 2008).

With the greater need to increase activity levels, many different employers are placing wellness programs in their organizations. A study done by Blair and associates (1984) evaluated a health-promotion program for educators in various schools. This program involved three experimental schools and one randomly selected control school.

The main purpose of this program was to increase health and fitness of the faculty members in the schools. The study consisted of before- and after- school sessions to educate faculty on physical activity and spousal support. There was also a fifty-five minute supervised physical activity session after school one day a week. These physical activity sessions contained guidance, feedback, and reinforcement. This study found a significant increase in exercise and fitness of the faculty in the experimental schools compared to the control school. Along with the increased activity individuals involved in the program also had a net reduction of 4.5 pounds and 4% reduction in fat. Along with health changes, individuals in the program found improvements in general well-being, self-concept, and job satisfaction. The participants of the program in the experimental schools showed significant results from the wellness program. Diets and exercise habits increased dramatically and they reported higher overall well-being and satisfaction. This worksite wellness program done in a school environment found positive results in changing lifestyle behaviors (Blair et al., 1984).

A study by Haines and associates (2007) was designed to examine the effects of a “Virtual Walking and Wellness Program” on college faculty and staff. They were looking specifically at health status and physical activity affected by the wellness program. This was a twelve week intervention that included pedometers and educational programs on physical activity and wellness. The results of this study showed an increase of 27% in pedometer based walking steps. They also saw improvements in health of the participants of the program in the program that included a reduction in mean BMI, a decrease of 3.4% in blood pressure for individuals who were considered hypertensive, and a decrease in mean total blood cholesterol levels. A follow-up survey showed that individuals involved

in the program reported experiencing a greater than moderate effect on fitness level, mood, health awareness, nutritional habits, and health status. Finally, the participants of the program experienced increased work productivity, decreased work absences, and increased health status, which indirectly provided financial gains for the employer. This program also showed that interventions using motivational tools like benefits and encouragement have a positive impact on the health of employees. This study is significant because it not only showed improvement in activity, but also specific health measures that were improved. This program had a significant influence on faculty and staff involved (Haines et al., 2007).

There has been a growing trend in developing programs in worksite environments to promote healthier and more active lifestyles. While many worksite wellness programs are succeeding, there are still many barriers to these programs. The largest barrier companies face is the lack of participation from employees. The average participation rate in a worksite wellness program is less than 50%. Results have shown that individuals who participate in these programs are very selective. Generally women, individuals with higher income, and individuals with more education have a much higher participation rate (Person et. al., 2010). The other challenge for these programs is program completion. While many individuals sign up and start the program, they become busy throughout the program and stop recording or participating in the challenge. The length of the program as well as amount of factors involved in the program play a role in drop-out rates. There is a large dropout rate in worksite wellness programs. Participation and completion rates need to be addressed more in these programs. New studies need to look at ways to

increase enrollment and keep employees involved throughout the entire program. This will lead to more accurate results and improved health outcomes.

Motivation

A key component to behavior change is motivation. Motivation is defined as having the intent to complete an action or behavior (Gagne & Deci, 2005). An individual's motivation towards a specific behavior, like physical activity, greatly determines the likelihood of engaging in that activity. The self-determination theory demonstrates the distinction between intrinsic and extrinsic motivation. Intrinsic motivation involves engaging in a behavior because an individual has enjoyment or interest in the activity. Extrinsic motivation is engaging in a behavior to achieve external rewards or to avoid negative consequences like weight gain (Decu & Ryan, 2008). This theory suggests that as an individual's motivations become more internalized they are more autonomous and self-determined to engage in specific behaviors (Fortier et al., 2012). Autonomous motivation is associated with greater determination, more positive effects, and improved performance. Those with higher autonomous motivation have a greater understanding of behaviors and healthier lifestyles (Deci & Ryan, 2008).

There are five subgroups describing the different types of motivation on a continuum from the lack of any motivation to strongest forms of external motivation to the strongest form of autonomous motivation. Amotivation is the absence of any motivation. The next type is external regulation, which is considered controlled motivation and has very little autonomous motivation component. External regulation is primarily the desire to achieve an external reward. Introjected regulation is another form of controlled motivation, but slightly more autonomous. Introjected regulation is

engaging in a behavior because of guilt or worry. Identified regulation is a stronger form of autonomous motivation. Identified regulation is engaging in a behavior because of the importance and benefits a behavior holds. Intrinsic regulation is the strongest type of autonomous motivation. This type of motivation is engaging in a behavior solely because of interest and enjoyment (Ryan & Deci, 2000). This continuum suggests that an individual becomes more likely to maintain a specific behavior as their autonomous motivation increases (Ryan & Deci, 2000).

Various studies have been conducted to look at associations between motivation and behavior change. A study done by Silva and associates (2010) looked at key factors associated with long-term physical activity adoption. This was a behavior change intervention aimed to achieve long term weight control by increasing exercise self-motivation and adherence. They found that intrinsic and identified regulation had a positive association with physical activity behaviors. The influence of external and introjected regulation had a negative impact on long term physical activity behaviors. This implies that creating an active lifestyle as a long-term habit requires an individual to have intrinsic and identified motivation. These types of motivation will facilitate healthy long-term behaviors (Silva et al., 2010).

A similar study looked at individuals' motivation levels and their adherence to exercise programs. This study by Edmunds and associates (2007) involved obese or overweight individuals. They studied specific factors that increased an individual's likelihood of participating in physical activity. The results of the study showed that those who reported higher levels of identified and intrinsic motivation had higher levels of exercise behavior, commitment to the exercise program, greater intention to continue

activity in one's general life and greater self-efficacy to overcome barriers to exercise (Edmunds et al., 2007). This shows that motivation is positively associated with physical activity behaviors. Also, individuals with higher identified and intrinsic motivation levels are more likely to engage in an active behaviors and continue this behavior long-term.

Motivation can come from many different outlets. Different types of motivation have different effects on an individual's behavior changes. Increasing an individual's motivation levels can increase their likelihood of engaging in an active lifestyle. Providing motivation in a worksite wellness program can achieve similar results. Greater forms of intrinsic and identified motivation levels will lead to greater behavior changes and healthier lifestyle choices (Deci & Ryan, 2008). While there is a lot of research on motivation affecting physical activity, there is a gap in literature on the types of motivation involved in worksite wellness programs. Many studies have shown that autonomous motivation has a significant effect on physical activity levels. There is little research done on types of motivation created in worksite wellness programs and what types of motivation have the most influence on behaviors in a worksite wellness program (Deci & Ryan, 2008).

Support

Social support can greatly influence physical activity behaviors. Prochaska and associates (2002) stated social support occurs when an individual assists another in specific activities to achieve greater health. There are five main types of social support and they include: instrumental, informational, emotional, motivational and observational. Instrumental support is offering help to others, such as providing individuals with transportation to a park or gym. Informational support is sharing advice and information

on exercise classes and different activities to do. Emotional support is checking on their physical activity progress as well as listening and providing help to solve problems an individual may encounter. Motivational support is offering encouragement or praise about one's physical activity. Observational support is demonstrating appropriate physical activity behaviors (Prochaska, Rodgers & Sallis, 2002).

It is likely that an individual with more social support will have more opportunities and resources to engage in active behaviors. Fraser and Rodger (2012) showed that if an individual is in an environment with supportive people, that person is more likely to be successful with new behaviors like physical activity. This is supported by a study looking at exercise-specific support of patients overcoming barriers for cardiac rehabilitation. The study found that when an individual had higher perceptions of social support they experienced less stress and greater confidence in overcoming exercise barriers. The individuals with higher support perceptions have a greater likelihood of engaging in active behaviors (Fraser & Rodger, 2012). This shows that the individuals who received support specific to their exercise routine had lower levels of stress and a lower perception of barriers to their exercise program. This support led to individuals engaging in a more active lifestyle.

Higher support levels have also been linked with better health outcomes because of better adherence to programs. Research by Sallis and associates (1987) has shown that specific support was more effective than general support. Individuals who had physical activity specific support found positive results related to their activity habits, but no change in dietary behaviors. Likewise, individuals with dietary support found positive results in their dietary habits, but no change in their physical activity behaviors. This

shows that specific support can be beneficial for an individual's physical activity levels and healthier lifestyle choices (Sallis et al., 1987).

A health-promotion program conducted at hospital worksites looked specifically at the effects of support on employees' obesity, activity, and diet. Lemon and associates (2009) studied the results of this health-promotion program done on six member hospitals in Massachusetts. The program duration was six months with a baseline test and post-test assessment given to the participants of the program. The study found that greater commitment and support from coworkers lead to more positive results. The first significant finding showed that when participants of the program felt there was commitment and positive perceptions of the program they had greater weight control and improved BMIs. They also found that employee behavior is greatly influenced by coworkers. They found that support from co-workers and the support of leadership management can greatly affect behavioral patterns. Overall this study found that participants with perceptions of a supportive worksite had greater behavioral changes. They concluded that support is greatly associated with change, and the addition of leadership and a model with a healthy lifestyle can encourage greater results in promoting healthy eating and activity (Lemon et al., 2009).

An individual can receive support in various environments. Sources of social support for physical activity behaviors can include: family, friends, work colleagues, physicians, and/or exercise instructors. Family members can provide support by encouraging each other to go on a walk or by going to the gym together. Work colleagues can provide support by encouraging each other to get up periodically throughout the day and take a short walk or activity burst. Friends can encourage each other to choose active

behaviors like playing tennis rather than engaging in sedentary behaviors like watching TV (Sallis et al., 1987). A study by Sherwood and Jeffery (2000) showed that individuals who participate in regular physical activity reported higher levels of support from people in their home and work environment. It was found that individuals who joined a fitness program with their spouse had higher rates of adherence compared to those who joined without their spouse. In conclusion, this study found that people should be encouraged to exercise with others because the support aspect will increase active behaviors. They also showed that each individual is different and types of support may differ for each person (Sherwood & Jeffery, 2000). Support in a worksite wellness program can achieve similar results. In a worksite program co-workers have the ability to offer support to one another in order to achieve increases in physical activity and healthier lifestyle choices. Support from co-workers will create greater behavior changes and positive results (Sherwood & Jeffery, 2000).

Overall, worksite wellness programs have the ability to decrease sedentary behaviors by increasing the activity of employees. A more active lifestyle can be achieved through support within a worksite, as well as increased motivation levels. While there is substantial evidence of the effectiveness of worksite wellness programs there are gaps within this research this study can address. This research will add information on the difference in activity, motivation, and support between individuals who enroll in a worksite movement challenge compared to those who do not enroll. This study will provide insight on specific portions of a wellness program that significantly changed behaviors from that program. It will also provide insight on what aspects of a wellness

program were most effective and what had little effect on behaviors. It will provide insight on these variables by addressing the three specific aims.

The first aim of this study was to examine factors associated with average steps participants of the program took throughout the movement challenge. We hypothesized that the presence of team leaders and colleagues would increase average step count of individuals involved in the program. The second aim of this study was to examine the most frequently reported reasons for participating and not participating in the worksite wellness movement challenge. The third aim of the study was to compare physical activity, motivation and support levels between participants and non-participants of the worksite wellness movement challenge. We hypothesized the individuals involved in the movement challenge would report higher levels of physical activity, motivation and support.

Chapter 3: Methods

Study Design

In fall 2015, a movement challenge sponsored by Human Capital Services (HCS) was conducted to encourage Kansas State University employees to engage in a more active lifestyle. The overall goal of the challenge was to encourage less active individuals to gradually achieve 10,000 steps per day and more active individuals to achieve more than 10,000 steps per day. Steps were averaged for each department to create a challenge within the University. The challenge lasted four weeks and employees were asked to fill out a survey at the end of each week. Two weeks after the conclusion of the movement challenge a follow-up survey was sent to all employees including individuals who enrolled in the challenge and those who did not. For this study, data were utilized from each survey taken throughout the challenge as well as the follow-up survey. Each survey took individuals around 5-10 minutes to complete. The information gathered in the surveys allowed us to compare results from participants and non-participants of the program. In this study participants are referred to as individuals who participated in the movement challenge as well as took the follow-up survey. Non-participants are referred to as the individuals who were not involved in the movement challenge, but did fill out the follow-up survey. We compared physical activity, motivation and support levels.

The worksite wellness program at Kansas State University was a low-budget program used to pilot the implementation of wellness initiatives in a university setting. As a pilot program, a major objective was to find what worked and did not work throughout the four weeks. HCS hoped to take the information it gained from the

program to help create additional university wellness programs that would be more constructive and beneficial in the future.

Participants and Setting

Kansas State University employees were first recruited for the movement challenge through a mass email. This informed faculty and staff about details involved with the challenge, the start date, duration of the challenge, and a link to sign up for the challenge. The email was sent to all employees a week and a half before the start of the challenge. Employees were also recruited through an announcement on K-State Today an email with announcements within the University sent daily to all faculty and staff. K-State Today promoted the movement challenge by including details about the challenge and links to sign-up.

Movement Challenge

After signing up for the worksite wellness challenge, employees were offered a free activity tracker provided by the University or a discount to a local store for an activity tracker of their choice. This allowed each individual to use the activity tracker of their preference and one that worked best for their lifestyle. Before the start of the challenge, Human Capital Services encouraged departments to nominate a team champion to take a leadership role in promoting the program. An ideal team champion was motivating to others, set a good example of living an active and healthy lifestyle, and cared about improving the well-being of their team members. The goal of the team champions was to provide support throughout the department and help motivate more people to join the challenge.

The movement challenge program lasted a duration of four weeks. At the end of each week an email was sent to all participants of the program which included a short survey to fill out. The survey prompted individuals to log their steps for the past week. They were also given a link for an activity converter. It converted the amount of work from an activity to an equivalent amount of work measured in steps. The steps were averaged in each department, then a ranking was sent out a few days later to show which departments were in the lead. The end of the week surveys included a spot to set a step goal for the next week as well. Respondents were asked if they met their goal in the previous week and how confident they were to meet their goal for the following week. Within each survey, links for motivation and support were included. If someone did not meet their step goal in the previous week, or felt discouraged about their activity levels they were provided with a link to reputable websites that were science based. These links were used to give an individual support and strategies to engage in more activity in the following weeks.

Measures

The questionnaires described below were included in the follow-up surveys that were sent to all employees.

Demographics

Employees were asked to answer a few demographic questions. These questions included information on age, sex, employment status, marital status, education, income, race, and ethnicity.

Physical Activity

To gather data on physical activity levels we used the Modifiable Activity Questionnaire (MAQ). The MAQ evaluates thirty eight common physical activities. Employees were asked to check off activities that they engaged in during the past week. They were asked to record the duration of these activities in minutes each week. All activities were weighted with a metabolic equivalent (“MET”) value and totaled per week. Estimates for total physical activity were expressed as MET minutes per week (MET*min/week). This questionnaire accounts for all the activities the individual checked off or wrote down as other and assigns an accurate MET value depending on the intensity. The assigned MET value for each activity also accounts more accurately for the activities that do not involve a lot of movement, but still involve substantial energy expenditure, such as weight lifting or rowing. The MAQ calculates total activity during the past week in METs (Gabriel et al., 2010).

Social Support

To determine support levels we used the Social Support for Exercise questionnaire. This questionnaire was used to assess support levels for exercise behaviors received from co-workers. Individuals answered questions on a five-point scale ranging from 1 (“never”) to 5 (“very often”). Example questions included, “Gave me encouragement to stick with my physical activity program.” The wording in this questionnaire was altered to include “co-workers” instead of “friends” or “family.” These words were altered to improve the relevance to the population. Scores were then taken from all ten questions and summed to create a total social support score (Sallis et al., 1987).

Motivation

To identify motivation levels, we used the Behavioral Regulation in Exercise Questionnaire 2 (BREQ-2). The questionnaire includes five different subscales of motivation which include: amotivation, external regulation, introjected regulation, identified regulation, and intrinsic regulation. An average score is calculated for each subscale. A sample statement related to amotivation is “I can’t see why I should bother exercising.” This is known as a lack of any motivation. A sample statement related to external regulation is “I exercise because people say I should.” A sample statement related to introjected regulation is “I feel guilty when I don’t exercise.” This is also a form of extrinsic motivation. A sample question of identified regulation is “It’s important to me to exercise regularly.” This is an example of autonomous motivation. A sample question of intrinsic regulation is “I enjoy my exercise sessions.” This is also a form of autonomous motivation. Items within each subscale are averaged to compute individual subscale scores (Markland & Tobin, 2004).

Additional Questions

On the follow-up survey, the individuals who participated in the movement challenge were asked additional questions on the survey to gain a better understanding of their experience. They were first asked about the type of tracker they used, how they heard about the challenge, whether they had a team leader or not, if they completed the challenge with colleagues or friends, and if anyone specific impacted their motivation to participate. The participants of the movement challenge were also asked to answer the following: *Did you complete all four weeks of the movement challenge? If not why did you discontinue your participation? What did you like best about the challenge? What*

did you like least in the challenge? How would you change the challenge to improve it for the future? Finally they were asked; *What would encourage you to participate in future wellness campaigns?* The individuals who completed the follow-up survey, but did not participate in the movement challenge were asked additional questions that included; *What were your main reasons for not participating in this challenge? Did your department have a team leader? Did any of your department colleagues participate in the challenge?* Finally, they were also asked, *What would encourage you to participate in future wellness campaigns?*

Procedures

This study began by receiving approval from the Institutional Review Board. We obtained a list of employees and email addresses from HCS. A follow-up survey was sent by email to all faculty members two weeks after the completion of the movement challenge. The email included a short description of the follow-up survey and a link to take the survey. Employees provided consent on the first page of the survey to continue.

There were a total of 6,798 emails sent to all employees that invited them to complete the follow-up survey. There were 711 emails sent to employees who participated in the movement challenge, and 6,087 emails were sent to employees who did not participate in the challenge. A week after the email was sent to all employees, a reminder email was sent to the employees who had not yet filled out the follow-up survey. The follow-up survey remained open to be completed for a month after the first email was sent out. After a month the follow-up survey was closed and the data within each survey was gathered.

Data Analysis

SPSS, a predictive analytic software, was used to analyze data collected. We started by calculating the average number of steps individuals reported taking during the challenge. We averaged steps per week then took the average of all four weeks to get an overall average.

Analysis of data from program participants started with t-tests to compare scores between groups. A p-value less than 5% ($p\text{-value} < 0.05$) indicated a statistically significant difference. The first t-test was used to show if there was a significant difference in average steps between those who adhered to all four weeks of the challenge compared to those who reported steps in at least one week of the challenge, but did not complete all four. The next t-test was used to determine if there was a significant difference in average steps between participants with a team leader and participants without a team leader. The final t-test examined the difference in average steps between the employees who reported completing the challenge with friends or colleagues and those who did not have friends or colleagues in the challenge. Before the start of these tests a large outlier was found in the average steps. The large outlier was an individual who reported much higher step counts each day than the other individuals in his group. Separate t-tests were conducted with and without the outlier to compare results for the team leader and completing the challenge with friends and colleagues. The next analyses were correlation tests to examine the relationships among variables. Initial correlations compared the relationships between physical activity levels, support and motivation variables. The second set of correlations examined average steps taken during the program in relationship to participants' motivation and support levels. This correlation

was used to determine if support and motivation were significantly associated with average steps taken among participants of the program.

Additional t-test were conducted to determine whether or not participants and non-participants of the program differed in their physical activity, motivation, and support levels. We also examined the correlations between physical activity, support and motivation among the individuals who did not participate in the challenge.

Participants and non-participants of the program were asked a series of open-ended questions in the survey. To analyze this information, we looked through all the data to identify common themes occurring throughout the answers. The most frequently occurring themes were then recorded as the main answers for each open-ended question.

Chapter 4: Results

Characteristics of Participants and Non-Participants

After the completion of the movement challenge, a follow-up survey was sent to gather information from both participants and non-participants in the program. The survey was sent by email to 6,798 individuals. There were 711 surveys sent to participants of the program and 6,087 surveys sent to the non-participants of the program. From the individuals involved in the program, 310 (43.6%) started the follow-up survey, and 237 (33.3%) completed the survey. From the non-participants of the program, 936 (15.3%) individuals started the follow-up survey, and 608 (10.0%) individuals completed it. The results of this survey will be discussed in detail with regards to the nine tables appearing below.

Table 1 shows the employee demographics for those who completed the follow-up survey. Participants of the program had a mean age of 41.4 and ranged in age from 18-72 years old. The employees who did not participate in the challenge had a mean age of 47.3 and ranged in age from 22-92 years.

Table 1 - Demographic Characteristics of Movement Challenge

Variable	Participants N= 235	Non-Participants N= 545
Age	Mean= 41	Mean= 47
Gender		
Male	49 (20.9%)	173 (31.7%)
Female	186 (79.1%)	372 (68.3%)
Employment Status		
Full-Time (>35hr/week)	206 (87.7%)	506 (92.8%)
Part-Time (<35hr/week)	25 (10.6%)	35 (6.4%)
Other	4 (1.7%)	3 (.6%)

Marital Status		
Married/Partnered	170 (72.4%)	427 (79.4%)
Single	46 (19.6%)	63 (11.7%)
Divorced/Separated	17 (7.2%)	35 (6.5)
Widowed	2 (.9%)	13 (2.4%)
Education		
High School Graduate	50 (21.4%)	107 (19.9%)
College Graduate	90 (38.5%)	162 (30.1%)
Advanced Degree	94 (40.1%)	269 (50%)
Household Income		
<\$30,000	33 (14.2%)	28 (5.3%)
\$30,000-\$59,999	54 (23.2%)	131 (24.5%)
\$60,000-\$119,999	96 (41.2%)	201 (37.6%)
>\$120,000	30 (12.8%)	107 (19.9%)
Not Disclosed	20 (8.6%)	68 (12.7%)
Race		
White	225 (97%)	502 (93.8%)
Asian	4 (1.7%)	13 (2.4%)
African American	3 (1.3%)	20 (3.7)
Ethnicity		
Hispanic or Latino	13 (5.7%)	19 (3.7%)
Not Hispanic or Latino	216 (94.3%)	494 (96.3%)

Movement challenge participants who responded to the follow-up survey were 79.1% female and 20.9% male. Participants of the program comprised 87.7% full-time employees. Out of this same group, 78.6% reported that they had received a college degree or higher, and 97% reported white as their race. Among individuals who did not participate in the movement challenge, but completed the follow-up survey, 68.3% were females and 31.7% were males. Full-time employees made up 92.8% of the non-participants. Within the same non-participant group, 80.1% received a college degree or higher, and 93.8% reported white as their race. Several variables in Table 1 have a different sample size because not all individuals answered every question. Failure to answer each questions resulted in a different sample size for different variables.

Employees involved in the program were asked to record all of the reasons they decided to participate in the movement challenge. The results revealed that 42.8% participated because it sounded fun, 41.1% participated to increase physical activity, 31.2% participated because they wanted to improve their health, 26.7% reported they participated because of friends or colleagues, 11% reported other reasons, and 2.1% participated because they felt like they were being forced. The 11% of employees that reported other reasons stated they participated in the program because they were competitive, they were already tracking their steps, and they thought it was a fun way to do something healthy that was associated with work.

The employees not involved in the program were asked to indicate all of the main reasons they did not participate in the movement challenge. The results from the non-participants of the program showed that 16.2% reported other reasons for not participating, 14.9% were already physically active, 14.5% were not interested, 13.2% heard about it too late, 13% did not have time, 4% did not have an activity tracker, 2.6% were not physically active, and 1.8% did not want to hold back their team. The 16.2% of individuals who reported other reason for not participating consisted of: problems with the activity tracker, worked off campus, were unaware, and forgot about it and missed the start date.

Tables 2 and 3 provide the means and standard deviations of the variables studied for participants and non-participants of the program in the study. First we calculated the mean and standard deviation of the total social support levels for both groups. Next the modifiable activity questionnaire (MAQ) allowed us to find the mean and standard deviation for activity levels in both groups. Finally, we looked at scores from the

behavioral regulation in exercise questionnaire 2 (BREQ2) to give us a mean and standard deviation for the different types of motivation.

Table 2 – Movement Challenge Participants’ Social Support, Physical Activity, and Motivation

	Social Support Total	MAQ Total	BREQ: Amotivation	BREQ: External Regulation	BREQ: Introjected Regulation	BREQ: Identified Regulation	BREQ: Intrinsic Regulation
# of Responders	242	292	235	235	235	234	235
Mean	20.05	17.67	0.29	0.62	1.86	3.02	2.60
Standard Deviation	8.95	20.34	0.55	0.74	1.14	0.87	1.12

Table 3 – Movement Challenge Non-Participants Social Support, Physical Activity, and Motivation

	Social Support Total	MAQ Total	BREQ: Amotivation	BREQ: External Regulation	BREQ: Introjected Regulation	BREQ: Identified Regulation	BREQ: Intrinsic Regulation
# of responders	592	820	545	546	546	546	546
Mean	15.28	12.15	0.33	0.53	1.50	2.79	2.36
Standard Deviation	6.92	20.78	0.70	0.74	1.16	1.02	1.26

Participants of the Movement Challenge

During the movement challenge, a survey was distributed to the participating employees at the end of each week. Table 4 shows the total number of individuals that started at least one survey and filled out the demographics section by gender and age group. Seventy-six percent of these individuals were females and 24% were males.

Table 4 - Age Groups & Gender Distribution for Movement Challenge Participants

	18-24	25-34	35-44	45-54	55+	Total Participants of the program
Male	27	45	28	27	43	170
Female	64	145	109	99	122	539
Total	91	190	137	126	165	709

Of the 6,798 employees who received an email about the Movement Challenge, 650 (9.6%) completed at least one survey and 376 (5.5%) completed all four surveys. In these surveys, the total number of steps were reported for each day during the previous week. Data were collected on week one for 588 individuals and found an average number of steps to be 9,445. The average in week two of 554 respondents was 10,399 steps. In week three, 486 individuals had an average of 10,689 steps. In the final survey, week four, there were 429 respondents with an average of 11,243 steps. However, those averages differed when only the participants who reported step data all four weeks were included

Table 5 is a comparison of those who adhered to all four weeks of the program and participants who did not complete all four weeks of the challenge. These differences were statistically significant between the two groups in weeks one and two of the challenge, with participants who did not complete all four weeks of the challenge reporting significantly fewer steps in weeks one, two, and three of the challenge than those who completed all four weeks.

Table 5 - Comparison of Average Steps between Challenge Adherents and Non-Adherents

	Average steps for participants who completed all four surveys (N = 376)	Average steps for participants who did not complete all four surveys		t	p-value
		Steps	N		
Week 1	10,104	8,286	212	-4.303	.000
Week 2	11,063	9,009	179	-3.469	.001
Week 3	11,051	9,469	111	-2.743	.006
Week 4	11,317	10,735	54	-.676	.500

In the challenge, individuals used an activity tracker of their choice to record their daily steps; 32.2% used the pedometer provided by Kansas State University, 23.3% used a Fitbit, 8.6% used other pedometers, 4.6% used a Garmin, 1% used the Jawbone, 1.4% used the Pivotal Living Tracker and 14.8% used other non-pedometer activity trackers. Other activity trackers included a cell phone app, Samsung Gear Fit, Nuband, Miband, Smart Watch, Pebble, and Misfit Flash.

The end of the week surveys also collected data on step goals. At the end of week one, individuals were prompted to set a step goal for week two in the challenge. The survey reported that 85.7% of respondents set up a step goal, and 14.3% did not set a goal for week two. Of the individuals that set a goal, 51% met their step goal in week two, and 49% did not meet their goal. Individuals then set a new goal for week three in the challenge. The survey reported that 85.6% of respondents set a new goal, and 14.4% did not set a new goal for week three. Of those that set a goal, 56% met their step goal for week three, and 44% did not meet their goal.

Movement Challenge Participants Analyses

Table 6 displays the correlation between average weekly steps and physical activity (MAQ Total), social support, and motivation levels among movement challenge participants who completed the follow-up survey. The results show that average step count is not correlated with total physical activity (MAQ Total), amotivation, external regulation or introjected regulation. There were positive and statistically significant correlations found, for social support, identified regulation, and intrinsic regulation levels in relation to higher average step counts for participants of the program.

Table 6 - Support, Motivation & Activity Levels correlated with Average Steps for Movement Challenge Participants

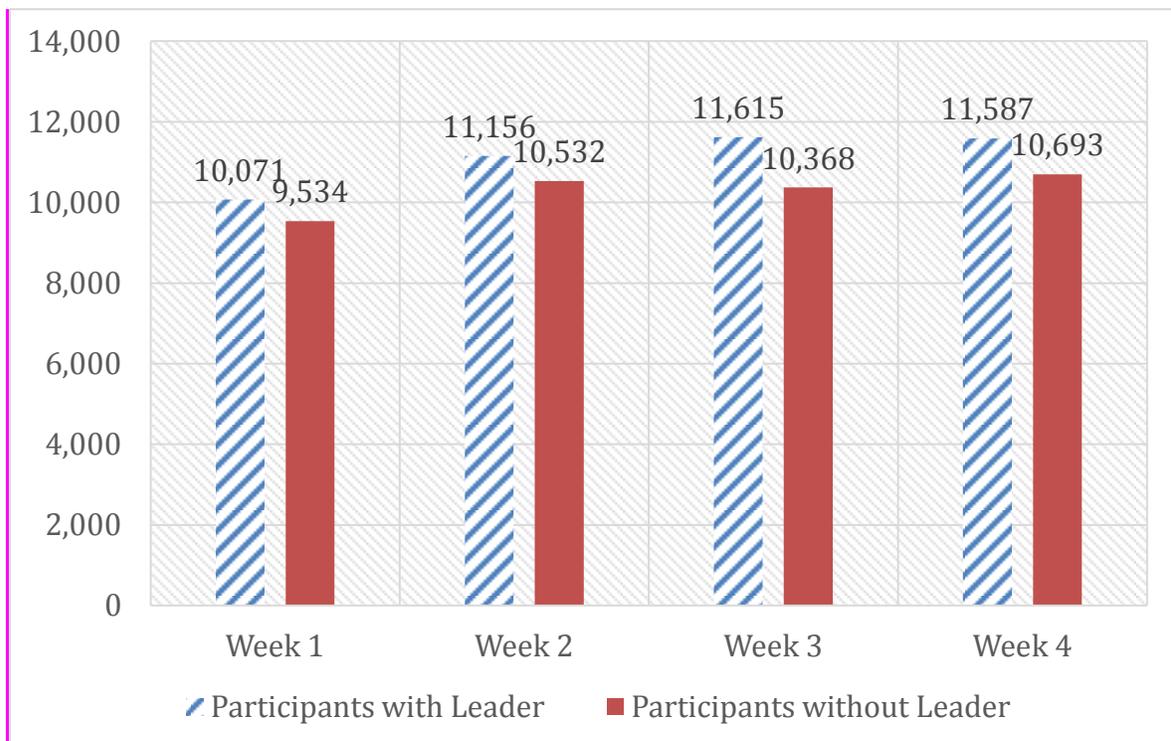
	Average Steps
Social Support Total	.209**
BREQ: Amotivation	-.080
BREQ: External Regulation	-.074
BREQ: Introjected Regulation	.093
BREQ: Identified Regulation	.321**
BREQ: Intrinsic Regulation	.353**
MAQ Total	.106
* = $p < .05$	
** = $p < .01$	

Next t-tests were used to look for differences in average steps across all four weeks between employees involved in the program with a team leader and employees involved in the program without a team leader. The results of descriptive statistics indicated that 42.5% said yes to having a leader, 32.6% reported no to having a leader

and 24.9% were not sure if they had a leader. The individuals who answered “not sure” were combined with the “no” answers in the t-test. Looking at these results one large outlier was found in the participants of the program which skewed the results. An additional T-test was run with the outlier excluded from the data and the results were altered. The results of the T-test with the outlier not included showed a significant difference in average steps between the two groups, $p = 0.029$. The participants who reported having a team leader had significantly higher step counts than those without a team leader.

Figure 1 is a bar graph that shows the average steps per week of participants in the program with a team leader and participants in the program without a team leader.

Figure 1 - Bar Graph of Participants' Average Steps in the Movement Challenge with and without a Leader



The last test was a t-test to look for a difference in average steps between individuals who reported having friends or colleagues in the challenge (81.5%) and those who reported doing the challenge without friends or colleagues (18.5%). There was no significant difference for average steps, $p = .679$. After excluding the same outlier the t-test remained non-significant ($p = .115$).

Additional Questions

Participants of the program

The employees who participated in the were asked their primary reasons for not completing all four weeks of the challenge. The most frequently reported reason for not completing all four weeks of the challenge was missing the deadline to record their steps. Employees had approximately one day to record their weekly steps before the survey closed and many reported this was not enough time to record their steps. Many individuals said they tracked their steps for all four weeks, but missed one or two of the surveys because the survey closed too quickly or they were busy during the times the survey was open so they could not record their activity. The second most frequently reported reason for not completing all four weeks of the challenge was problems occurring with the pedometers or activity trackers. Participants of the program reported they forgot to wear their activity tracker or lost it several times throughout the challenge. Many individuals also reported that they did not feel their activity tracker was accurately recording their physical activity so they did not fill out their information in the survey. The third most common reason for not completing all four weeks of the challenge was individual illnesses during the challenge. Once they became ill, individuals did not want

to bring down their team so they stopped recording their activity and filling out the surveys.

The same group of employees were then asked what they liked best and least about the challenge. One of the main reasons employees liked this challenge was because they enjoyed seeing how many steps and how much activity they got each day. With pedometers, they were able to put into perspective how much activity they engaged in and it was very informative. Another reason participants liked the challenge was the involvement of the entire University and the competition between departments. Individuals reported a higher motivation to keep going and stay involved because of the competition and to see how other departments compared. A final reason individuals liked this challenge was because it held each employee accountable and gave them a goal to work towards.

The most frequently reported reason employees did not like the challenge was because of the quality of the free pedometers the University offered. Many employees stated these pedometers broke often, fell off easily, died quickly, and were not accurate. Another reason employees did not like the challenge was because they did not know who was participating within their department or team. Employees said it was hard to motivate one another when they did not know who was participating and this made it difficult for teamwork to occur. The final aspect employees liked least about the challenge was the time frame to record activities and the process to convert activities to steps. Many individuals found it hard to remember to record their activity each week with such a small time frame to do so. They also felt it was hard to convert their activities to steps and felt this process was inaccurate.

Next, participants of the program were asked what aspects they would change to improve the program for the future. The main thing employees would like to see in future programs is a longer challenge. They do not believe that four weeks is long enough to track accurate activity levels and this time frame will not fully realize behavior changes. The next aspect employees would like to change is more involvement throughout each department. They would like to see meetings within the departments to motivate one another and identify who is participating in the challenge within their department. The last change employees would like to see is better marketing and promotion of the challenge. Those who enrolled in the program reported that friends and other individuals within their departments would have liked to do the challenge, but were not given enough time to sign up or were not informed about the challenge. Better marketing for the movement challenge may increase participation levels.

Finally they were asked what would encourage them to participate in a future wellness programs. Participants of the program responded that the best way to get individuals to participate is to include an incentive. They said adding gift cards or benefits to their health care would greatly motivate them to participate again.

Non-Participants to the program

Non-participants of the movement challenge were first asked to state their main reasons for not participating in the movement challenge. The most reported reason for not participating was employees were unaware the challenge was happening or found out too late to sign up. The second reason employees did not participate was because they did not want to take the time to track their activity each day. The last reason employees reported

for not participating was problems occurring with their pedometers. Many individuals' pedometers broke before the start of the challenge so they did not participate at all.

Non-participants of the program were asked if other colleagues participated in the challenge. Of the 374 non-participants of the program that responded, 18.2% said yes other colleagues participated, 18.2% said no other colleagues participated, and 63.6% said they were not sure if other colleagues participated.

Finally, they were asked what would encourage them to participate in future wellness campaigns. A majority of those who did not enroll in the program answered that they would participate if there was better awareness and advanced notice of the program. They would also be more likely to participate if there were incentives like money, prizes or health insurance benefits. The last reason individuals not involved in the program might participate in the future is an easier way to track activity and better reminders to record the activity.

Participants of the Program and Non-Participant Comparison

Table 7 displays descriptive statistics and t-tests used to examine differences in the participation and non-participation of the program based on their physical activity, motivation and social support levels. Employees involved in the program reported significantly higher levels than employees not involved in program in their total physical activity (MAQ Total, $t=3.91$, $p < .001$), total social support ($t=7.549$, $p < .001$), introjected regulation, identified regulation, and intrinsic regulation levels.

Table 7 – Comparison of Physical Activity, Motivation, and Social Support for Participants vs. Non-Participants in the Movement Challenge

	Movement Challenge Participants		Non- Participants in the Movement Challenge		t-value	p-value
	M	SD	M	SD		
MAQ Total	17.7	20.3	12.2	20.8	3.910	.000
BREQ: Amotivation	0.3	0.6	0.3	0.7	-.949	.343
BREQ: External Regulation	0.6	0.7	0.5	0.7	1.616	.106
BREQ: Introjected Regulation	1.9	1.1	1.5	1.2	4.051	.000
BREQ: Identified Regulation	3.0	.9	2.8	1.0	3.107	.002
BREQ: Intrinsic Regulation	2.6	1.1	2.4	1.3	2.574	.010
Social Support Total	20.0	9.0	15.3	6.9	7.457	.000
(BREQ)- Behavioral Regulation in Exercise Questionnaire (MAQ)- Modifiable Activity Questionnaire						

MAQ is the modifiable activity questionnaire looking at physical activity levels. BREQ is the behavioral regulation in exercise questionnaire looking at motivation levels.

Table 8 presents the results of correlation analyses between physical activity, motivation and social support levels. The correlation analyses were run separately for those who were enrolled in the challenge and those who were not. The results indicated there was no correlation between external and introjected regulation levels of the employees involved in the movement challenge in relation to their physical activity levels. A significant negative correlation was found for participants amotivation levels in

relation to their physical activity levels. There was a significant positive correlation for participants of the program's support levels in relation to their physical activity levels. There was also a positive correlation with identified and intrinsic regulation levels in participants of the program in relation to physical activity levels.

For the non-participants of the program similar results were found. There was no correlation found between external and introjected regulation in relation to the non-participants physical activity levels. There was a significant negative correlation found for non-participants of the program's amotivation levels in relation to their physical activity levels. There was a significant positive correlation for non-participants' support, identified and intrinsic regulation levels in relation to their physical activity levels.

Table 8 - Motivation and Support Correlation (r) with Physical Activity (MAQ)

	Participants	Non-Participants
BREQ: Amotivation	-.13*	-.09*
BREQ: External Regulation	-.07	-.04
BREQ: Introjected Regulation	-.01	.01
BREQ: Identified Regulation	.27**	.28**
BREQ: Intrinsic Regulation	.25**	.27**
Social Support Total	.13*	.11**
		*= p< .05 **= p< .01

Chapter 5: Discussion

A movement challenge was conducted at Kansas State University to increase the average steps and activity behaviors of employees. In the movement challenge 6,798 employees received an email inviting them to participate, approximately 9.6% submitted at least one survey, and 5.5% completed all four surveys. In this program, results showed an increase in average steps throughout the program. Those who reported data all four weeks exceeded 10,000 steps all four weeks.

Movement Challenge Participant and Non-Participant Comparison

A specific aim of this study was to compare the differences in physical activity, motivation and support levels of participants and non-participants in the worksite wellness challenge. Data from the study showed there was a significant difference between participants and non-participants of the program in their total physical activity levels, total social support, introjected regulation, identified regulation and intrinsic regulation levels. After the completion of the program, individuals who participated in the movement challenge showed significantly higher levels of physical activity than the individuals not involved in the program. We can conclude that the worksite wellness movement challenge may have prompted an increase in participants' of the program physical activity. The increase in activity during the program may have led to an increase in activity after the completion of the program as well. However, it is also possible that active individuals were more likely to sign up for the challenge and this may have resulted in higher physical activity levels.

There was a difference in social support levels, which led us to conclude that those who participated in the worksite wellness program felt a greater sense of social support, potentially leading to initial participation or continued participation in the program. This information is consistent with similar research done on improving participation in worksite wellness programs done by Erfurt and associates (1990). The Erfurt study found that participation was higher in groups with in-site support systems that had one-on-one meetings to aid with behavior change. Individuals with the one-on-one meetings that consisted of support systems saw a much higher participation rates than those who did receive additional support (Erfurt et al., 1990). Another study by Alexy (1991) found similar results when looking at factors associated with participation in a worksite wellness program. The study found that participants of the program who were involved in the worksite wellness program in their company encouraged one another to participate in the exercise center and fully engage in the program. Alexy (1991) concluded that peer and spousal support may directly influence participation in wellness programs and give individuals the encouragement they need to continue participation. Thus, providing support may increase participation in future programs or increase continued participation throughout a wellness program. We also found that higher levels of support were correlated with higher levels of physical activity. This was true for both individuals who adhered to the movement challenge as well as individuals who did not adhere to the program. Types of support that had most effect on employees in the program were co-workers offering to be active with one another and co-workers giving encouragement to one another to stick with the program and increase their activity. From

this we conclude that individuals who feel a greater sense of social support from co-workers may be more likely to have higher physical activity levels.

There was a significant difference in three subscales of motivation levels between the participants and non-participants of the program. The first, introjected regulation, which is considered an extrinsic motivation, was found to be significantly higher in the individuals who were enrolled in the movement challenge. The participants of the program may have felt higher levels of introjected regulation because they felt obligated or guilty to be active while in the program in order not to let down their colleagues. This shows us that individuals who feel a higher sense of introjected motivation may have higher participation rates. A study by Gillison and associates (2009) looked at the involvement of introjected regulation on physical activity behaviors. Interviews and questionnaire were given to students in West England to gain a better understanding of why they get involved in exercise and sports. The findings showed that individuals who had higher adaptive levels of physical activity also reported the highest levels of introjected regulation. The study concluded that although introjected regulation has a slight negative connotation, it can be a positive contribution to short term behavior adoption. The study suggested that gender and social environment have a great influence on introjected levels as well (Gillison et al., 2009). The results of this study are consistent with our findings suggesting those who were involved with the program felt more introjected regulation from co-workers and were more likely to participate. We also found that introjected regulation had no correlation with physical activity levels in both groups. From this we can conclude that introjected motivation has little effect on physical activity levels.

Another significant difference found between participants and non-participants of the program was in their identified and intrinsic regulation levels, which are both types of autonomous motivation. Identified and intrinsic regulation were positively correlated with physical activity while amotivation and external regulation were not found to have a significant correlation. A study by Silva and associates (2010) found similar results. The Silva study looked at long-term physical activity adoption found that those who reported intrinsic and identified regulation had much higher levels of physical activity and greater motivation to change this behavior long-term (Silva et al., 2010). We can conclude that intrinsic and identified regulation had an impact on participation in the wellness program. By seeing a change in these variables our program will see more significant results and long-term behavior change in employees like the results shown in the study by Silva and associates (2010). From this we can conclude that individuals with higher autonomous motivation have higher physical activity levels.

Our findings show that individuals with identified and intrinsic motivation in the wellness program were more likely to engage in physical activity. This is similar to the results in a study by Edmunds and associates (2007). This study showed that the employees in a worksite wellness program with the highest levels of physical activity also reported the highest levels of identified and intrinsic motivation. This is similar to the findings in our study, which show that these forms of motivation are correlated with physical activity behaviors. Increasing these forms of motivation will create more active behaviors in a wellness program (Edmunds et al., 2007). Although the findings in our study were significant, they were relatively small. There are many other factors that could

influence employee's physical activity levels that the movement challenge did not measure.

Average Steps

Another aim of this study was to examine factors associated with average step counts of participants throughout the movement challenge. From the data, we found that the employees involved in the program reported higher levels of social support, identified regulation, and intrinsic regulation had a higher weekly average in steps. This is in agreement with current research showing that individuals who feel higher levels of autonomous motivation and higher levels of support report higher levels of activity. Deci and Ryan (2008) showed in their study that individuals with higher autonomous motivation have greater determination and improved performance. Our findings also show that those who had higher autonomous motivation reported a higher average number of weekly steps and improved performance by increasing activity. A study by Krieger and associates (2009) looked at the effects of a social environment and perceived support levels on walking behaviors. The purpose of this study was to increase activity in a public housing community in Seattle by making a more supportive walking environment. Walking groups were designed to provide support for individuals to get more activity. The study's results show the individuals who participated in the walking groups increased their activity levels. They believe they saw an increase in activity from the support of participants within the walking groups (Krieger et al., 2009). This is similar with the findings in our study that showed a significant relationship between step count and social support among individuals involved in the movement challenge.

Next, we looked at average steps in employees in the program with a team leader and employees in the program without a team leader. Results, with the exemption of an outlier, found that the employees the program with a leader reported consistently higher step counts. From this we can conclude that having a leader in the program had a positive effect on behavior change. This is consistent with other studies on the effects of having team leaders. In a study done by Sarin and McDermott (2003) they looked at team leader characteristics of learning, knowledge and performance and found similar results to our study. They found that having a team leader in a group has considerable influence on employees learning and behavior. They also found that team leaders who involved their team members in decisions found even more significant results (Sarin & McDermott, 2003). This shows that the addition of a leader will produce greater results within the specific members of that team. It is possible that the higher average steps were due to the leaders sending out motivational emails and providing support to their team. This gave the team members additional encouragement they needed to increase their daily activity. These results suggest that having a team leader is significant for behavior change and can notably influence activity levels.

Finally we looked at average steps of those who adhered to all four weeks in the challenge compared to individuals who did not complete all four weeks. We found that there was a significant difference between the two groups in week one, two, and three. From this we can conclude that the individuals who participated in at least one week of the challenge, but then dropped out of the program, had an impact on average steps for those weeks. There was no significant difference found for week four in the challenge.

This may be because the individuals with a lower step count had already dropped out of the program.

Additional Questions

The final aim of study was to qualitatively examine the main reasons for participating or not participating in the challenge. Participants of the program reported their favorite aspect of the challenge was seeing their daily activity from their pedometers or activity trackers. They were able to put into perspective how much activity they were getting by seeing the amount of steps they achieved each day. Previous research by Faghri and associates (2008) found that pedometers are a successful tool in increasing physical activity. They found that the use of pedometers allowed individuals to track their own activity and know when they needed to get more activity (Faghri et al., 2008).

The movement challenge saw an increase in the average steps of individuals involved in the program, but a larger increase may have been found if a more accurate pedometer was offered. Participants in the program also liked having competition between the departments. Having a competition between the departments was an effective way to motivate people to get more activity. This is similar to the results Buis and associates (2009) found in their study on a program to promote physical activity for faculty, staff and graduate students at the University of Michigan. This study showed that the individuals who participated in the competition portion of the program were more likely to meet their goals and get higher levels of physical activity (Buis et al., 2009). Having a competition portion in a wellness program will increase social support and encouragement from others and get people to become more active to help their team.

Participants of the program reported that they least liked the quality of the pedometers offered by the university. These individuals felt the pedometers were inaccurate and fell off often. There would have been a higher participation rate throughout the challenge if a higher quality pedometer had been offered to the employees involved in the program. Another reason participants of the program did not like the challenge was not knowing who was involved in the movement challenge. This poor publicizing job may have been due to a quick preparation for the program or the low budget for the program. Individuals would have had a higher participation rate if they had known who was involved in the program because they could have found support and encouragement from those who were participating. Future programs should encourage employees to reach out to each other and encourage their colleagues to participate. Employees involved in the movement challenge also reported they wished the program had been longer. They believed that there would have been different results if the challenge would have lasted longer (e.g., four months instead of four weeks). This study was a low-budget program and many limitations that were encountered through the program could have been eliminated by investing additional resources.

Employees who were not involved in the movement challenge responded that the main reasons they did not participate was because they were unaware of the challenge or found out too late to sign up. The program could have provided better advertising. It could have gone beyond emails and provided banners throughout campus or placed memos in departments to remind faculty. Non-participants of the program reported they did not have enough time to track their activity and log it each week. They also reported problems with their pedometers before the start of the program so they did not participate

at all. A way to increase participation would be to offer better pedometers and incentives. An article by Person and associates (2010) looked at barriers associated with participation in wellness programs. Results showed that presenting the program and information in a more appealing way had a strong impact on participation. They also found that implementing creative approaches to meeting employees' needs and finding impactful incentives greatly increased participation in similar programs (Person et al., 2010). Identifying barriers ahead of time and strategically planning and marketing a wellness program with adequate time before the start of the program will greatly influence participation.

Strengths

There were several strengths in this study on the worksite wellness movement challenge. Giving participants of the program the ability to choose the activity tracker of their choice was a strength in the study. Allowing participants of the program to choose the activity tracker of their choice made the program more accessible for them. A strength in the overall findings of the study was having the ability to collect data throughout the challenge as well as gather data in the end through a post-test survey. This allowed us to look at variables in relation to behaviors during the challenges as well as after the challenge was complete. The final strength of this program was the minimal burden it presented for employees in the program. The employees were asked to complete very minimal tasks that did not take much time or effort.

Limitations and Suggestions for Future Research

There were limitations of the study that should be noted for future research done on worksite wellness programs. The most significant limitation we faced was initial

enrollment as well as continued participation throughout the study. Future research should increase promotion and awareness of the program before it begins to increase initial enrollment in the program.

Additional studies should also look at ways to increase participation throughout the duration of the program. There was a significant portion of people who did not complete all four weeks of the challenge. Finding ways to increase adherence to the program will yield stronger results. A struggle of the program was the free pedometers offered by the University. These pedometers were cheap and broke easily. Future research will see greater results with a pedometer that is more reliable. The difference in activity trackers may have affected the reliability of the average step count. Each activity tracker has a different way of recording steps, so finding similar activity trackers to record steps will increase reliability of the results. Time to report steps was a limitation as well. Participants of the program did not have enough time to record all their results in the survey the short time it was open each week. The limited time frame to input activity was used so HCS could tally and post the departmental results. If the survey was open longer there may have been increased participation throughout the movement challenge.

A limitation in the results of the comparison between participants and non-participants of the program was that we cannot determine whether the differences were due to the challenge, or whether participants of the program were already more active or motivated before they signed up for the challenge. A way to avoid this pitfall in future studies would be to do a pretest survey of activity levels for both groups. This survey will allow us to see if there were improvements after the challenge when compared with the baseline data.

An additional limitation of the study was bias created from self-reports. Individuals may overestimate or underestimate when they are recording their total activity, which can alter the validity in the results. Having an additional option other than self-report will increase the validity of the results. For example, pedometers that automatically report would increase the accuracy of the step counts and the ease for the participants of the program. Additionally, participants of the program had to remember their goal they made each week as well as how many steps they got each day. This may have impacted their recall of whether they met their goals each week.

The final limitation found in the study was the lack of mandating the involvement of team leaders. Team leaders were found to have a significant influence on average steps. Future research should have better control over the exact involvement and placement of team leaders to all sections of the program. Having a more structured team leader involvement may lead to more significant results.

encourage

Overall conclusion

Worksite wellness programs have a lot of benefits and potential, but more research needs to be done on how to get more individuals involved. Our first aim was to examine factors associated with average steps. Another aim compared physical activity, motivation, and support levels between two groups. We found that social support was a key factor in influencing total physical activity and steps. Autonomous motivation also had a positive influence on activity levels as well. Participants of the program reported that they like team support and competition between departments. The results of the study suggest future research should increase involvement between teams to build support. The

program should also increase the competition between departments and increase team leader involvement to build motivation and encouragement within each team. These findings show that worksite wellness programs will have more success from individuals who adhere to the program if competition, social support and identified and intrinsic motivation are increased.

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