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Facilitation of Social Cognitive Constructs in an Employee Wellness Exercise Intervention Program

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FACILITATION OF SOCIAL COGNITIVE CONSTRUCTS IN AN EMPLOYEE WELLNESS EXERCISE INTERVENTION PROGRAM

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FACILITATION OF SOCIAL COGNITIVE CONSTRUCTS IN AN EMPLOYEE WELLNESS EXERCISE INTERVENTION PROGRAM

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The current study examined the influence of social cognitive variables on physical activity and proposed an intervention for an 8-week physical activity promotion program. Four specific components were examined: implementation intentions, goal commitment, barrier self-efficacy, and value. Participants included faculty and staff enrolled in a university Employee Wellness Program. Participants in the treatment group received goal-setting prompts focused on developing implementation intentions, identifying the value of outcome expectancies, and overcoming self-efficacy barriers. Participants in the control group did not receive goal-setting prompts. The use of goal-setting prompts did not result in significantly more minutes spent exercising. Overall, participants who received goal-setting prompts maintained their engagement in physical activity throughout the program, while participants in the control group steadily declined after week 5. For the treatment group, physical activity was dropping after the first week, but after receiving implementation-intentions prompts, physical activity increased. The use of implementation intentions should be further investigated. Additionally, the use of administering prompts throughout the complete program should be examined.

Examining the Effectiveness of Goal Setting in an

Employee Wellness Program's Exercise Intervention Program

The United States Department of Health and Human Services (2004) found that in 2000, 67% of adults (age 18 or older) did not engage in moderate levels of physical activity. A moderate level consists of exercising at least five days a week for 30 minutes or more. In that same year, poor diet in conjunction with insufficient exercise was the second leading cause of death. Exercising regularly and staying in shape helps prevent diseases and disabilities that develop with aging (National Institute of Health, 2007). Adults can lose ability in strength, balance, flexibility, and endurance because of sedentary lifestyles. In addition to the personal benefits of good health, it is also in an organization's best interest to employ healthy employees. Research indicates that exercise intervention programs aimed at increasing exercise can help reduce turnover, absenteeism (Cox, Shephard, & Corey, 1981), and health care expenses (Erfurt, Foote, & Heirich, 1992). Although many people are aware of the health benefits, people often find it difficult to develop the motivation to start an exercise program or maintain the program for an extended period of time. Forming a goal provides a person with direction and clarity. The current study examined cognitive variables thought to impact the likelihood of successfully completing an exercise intervention program.

Bandura (2005) suggested two conditions that determine successful goal pursuit. The first revolves around defining one's goals. This is based on Locke and Latham's (1990) theory of setting specific, challenging goals. The second includes the use of self-regulatory behaviors that are found in social cognitive theory. Social cognitive theory examines self-regulated behaviors from a cognitive, social, and motivational view

(Bandura, 1997). Self-regulation includes thoughts and behaviors that are self-produced, premeditated, and adaptable to situations in an effort to achieve one's personal goals (Zimmerman, 2000). Self-regulation is affected by metacognition, self-beliefs, and situation reactions. Three phases make up the self-regulation cycle: forethought, performance, and self-reflection. Forethought involves prior motivational variables that influence initiation of the behavior (e.g., goal setting, self-efficacy, strategic planning). Performance involves processes that occur while engaging in the behavior (e.g., attention focusing, self-instruction, and imagery). Self-reflection involves the evaluation of the behavior and experience after performance is complete (e.g., causal attribution, self-satisfaction/affect).

Social cognitive theory suggests that use of self-regulatory behaviors can increase performance behavior (Conn, Minor, Burks, Rantz, & Pomeroy, 2003; Zimmerman, 2000). The purpose of the current study was to examine motivational behaviors in the forethought phase. Through the forethought phase, a person develops the cognitive motivation to engage in goal directed behaviors. In the following sections it will be demonstrated that utilizing the following self-regulatory behaviors positively influence exercise behavior: goal setting, implementation intentions, goal commitment, barrier self-efficacy, and value.

Goal Setting

Locke's theory of goal setting focuses on a person's conscious efforts to regulate their behavior in an effort to achieve a desired result (Locke & Latham, 2002). Two main aspects of goal setting are addressed in the theory: goal specificity and goal difficulty. Goal setting theory suggests difficult goals result in higher levels of performance than

easy goals, and that specific goals result in higher levels of performance than no goals or vague goals. Latham and Yukl (1975) reviewed 11 studies that tested the benefit of setting specific goals compared to no goals or general goals. The focus of the studies included the effect of goal setting on the quality and quantity of production and performance, modifying behavior and personal developmental goals, and the appraisal interview process. Ten of the 11 studies supported Locke's theory on goal specificity. The one study that failed to support goal specificity suffered from validity flaws. Goal specificity can also be classified as absolute, relative, and "do your best" goals (Kyllo & Landers, 1995). Absolute goals are specific goals, in which all participants in the treatment group had the same goal. Relative goals are more general and based on individual performance. In addition to no goal groups, vague (do your best) goals can be used as a control group to make comparisons. Kyllo and Landers' meta analysis of 36 studies found absolute goals with moderate goal difficulty to provide the largest performance improvements compared to vague or no goals with a mean effect size of d = .93.

In addition to the need to set specific goals, Locke and Latham (2002) stressed the importance of goal difficulty. To examine the aspect of goal difficulty, Smith, Hauenstein, and Buchanan (1996) completed a study that applied goal setting to exercise performance. Participants were given a 1.5 minute timed sit-up task under four randomly assigned conditions: (a) specific, difficult goals; long-term only; (b) specific, difficult goals; short-term and long-term; (c) "do your best" goals; and (d) no goals (null control). Each participant took part in four trials. Participants were randomly assigned to one of the four conditions after completing the first trial. The first trial served as a baseline measure; all

participants were told to "do your best." In trials 2, 3, and 4, participants in the two specific, difficult goal conditions were given their long-term goal or long-term and short-term goals. Participants' long-term goal was to increase the number of sit-ups they could perform in 1.5 minutes by 40% of the number from their first trial. Participants' short-term goal was to increase the number of sit-ups by 10% from each previous trial. Specific, difficult goals resulted in better exercise performance for conditions of long-term goals as well as the combination of short-term and long-term goals than the "do your best" and no goal conditions.

It is important to note how researchers operationally define the levels of difficulty when examining the role goal difficulty. For example, Kyllo and Landers' (1995) meta-analysis found only goals with *moderate* levels of difficulty, as compared to difficult goals, increased performance. They suggested this was because of their use of Locke's (1991) definition of difficult goals as only goals that are successfully reached by no more than 10% of participants. The restricted definition may have led to categorization of difficult goals as only those that participants viewed as unrealistic and unachievable. In redefining difficult goals using a criteria of 25% of participants who reached goal attainment, difficult goals were found to increase performance, yielding a mean effect size of $d = .41$.

Conn et al. (2003) reviewed seventeen studies (6,391 participants) designed to increase the amount of physical exercise in older adults. Interventions used in the studies included self-monitoring, goal setting, problem solving, general health education, supervised center-based exercise, and feedback. Nine studies monitored exercise adoption; seven studies monitored exercise maintenance. Social cognitive theory was the

most commonly used theoretical basis, which was used for seven studies. Self-efficacy/efficacy expectations (confidence in one's ability) and outcome expectancy (expected results of behavior) were two constructs that were especially prevalent across studies. Of the seven studies assessing exercise maintenance, positive results were found for five. Several other studies have provided evidence that social cognitive theory is an effective theoretical foundation for the development of an exercise intervention program (Hallam & Petosa, 2004; Rogers et al., 2005; Suminski & Petosa, 2006).

Chyou, Scheuer, and Linneman (2006) developed a 20-week walking program for staff and physicians at a clinic. The program was designed to provide a structured walking-program based on pre-program exercise assessments, incentive to participants to meet minimum recommended requirements, and bi-weekly emails with information on healthy exercise and eating habits, and to evaluate participant remarks and biometric measures. Results indicated significant increases in exercise activity in 186 of 191 women who completed pre- and post-program information. Chyou et al.'s assessment of the employee exercise program found it feasible to develop programs that aid in employees' efforts to maintain and increase their physical well-being. Similar to Chyou et al.'s study, the current study used incentives and sent bi-weekly email prompts to participants.

The literature reviewed provides evidence that goal-setting behaviors can be used to predict exercise performance (Chyou et al., 2006; Kyllo & Landers, 1995; Smith et al., 1996). In addition, social cognitive theory has been supported as an effective theoretical basis to develop an exercise intervention program (Conn et al., 2003; Hallam & Petosa, 2004; Rogers et al., 2005; Suminski & Petosa, 2006). Now, research will be discussed

that demonstrates that identifying and utilizing self-regulated behaviors surrounding goal setting can increase the likelihood of successful completion of an exercise intervention program. Self-regulated behaviors include a person's intentions and strategy, commitment, confidence in their ability to overcome barriers, and value of expected outcomes to occur as a result of goal attainment. Each of these behaviors is discussed in the following sections.

Implementation Intentions

Goal setting helps direct one's motivation to achieve a goal; implementation intentions help provide information *how* the person can successfully achieve a goal. Implementation intentions define the characteristics of strategy and guidelines for a person to meet their goal. Developing implementation intentions is a more specific process of identifying what conditions must be present for a person to perform certain behaviors in an effort to accomplish a goal. Gollwitzer (1999) described implementation intentions as the process of identifying when, where, and how a person will act to reach goal attainment. For example, an individual may decide to jog Monday through Friday at the gym at 5:00 after work. The process requires the person to define characteristics that make up the circumstances under which he or she will engage in designated behaviors, termed the "critical situation" (Sheeran, Webb, & Gollwitzer, 2005).

The formation of implementation intentions can facilitate adherence to goal setting programs (Koestner, Lekes, Powers, & Chicoine, 2002; Sheeran & Orbell, 1999). Sheeran and Orbell tested the effect of implementation intentions on encouraging participants to take vitamin C pills over a 3-week period. Participants were given a free bottle of vitamin C pills and information on taking one pill per day over the 3-week

period. Participants who formed implementation intentions in both experiments missed significantly fewer pills than those who did not form implementation intentions. Koestner et al. completed a study in which they instructed participants to form New Year's resolutions as their goals. Forty-five of 59 participants listed a health related resolution, such as "exercise regularly" and "lose 10 pounds." Participants planned what times and places they would engage in goal directed behaviors. Participants also identified possible barriers that could prevent them from working towards their goal. Identification of potential obstacles that could hinder performance introduces barrier self-efficacy that will be addressed later in this paper. Results showed the highest levels of performance were completed by participants who had self-concordant (personal interest) goals that were developed with implementation intentions. The level of goal progress was also significantly related to commitment and self-efficacy. Koestner et al.'s meta-analysis reviewed 13 studies that demonstrated the likelihood of goal attainment to be significantly higher when implementation intentions were formed. Results provided a significant effect, equal to a Pearson correlation of .27. Other studies (Gollwitzer, 1999; Brickell, Chatzisarantis, & Pretty, 2006) also support the finding that the formation of implementation intentions helps motivate people to initiate goal directed exercise behaviors.

Bagozzi and Edwards (2000) distinguished between goal intentions and implementation intentions. Goal intentions focus on the end result of the goal or performance that is accomplished by enacting certain behaviors. Similar to process goals, implementation intentions focus on the procedure of how the end result is reached. This procedure includes indentifying contingencies, specific barriers that may hinder

performance, and the when, where, and how of the situation (Gollwitzer, 1999). The link between strategy and results assists a person in identifying the opportunities provided by the implementation intentions. When implementation intentions are developed and the conditions of the critical situation are present, commitment to perform goal directed behaviors is enhanced (Gollwitzer & Brandstatter, 1997). Gollwitzer and Brandstatter determined through several studies that the likelihood of goal directed behaviors significantly increased when participants developed implementation intentions with their goal intentions versus participants who developed goal intentions alone. This only occurred, however, for difficult goals. In one experiment, participants developed implementation intentions for an easy and difficult project to work on during Christmas break. When participants modified their difficult project into an implementation intention, the rate of carrying out their difficult task increased from 22% to 62%. There was only a slight increase for the easy projects from 78% to 84%.

Sheeran et al. (2005) suggested two dominant processes in implementation intentions that help explain how goal attainment is improved. First, implementation intentions require the person to define the critical situation clearly. This is aided by external cues that help a person quickly identify when they are in the critical situation. Second, when implementation intentions are formed, the initiation of goal directed behavior becomes more of an automated response that is performed quickly and efficiently. From the previous example, a person forming an implementation intention to exercise may plan to jog for thirty minutes immediately after work at 5:00, Monday to Friday. The time of day, daily activities performed before leaving work, and routine actions of other employees may provide external cues that it is the time to jog. When the

person sees another employee leaving for the day the cue will signal to the person that it is the designated time to jog. The behavior becomes more of an automated reaction to such cues. Implementation intentions facilitate goal achievement by perceptually preparing the individual when the situation occurs. Cues from the critical situation signal the person to engage in goal directed behaviors.

The automaticity of implementation intentions allows for use of less cognitive resources (Bandura, 2005) and mirrors much of the operation of habits (Gollwitzer & Brandstatter, 1997). Both implementation intentions and habits can occur outside of conscious awareness in an immediate, resourceful manner. In habits, the frequency of performing a behavior in a consistent manner contributes to strengthening the relationship between cues and behavior. Prestwich, Lawton, and Conner (2003) suggested that implementation intentions are capable of altering habitual behavior. This is relevant to the current study in that many people who would take part in the program may have a habitual, sedentary lifestyle.

Formation of implementation intentions provides a structured plan that allows people to use fewer mental resources to identify and react to the specified situations where goal directed behaviors should take place (Bandura, 2005). Setting a goal to increase the amount of time spent exercising means changing a person's current schedule or routine. Implementation intentions guide a person in how to accommodate such a lifestyle change. Learning to define the critical situation with external cues and acting upon them strengthens the likelihood of goal attainment. As a person increases the frequency in which such goal directed behaviors take place in the critical situation, the behaviors become part of a person's new schedule or routine (Sheeran et al., 2005).

Goal Commitment

Several researchers view goal commitment as an essential element of goal setting (Harrison & Liska, 1994; Locke, Latham, & Erez, 1988). The concept of goal commitment refers to a person's determination to reach a goal (Diefendorff & Lord, 2003). Goal commitment is influenced by several factors including implementation intentions (Diefendorff & Lord), self-efficacy, and expectancy (Locke et al.; Wooford, Goodwin, & Premack, 1992). Research indicates that for an exercise program to be successful, adequate goal commitment must be present (Hollenbeck & Klein, 1987). Locke (1991) stressed the significance of measuring goal commitment to ensure participants accept and put forth the effort to achieve their goal. In Smith et al.'s (1996) timed sit-up study, goal commitment and exercise performance were found to be positively related for conditions where specific, difficult goals were set.

To ensure the presence of goal commitment and increase physical activity, researchers must understand the self-regulated behaviors that increase goal commitment. These self-regulated behaviors, proposed by social cognitive theory, include goal setting, self-efficacy, and value. Goal setting is primarily a self-regulated behavior that is used to decide on an outcome a person will work towards achieving. Self-efficacy and perceived value are self-motivated beliefs that contribute to a person's goal commitment. It is expected that a person's self-efficacy, value, and goal commitment will be positively related.

Barrier Self-efficacy

Bandura (1997) defines self-efficacy as a person's confidence in their own abilities to execute certain behaviors to achieve a desired goal. Exercise barrier self-

efficacy addresses a person's confidence in their ability to exercise regularly when faced with the common reasons people cite for not exercising. Barriers can include bad weather or self-conscious feelings about one's appearance when exercising. Increased levels of physical activity have been associated with higher levels of barrier self-efficacy (Herrick, Stone, Mettler, 1997; Marcus & Owen, 1992; Rogers et al., 2005). Bandura (2004) argued that barrier self-efficacy must be used to measure personal efficacy for exercise behavior. People judge their abilities to perform behaviors when problems are present. If there were never any obstacles, the behavior would be easy and everyone would be high in efficacy.

Bandura's social cognitive theory suggests self-efficacy is a major contributing factor in determining a person's behavior. Results from multiple meta-analyses and studies support self-efficacy as a primary factor in a person's motivation and performance (Bandura & Locke, 2003; Chen & Chang, 2004; Gao, 2008; Moritz, Feltz, Fahrbach, & Mack, 2000; Netz, Wu, Becker, & Tenenbaum, 2005). Moritz et al. reviewed 45 studies (3,055 participants) examining self-efficacy and performance in sport. Performance measures included subjective (by external observers), objective (more quantitative in nature, such as points earned), and self-report measures. Results from the studies provided an average correlation between self-efficacy and performance of $r = .38$. Netz et al.'s meta-analysis of 36 studies examined physical activity and psychological well-being in older adults. Results indicated that engaging in physical activity significantly affected self-efficacy with a mean effect of $d^c = .38$.

Chen and Chang (2004) distributed a questionnaire to female employees of a Taipei bank that included questions measuring socio-psychological factors related to

exercise behavior. The socio-psychological factors consisted of self-efficacy in exercise, self-perceived exercise barriers, self-perceived exercise benefits, body image, social support for exercise, and exercise enjoyment. Exercise self-efficacy and self-perceived exercise barriers were found to be primary factors in predicting exercise behaviors. The results suggested exercise self-efficacy is a predictor of regular exercise and total exercise amount, and self-perceived exercise barriers are a predictor of whether or not a participant will engage in an exercise activity regularly. Understanding the large influence barrier self-efficacy has on performance leads to the next step of understanding methods to raise a person's self-efficacy. Chen and Chang recommended that developers of an exercise intervention program consider methods of increasing exercise self-efficacy and reducing self-perceived barriers to further the likelihood of success.

Harrison and Liska (1994) suggested several ways in which goal commitment can be increased by raising a person's barrier self-efficacy. The primary means of raising exercise-specific self-efficacy is to reduce perceived barriers. First, treating perceived barriers as though they are real can help reduce work-related barriers. For example, conflicting schedules are a commonly reported barrier for employees. Developing flexible work and exercise schedules treat the perceived barrier as real and reduce the difficulty of the barrier. Providing a choice among options of varying levels of exercise intensity aids in reducing fatigue-related barriers. If a person does not feel like running one day, he/she has the option to walk or bike ride. Training programs further a person's knowledge of time management of their work and exercise schedules, the various options of modes of exercise, and other healthy lifestyle habits. Family-related barriers can be reduced by permitting spouses and family to be a part of the exercise program. Last, the

initiation of the goal-setting exercise intervention itself can foster self-efficacy in performing exercise behaviors if the person is successful in their first few attempts. The current study focused on prompting participants to determine methods of overcoming such obstacles that prevent them from exercising.

Expectancy X Value

Expectancy X Value theory views people's behavior to be a function of expectations for achieving outcomes and the attractiveness or value of those outcomes (Eccles & Wigfield, 2002). Eccles and Wigfield's view on expectancy and value is similar to Vroom's expectancy theory that is based on the Valence – Instrumentality – Expectancy Model (VIE Model), which is commonly used in work motivation research (Van Eerde & Thierry, 1996). Valence refers to the attractiveness and desirability of outcomes. Instrumentality refers to the relationship between an outcome and another outcome, and probability to obtain an outcome. Expectancy refers to the perceived relationship between a specific action and an outcome. Eccles and Wigfield refer to a person's expectancy of success and the level of performance he or she will reach on forthcoming tasks as personal or efficacy expectations. Their definition suggests motivation to be higher for conditions where participants have higher efficacy expectations. Value is defined as a multidimensional construct, made up of four components: attainment value (importance), interest value (intrinsic pleasure), utility value (usefulness for existing and future goals), and cost (negative consequences). A person with higher levels of attainment, interest, and utility, and a lower level of costs is expected to have higher motivation. The current study will only examine value, not

expectancy. It is believed that because barrier self-efficacy is being measured, it is redundant to measure efficacy expectations.

Research evaluating the effect of value on physical activity is scarce; however, studies have indicated that the value of participation in a physical activity program is related to the levels of participation (Godin & Shephard, 1986; Marcus & Owen, 1992; Sexton, Tuckman, Crehan, 1992; Zavela, Davis, Cottrell, & Smith, 1988) and goal commitment (Harrison & Liska, 1994). Harrison and Liska examined the influence of barrier self-efficacy, outcome likelihood, and outcome value on goal commitment of university employees participating in a fitness program. Barrier self-efficacy positively correlated with goal commitment. When they examined the likelihood of an outcome resulting from exercise (what they termed *instrumentalities*) and value of the outcome (what they termed *valence*) independently, value was the only component that was significantly related to goal commitment. Caserta and Gillett (1998) further found that people with higher values of perceived benefits exercised more frequently, especially over an extended period of time.

Most studies reviewed did not measure each component of value independently (Caserta & Gillett, 1998; Godin & Shephard, 1986; Harrison & Liska, 1994; Marcus & Owen, 1992; McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003; Rogers, Courneya, Shah, Dunnington, & Hopkins-Price, 2007; Sexton et al., 1992). Value was generally assessed by participants' comparison between benefits and risks of exercise (Godin & Shephard; Harrison & Liska; Marcus & Owen; Herrick et al., 1997; Rogers et al.) or by rating the importance of benefits of exercise (Caserta & Gillett; Desharnais, Bouillon, & Godin, 1986; McAuley et al; Sexton et al., 1992.). In developing the current study, the

decision of whether or not to include the negative aspects of exercise (cost) was carefully considered. Participant adherence to the physical activity program is of great importance to the appropriate measurement of the constructs. Cost was not assessed due to concern that prompting participants to identify costs may negatively influence adherence to the program.

This review of literature suggests the important roles implementation intentions, goal commitment, barrier self-efficacy, and value play in goal setting effectiveness. Social cognitive theory recognizes goal setting, implementation intentions, self-efficacy, and value as components of a person's forethought that develops anticipated future states. Through the forethought phase, a person develops the cognitive motivation to engage in goal directed behaviors by developing strategies to achieve a goal, confidence in one's own ability despite perceived barriers, and identifying the valued outcomes expected to be gained (Zimmerman, 2000; Bandura, 1997). When developing an exercise intervention program, utilizing these facets is key to increasing the likelihood of success.

The purpose of this experiment was to examine the motivational effect of social cognitive variables on exercise intervention program outcomes. The four covariates measured were as follows: use of implementation intentions, goal commitment, barrier self-efficacy, and value. The primary hypothesis was that goal-setting prompts would increase the amount of weekly physical activity engaged in by participants compared to participants who did not receive goal setting prompts. The secondary hypotheses examined the effects of the covariates. It was expected that each covariate would account for a significant amount of the variance in weekly physical activity. Analyzing the covariates provided a more sensitive measure. It was expected that the three prompts

instructing participants to focus on the areas of implementation intentions, value, and barrier self-efficacy would increase implementation intentions, goal commitment, barrier self-efficacy, and value. Three hypotheses are presented below.

H1: The treatment group would significantly increase the amount of time spent exercising across the 8 weeks as compared to the control group.

H2: The treatment group would have significant increases in covariate values from pre to post assessment compared to the control group.

H3: Each covariate at pre assessment would account for a significant amount of the variance for time spent exercising

Method

Participants

Participants included Western Kentucky University faculty and staff participating in an Employee Wellness Program. The demographics of participants are listed in Table 1. A similar physical activity program implemented through the Employee Wellness Program the previous year had 92 participants enroll. One hundred ninety-two participants signed up for program, only 162 indicated they would be willing to take part in the study. Ten participants in the treatment group were dropped because they did not respond to any of the prompts. The treatment was the responses to the prompts, therefore the ten that did not respond did not receive any treatment. Participants signed up electronically after reading an informed consent through the Employee Wellness website. Meal vouchers and awareness of the health benefits that stem from increasing exercise behavior were provided as incentives.

Design

The study was a treatment X control group design that investigated the motivational effect of the following social cognitive variables on physical activity engagement: implementation intentions, goal commitment, barrier self-efficacy, and value. The independent variable was whether the participant received goal setting prompts while engaging in the exercise program. The dependent variable was the total amount of time spent exercising each week (frequency x duration x intensity). Four covariates were examined: goal commitment, implementation intentions, barrier self-efficacy, and value. Pre-tests and post-tests of the goal commitment, implementations

intentions, barrier self-efficacy, and value measures were administered to participants for comparison.

Table 1

Demographics of the Prompt and No Prompt Group

	Male	Female	Faculty	Staff	Total
No Prompt	18	71	26	63	89
Prompt	13	50	15	48	63
Total	31	121	41	111	152

Materials

The goal setting prompts were delivered to participants through three emails (see Appendixes A, B, and C). Delivering exercise intervention instruction and information through the web has been demonstrated to be an effective medium of communication for an exercise program (Suminski & Petosa, 2006). The three prompts participants in the treatment group received instructed them to identify implementation intentions, their values of exercising, and solutions to self-efficacy barriers to exercise. Participants' physical activity was recorded using the Leisure Time Exercise Questionnaire (LTEQ) developed by Godin and Shephard (1985). The questionnaire asks participants how many times per week they engage in strenuous, moderate, and mild exercise for more than 15 minutes. A question asking participants the average duration of each exercise bout was included. A test-retest reliability coefficient for strenuous exercise as measured by the LTEQ and composite score were reported as .94 and .74, respectively.

Implementation intentions were measured via six questions asking participants the percent of time (from 0% to 100%) they pre-determined a plan to exercise in regard to what, when, where, frequency, duration, and intensity (see Appendix D). A sample question asks how often the participant pre-determines when they will exercise, such as the specific day and time. Value was assessed through open-ended questions. Due to the lengthy number of possible outcomes (Rogers et al, 2007), a list was not provided. Participants were asked to identify the top three beneficial outcomes they expected to gain as a result of successful completion of the exercise intervention program and to rate on a scale from 1 (*not at all)* to 5 (*very important)* the importance of each (see Appendix E).

Barrier self-efficacy was measured using a modified version (Dyrlund & Wininger, 2006) of a questionnaire developed by Marcus, Selby, Niaura, and Rossi (1992). The 6-item questionnaire asks participants to report a percentage (from 0% to 100%) of how confident they are in their ability to exercise regularly when faced with barriers that may prevent participation (see Appendix F). An example item is "When you are feeling pressed for time." The coefficient alpha of internal consistency from item analysis and reliability estimation was .82.

Goal commitment was measured using a 5-item measure developed by Klein, Wesson, Hollenbeck, Wright, & DeShon (2001) that is a modification of Hollenbeck, Williams, and Klein's (1989) original 9-item measure. On a 5-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*), participants are asked to rate how much they agree with statements regarding their devotion to achieving the goal (see Appendix G). A sample item is "It's hard to take this goal seriously." For the 5-item measure, Klein et al.

found a coefficient alpha reliability of .74 and factor loadings from a confirmatory factor analysis ranging from .65 to .74. These results indicated a unidimensional 5-item measure of goal commitment derived from the original 9-item measure.

Procedure

Participants signed up for the study through registering for the Physical Activity Challenge offered by Western Kentucky University's Employee Wellness Program. The objective of the Physical Activity Challenge was to increase the weekly amount of time spent exercising at a moderate intensity level. Participants were given standard weekly goals designed to increase their amount of exercise to a total of 30 minutes or more on 5 or more days. The specific goals for each week are listed in Table 2. In the registration process, participants were notified that taking part in the Physical Activity Challenge would include reporting goal setting measures that would be included as part of the current study. Participants were asked whether they would be willing to receive e-mails as part of a study.

Table 2

Weekly Exercise Goals

	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8
Minimum Minutes/Day	15	20	20	25	25	30	30	30
Minimum Days/Week	3	3	4	4	5	5	5	5
Total Minutes/Week	45	60	80	100	125	150	150	150

Half of the participants were randomly assigned to the treatment group to receive prompts on goal setting while engaging in the exercise program. The other half, the control group, did not receive goal-setting prompts while engaging in the exercise program. Before starting the exercise program, the treatment group and control group reported their implementation intentions, goal commitment, self-efficacy, and expectancy values. Pre-measures of the covariates were taken to serve as a comparison to post-measures when the exercise program was complete.

Participants took part in the exercise program for eight weeks. Goal setting prompts were emailed to treatment participants during the second, third, and fourth weeks of the program. The three prompts focused on the areas of implementation intentions, value, and barrier self-efficacy, respectively. The implementation-intention prompt asked participants to identify such things as when, where, and for how long he or she plans to exercise. The value prompt asked participants to identify the benefits they expected to occur as a result of the program, rank their importance, and write a sentence explaining why the benefit is important to them. The barrier self-efficacy prompt asked participants to think of solutions or alternatives to commonly reported situations that prevent exercise, such as bad weather or schedule conflicts. Control group participants received reminder emails that were also sent to treatment group participants. Participants from both groups received activity ideas, meal vouchers, and prizes that were determined through drawings. Participants recorded the number of minutes spent engaging in strenuous, moderate, and mild exercise each week. When the program was completed, measures were taken for both groups on implementation intentions, goal commitment, self-efficacy, and value.

Results

Internal consistency reliability estimates were calculated for each of the four scales for both pre and post administrations. Reliability estimates for pre and post measures of implementation intentions were $\alpha = .944$ and .954, respectively. Reliability estimates for pre and post measures of goal commitment were $\alpha = .641$ and .751. Reliability estimates for pre and post measures of value were $\alpha = .699$ and .845. Reliability estimates for pre and post measures of barrier self-efficacy were $\alpha = .869$ and .897.

To test the first hypothesis that the treatment group would significantly increase the amount of exercise each week as compared to the control group, a repeated measures analysis of variance (ANOVA) was run with group (treatment or control) as the between groups factor and 8 repeated measures: the minutes spent exercising at select intensities from week 1 through week 8. A composite score for the total amount of each participant's weekly exercise was calculated using the following LTEQ formula: Composite Score = (9 x Strenuous minutes) + (5 x Moderate minutes) + (3 x Light minutes). The LTEQ formula (Godin & Shephard, 1985) was designed to calculate the metabolic equivalent of different levels of physical activity. The mean composite scores of physical activity across the eight weeks for each group are listed in Table 3. Figure 1 illustrates the mean physical activity composite scores for each group for each week of the program. There was no significant main effect for group, F (1,150) = 1.48, $p = .23$. Contrasts were conducted to test for linear and quadratic trends. There was a significant linear relationship over time for the number of minutes spent exercising, F (1, 150) = 10.04, $p < .01$. The effect size (η_p^2) was .063. There was a significant quadratic

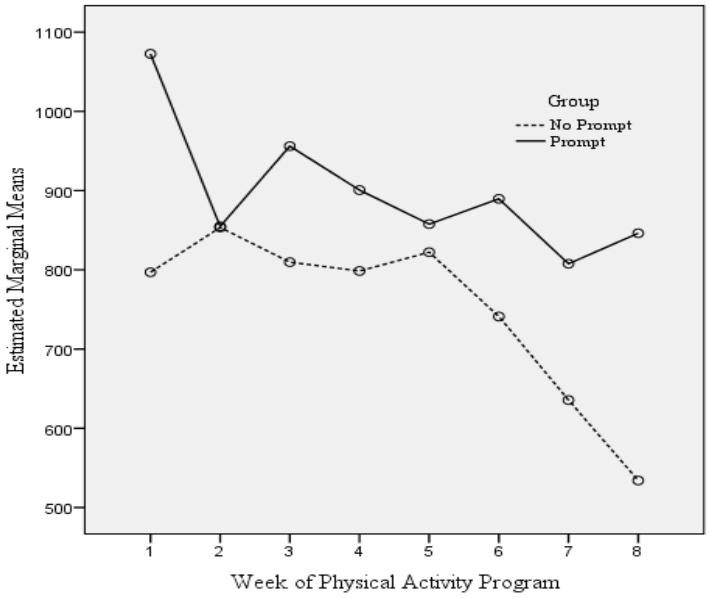
relationship between group and factor, F (1, 150) = 4.83, $p < .05$. The effect size (η_p^2) was .031.

Table 3

Means and Standard Deviations of Physical Activity Composite Scores

	No Prompt	Prompt	Total
Week 1	796.93 (757.06)	1072.57 (974.21)	911.18 (861.54)
Week 2	853.44 (884.48)	854.83 (799.01)	854.01 (847.38)
Week 3	809.66 (880.01)	956.08 (1236.83)	870.35 (1041.48)
Week 4	798.52 (888.56)	900.62 (843.98)	840.84 (868.99)
Week 5	822.27 (1007.02)	857.67 (806.83)	836.94 (926.60)
Week 6	741.04 (1025.96)	889.62 (912.20)	802.62 (980.04)
Week 7	635.55 (859.86)	807.63 (769.97)	706.87 (825.56)
Week 8	534.11 (803.92)	846.16 (862.32)	663.45 (840.09)
Total	748.94 (888.36)	898.15 (900.67)	810.78 (898.96)

Figure 1. Estimated marginal means of LTEQ.



To test the second hypothesis that the treatment group would have significant increases in covariate values from pre to post assessment compared to the control group, a repeated measures ANOVA was run with 4 dependent variables (implementation intentions, goal commitment, value, and barrier self-efficacy) and 2 dependent variable repeated measures (pre and post) with the independent variable, group (treatment or control), as the between groups factor. There was no significant between groups by factor difference for any of the four covariates. Table 4 lists the degrees of freedom, *F*-values, and significance for each covariate. There was a significant increase in implementation intentions from pre to post for all participants, $F\ (1, 70) = 6.636$, $p < .05$. The effect size (η_p^2) was .087. Mean scores of the covariates for each group before and after the program appear in Table 5.

Table 4

Covariate F-Values, Degrees of Freedom, and Significance

	df	*F*	*p*
Implementation Intentions	(1, 70)	.124	.726
Goal Commitment	(1, 70)	.066	.798
Value	(1, 70)	1.451	.232
Barrier Self-efficacy	(1, 70)	.087	.769

Table 5

Means and Standard Deviations of Covariate Values Before and After the Program

	Pre	Post
No Prompt:		
Implementation Intentions	68.42 (22.23)	77.46 (16.15)
Goal Commitment	4.36 (.49)	4.28 (.50)
Value	4.46 (.66)	4.60 (.64)
Barrier Self-efficacy	63.42 (17.82)	63.86 (18.14)
Prompt:		
Implementation Intentions	65.20 (23.54)	72.06 (21.99)
Goal Commitment	4.25 (.52)	4.14 (.54)
Value	4.45 (.76)	4.34 (.90)
Barrier Self-efficacy	62.50 (16.35)	61.67 (19.59)

To test the third hypothesis that each covariate would account for a significant amount of the variance, a repeated measures ANOVA was run with group (treatment or control) as the between groups factor and 8 dependent variable repeated measures: the minutes spent exercising from week 1 through week 8. Pre-assessment of implementation intentions, goal commitment, value, and barrier self-efficacy were included as covariates. Barrier self-efficacy did account for a significant amount of variance in the dependent variable, time spent exercising, F (1,136) = 8.98, $p < .01$. Implementation intentions, goal commitment, and value were not significant covariates. Mean scores of the covariates for each group prior to the program appear in Table 7. The values in Table 5 that refer to the second hypothesis differ from Table 6 because the second and third hypotheses have different sample sizes. The second hypothesis uses pre and post measures of participants, while the third hypothesis only uses post measures. There were more participants who completed the pre measures than those who completed both, the pre and post measures.

Discussion

Across the eight weeks, participants who received goal-setting prompts did not significantly increase the amount of time spent exercising each week as compared to the control group, but there was a trend that the treatment group maintained a steady amount of exercise while the control group declined. The amount of physical activity declined in a linear manner. It is interesting to note that after the 5th week, the control group continuously declined, while the treatment group maintained a steadier rate of physical activity. The quadratic relationship showed a major decrease then an increase in physical activity in the treatment group from week 1 to week 2. Once the treatment group received the implementation-intentions prompt, physical activity increased for the treatment group.

Table 6

Means and Standard Deviations of Covariate Values of Both Groups Before the Program

	Pre
No Prompt:	
Implementation Intentions	65.67 (25.50)
Goal Commitment	4.29 (.49)
Value	4.52 (.65)
Barrier Self-efficacy	62.30 (17.83)
Prompt:	
Implementation Intentions	60.83 (26.65)
Goal Commitment	4.26 (.50)
Value	4.48 (.67)
Barrier Self-efficacy	58.31 (19.90)

The control group did not have such variation. The increase in physical activity after participants received the implementation-intentions prompt suggests potential value for forming implementation intentions in physical activity programs.

Our second hypothesis expected the treatment group to have significant increases in covariate values from pre to post assessment compared to the control group. Participants who received goal-setting prompts did not report significant increases in their values of implementation intentions, goal commitment, expectancy value, and barrier self-efficacy from pre to post assessment compared to the control group. Participants in both groups did significantly increase their implementation intentions over time.

Results from our third hypothesis indicated that barrier self-efficacy was the only covariate accounting for a significant amount of variance in time spent exercising. Further examination of the barrier self-efficacy pre-measures revealed that the control group had higher barrier self-efficacy prior to beginning the program. Examination of box plots revealed outliers in the control group that were actually skewing the results to be lower. Removal of those outliers would increase the control group's mean barrier self-efficacy even higher. In support of the current study, despite the control group's higher barrier self-efficacy, the treatment group with lower barrier self-efficacy scores maintained a steady rate of exercise, while the control group declined. An additional factor to consider is the high amount of physical activity reported in the first week by the treatment group, which was before any prompts were given. Future research should consider having participants complete the first week of the program to obtain physical activity measures, then match participants to assign to the treatment and control groups.

Gender differences were also examined because of the larger number of female participants. No differences in gender were found.

To examine further the reasons/expectations participants had for participating in the program, participants were classified by their main purpose for exercising. Possible classifications included the following: personal enjoyment (for fun), appearance/weight management, social reasons (to be with friends, to socialize), fitness/health (to be physically fit), and competition/challenge (to improve or maximize performance). This classification system was based on previous research by Ryan, Frederick, Lepes, Rubio, and Sheldon (1997). Participants were classified based on the expectation they valued highest. For participants who reported more than one expectation at the highest value, their classification was based on the expectation reported first. Fifty participants (32.9%) were classified as appearance/weight management, 85 participants (55.9%) as fitness/health, and 11 participants (7.2%) as competition/challenge. No participants were classified as personal enjoyment or social reasons. Examples of appearance/weight management expectations included “lose love handles” and “weight loss.” Examples of fitness/health included “reduction in stress level” and “more energy.” Examples of competition/challenge included “increase physical endurance” and “increase my pace time.” There were no differences in effectiveness of the treatment contingent upon a participant’s reasons for exercising.

Additional analyses were conducted to examine the changes in physical activity each week after a prompt was given (i.e., week 2, 3, and 4). A repeated measures ANOVA was run with group as the between subjects factor and 2 repeated measures: the mean physical activity composite score for week 2 and week 3. This analysis was also

done for the change from week 3 to week 4 and week 4 to week 5. The analyses did not yield any significant changes in physical activity.

One-hundred ninety-two participants signed up to take part in the physical activity challenge, 30 of which were not willing to receive the prompts as part of a thesis project. Those who were not willing to receive the prompts were removed from the sample. After the program, we examined whether there were any differences between those who were willing to receive the prompts and those who were not. It is interesting to note that it did not matter whether participants received the prompts or not, but whether or not they were willing to receive the prompts did. Those who did not want to receive the prompts had significantly lower scores in implementation intentions (F (2, 81) = 3.672, p<.05) than those who agreed to participate. Goal commitment, value, and barrier self-efficacy scores were lower, but not significantly. Future research should examine characteristics of participants not willing to receive the goal-setting prompts. Additionally, participants self-selected themselves to be a part of the program. There may be differences in the types of people willing to sign up for an exercise program compared to those who are not.

People who perceive a large number of barriers to goal attainment may be less likely to take part in an experiment (Harrison & Liska, 1994). Some barriers may include lack of physical ability, lack of resources (e.g., available time to exercise), environmental events, or unsuccessful past experiences (e.g., failed diets). Harrison and Liska further suggested that individuals who perceive the strongest barriers may be the individuals in the most need of health improvements through exercise intervention programs. Future research and programs should investigate methods for recruiting these individuals and for

reducing perceived barriers of feelings of obesity, chronic illness, and fatigue that may prevent participation.

Although I requested that participants not discuss the program with others, a limitation is the possibility that participants in the goal setting training group shared knowledge with the control group. An additional limitation is the role of goal difficulty. Although the goal-setting group was prompted to set realistic, but difficult goals, it is not a variable that was controlled. Participants' relative levels of physical ability influenced the difficulty of goals set. Future research should look further into the benefits healthier employees and exercise programs can bring to an organization.

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Appendix A

First Prompt E-mailed to the Treatment Group

The following 6 questions are part of a thesis project examining specific behaviors of participants in the Physical Activity Challenge. They are designed to assist you with successful completion of the program. Please reply with answers to the following questions. Please do not share this email with other participants. Thank you.

Develop a Plan with 6 Simple Questions!

1. How many times per week will you exercise?

2. What time and days of the week will you exercise?

3. How long will you exercise for?

4. Where will you exercise? (e.g., gym, outside, park)

5. What type(s) of exercise will you engage in? (e.g., running, swimming, biking, etc)

6. What intensity will you reach/perform at? (mild, moderate, strenuous)

Appendix B

Second Prompt E-mailed to the Treatment Group

The following questions are part of a thesis project examining specific behaviors of participants in the Physical Activity Challenge. They are designed to assist you with successful completion of the program. Please reply with answers to the following questions. Please do not share this email with other participants. Thank you.

What do you see as the top 3 benefits of exercising?

1.
2.
3.

Write a sentence for each benefit explaining why that specific benefit is important to you.

1.
2.
3.

Appendix C

Third Prompt E-mailed to the Treatment Group

The following 3 questions are part of a thesis project examining specific behaviors of participants in the Physical Activity Challenge. They are designed to assist you with successful completion of the program. Please reply with answers to the following questions. Please do not share this email with other participants. This is your last email asking for responses to questions. Thank you.

Identify the 3 most common barriers (e.g., bad weather or not enough time) that prevent you from exercising and identify how you will overcome them.

1. Barrier:
   Solution:

2. Barrier:
   Solution:

3. Barrier:
   Solution:

Appendix D

Implementation Intentions Measure

Indicate the percent of time that you pre-determine a plan to accomplish your goals using the above scale. (e.g., How often do you pre-determine when, where, etc. you will exercise?)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

WHEN (specific day & time)
WHERE (specific place)
WHAT (specific mode or routine)
FREQUENCY (times per week)
DURATION (minutes per session)
INTENSITY (mild, moderate, strenuous)

Appendix E

Expectancy Value Measure

List the top 3 benefits you expect to occur as a result of increasing the amount of moderate physical activity you engage in weekly.

Rate the overall importance (1 score) of each of these outcomes using the following 5 point scale: 1 (Not At All) – 5 (Very Important).

1.
2.
3.

Appendix F

Barrier Self-Efficacy Measure

I am sure I can't										I am sure I can
0%	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100%**

Circle the number that indicates how <u>confident</u> you are that you can…engage in moderate physical activity for at least 30 minutes per day for 5 or more days per week.

1. When you are tired.

0%	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100%**

2. When you are feeling sad.

0%	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100%**

3. When you are feeling pressed for time.

0%	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100%**

4. When you are feeling sick.

0%	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100%**

5. When the weather is bad.

0%	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100%**

6. Regularly for the next eight weeks.

0%	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100%**

Appendix G

Goal Commitment Measure

Read the following statements and rate the extent you agree or disagree using the above scale. "Your goal will be to increase the amount of weekly moderate physical activity you engage in."

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

1) It's hard to take this goal seriously.
2) Quite frankly, I don't care whether I achieve this goal or not.
3) I am strongly committed to achieving this goal.
4) It wouldn't take much to make me abandon this goal.
5) I think this goal is a good goal to shoot for.