SUSTAINABLE BEHAVIOR CHANGE AT KANSAS STATE UNIVERSITY: APPLYING THE FOGG BEHAVIOR MODEL AS A COMMUNITY-BASED SOCIAL MARKETING APPROACH AMONG FACULTY AND STAFF

by

MAGGIE STEPHENS

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Major Professor
Huston Gibson, Ph.D.

Abstract

Communities are currently faced with the issue of integrating sustainable practices into citizen lifestyles, a problem that can be addressed through behavior changes strategies. Higher education institutions can provide a testing ground for different behavior change strategies, specifically the Fogg Behavior Model (FBM) and its application to the social structures that are important in community-based social marketing (CBSM). This research proposes to examine FBM among Kansas State University faculty and staff as a viable CBSM approach for sustainable behavior change. A targeted behavior and trigger for the targeted behavior were selected. The trigger was implemented among select university departments with both pre- and post-experiment surveys distributed to assess trigger effectiveness and limiting factors to ability and motivation. The research showed an increase to the targeted behavior due to trigger implementation and described ability and motivation limiting factors within those select departments. With further investigation into these limiting factors and a widespread trigger effectiveness study, FBM could serve as an effective model that addresses social behavior change within a CBSM framework. FBM's potential success in a university setting bodes well for its success in communities and a community-based social marketing approach to create sustainable behavior change.

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Chapter 1 - Introduction

Communities are currently faced with the issue of practicing sustainable approaches for development. Community members need to adopt more sustainable lifestyles and participate in sustainable behavior change in order to effectively enhance the community experience. The use of sustainable approaches for behavior change is a topic that is best addressed through a social lens. Higher education institutions could potentially be leaders in encouraging sustainable behavior changes on campus and among university lifestyles. In an atmosphere that is founded on building community and simultaneously emphasizes academics and socialization, the university setting could serve as an effective medium to integrate sustainable practices into the daily routines of individuals that occupy campus social systems. While universities should offer and focus on academic opportunities related to sustainability for students, university faculty and staff play a more permanent role on campus and have greater influence on day-to-day behavior change. Universities and communities face the issues of determining how to communicate and promote sustainable behavior changes in ways that will not only enhance the sustainability of the organization, but will also permeate the social ranks that are engaged in daily operations.

Study focus and context

This research proposes to examine the Fogg Behavior Model (FBM) among Kansas State University (K-State) faculty and staff as a viable community-based social marketing approach for sustainable behavior change. FBM proposes behavior change by examining three contributing factors: ability, motivation, and triggers. Ability serves as a measurement for the behavior's simplicity. Simplicity can increase ability. Motivation refers to the level of desire to perform the behavior and triggers serve as forms of encouragement for the behavior (Fogg, 2011). Fogg (2009a) suggests that if both ability and motivation are present, only a trigger is needed for the individual to engage in behavior change. To better understand how FBM can contribute to the sustainability of K-State, it is necessary to examine the interaction among and perception of these three factors' within faculty and staff workspaces. To address these

needs, this research tests trigger effectiveness among select university departments and investigates limiting factors to ability and motivation that influence trigger success rates.

Within this research are three sub-problems. The first sub-problem will identify specific departments in which FBM will be tested on, while the second sub-problem will determine which common behavior has the potential to change among K-State faculty and staff by using FBM. The final sub-problem will identify a trigger for the determined behavior. It is assumed that the Fogg Behavior Model will continue to be a valid behavioral change model and that sustainable behavior changes will be needed in order to enhance the community's natural, social, economic, and other forms of capital. The research also assumes that K-State faculty and staff will continue to understand and have the ability to influence day-to-day campus operations.

K-State is located in Manhattan, Kansas with a current enrollment of more than 24,300 students from all 50 states and more than 90 countries. University faculty and staff instruct courses for more than 250 undergraduate majors, 65 master's degrees, and 45 doctoral degrees within nine colleges and work closely with students in more than 475 student organizations (Kansas State University, 2013). K-State offers a diverse population of interests in which to further study the implementation of sustainable behavior changes on a college campus. The university also serves as a great laboratory for social change. K-State's Admissions Office reports that 97% of alumni recommends the university to others, exhibiting the strong social capital on campus (Kansas State University, 2013). Combining a diverse population with a dynamic social atmosphere, K-State acts as a good environment for better understanding effective strategies for promoting sustainable behaviors.

Social importance of the research

Understanding how to influence sustainable behavior is crucial to enhance the quality of life on a university campus, and in turn, communities as a whole. Providing opportunities for individuals to choose lifestyles that consider the importance of environmental protection, societal justice, and a balanced economy is key during a time when sustainability is a topic of

great discussion among many communities. In general, we struggle to find symmetry in the three pillars of sustainability, making the development of behavioral change strategies an opportunity to create change among individuals and ultimately, within communities.

Chapter 2 - Literature Review

Social behavior change efforts require community involvement for sustainment (Monaghan, 2011; Slater et al., 2000). Utilizing the community spirit that exists in departments and offices on campus can play a powerful role in the desired social and environmental outcomes for the university, or the community as a whole. Faculty and staff social structures that exist across campus could be leveraged to get departments and offices in their entirety to actively seek behavior change. Small networks of like-minded people are most effective when attempting to practice behavior change within communities (Carrigan et al., 2010). A behavior change campaign will substantially suffer without member participation as it increases awareness and possible efficacy of such projects (Monaghan, 2011). Building relationships and using those relationships in behavior change strategies can strengthen the method's effectiveness and create results that withstand the challenge of time (Slater et al., 2000). Carrigan et al. (2010) says personal connectors are key drivers for both innovation diffusion and responsible behavior change. Faculty and staff working in established departmental structures can form a diverse range of social systems that serve as influential peer groups. Approaching university faculty and staff networks as social groups is the first step in understanding how to influence behavior on campus. Comprehensive knowledge of user consumption patterns and behavioral habits, as they exist in social settings, are crucial for sustainable behavior change. Studying user behaviors is directly related to environmental impact and improvements to daily practices. Ultimately, wasteful routines can decline, new habits can be formed, and long-term behaviors can be established when looking at behavior change through a community-based, social lens (Selvefors, Blindh Pedersen & Rahe, 2011).

Social marketing and behavioral change

An apparent gap exists between an individual's attitude toward and knowledge of sustainability and their willingness to accept a lifestyle change (Carrigan et al., 2010). Essentially, there is a significant difference between a stated desire to change and an actual tendency to change (Carrigan et al., 2010). Many assume that increasing knowledge or exhibiting positive attitudes can bring about sustainable conduct and, until recently, this is

how most advertising campaigns were conducted (McKenzie-Mohr, 2000a; 2000b). However, informational interference, otherwise known as promotional activity like advertising or education in conventional marketing, does not attack the social system in which these behaviors exist. Often, conventional advertising or educational campaigns inform the community but do not result in the actual acceptance of a behavior change (Carrigan et al., 2010; McKenzie-Mohr, 1999; Peattie & Peattie, 2009).

Promoting sustainable behavior changes among university faculty and staff requires an understanding of the social capital within departmental networks. A strategy that seems to best align with sustainability employs a concept called community-based social marketing (CBSM). Because one of the pillars of sustainability considers the importance of societal health, a concept focusing on social interaction creates a great amount of opportunity for sustainable change. CBSM capitalizes on the interaction between four groups of adopters: innovators, early adopters, early majority, and laggards (McKenzie-Mohr, 2000a). This research requires the identification of university faculty and staff social circles and the innovators within those circles. Placing faculty and staff leadership as the figurehead of the campus community intervention directly influences the potential for behavior change (Slater et al., 2000). Additionally, promotional activity typically implies some form of marketing. Combining these needs, the behavioral change conversation is best initiated with an overview of social marketing, specifically CBSM, and how the use of social capital in university offices and departments can lead to sustainable lifestyle changes within organizations and communities.

CBSM serves as an alternative to conventional informational or awareness campaigns that are commonly implemented among marketers. McKenzie-Mohr (1999) explains the term as "research in the social sciences that demonstrates that behavior change is most effectively achieved through initiatives delivered at the community level which focus on removing barriers to an activity while simultaneously enhancing the activities benefits," (p. 3). CBSM can achieve behavior change in four steps, 1) barrier and benefit identification, 2) behavior change tool strategy, 3) strategy implementation to remove barriers, and 4) strategy evaluation. McKenzie-Mohr suggests specific tools within the CBSM framework that can be

used to encourage sustainable behavior change including commitment, prompt, norms, communication, and incentive strategies. Commitment strategies target the concept of effectiveness in small requests. Those who agree to small requests are more likely to engage in a more substantial request. It allows an individual to recognize a difference in their actions and promotes the human desire to be consistent. Serving as reminders, prompt strategies capitalize on the tendency to forget. This tactic is often found in the form of visual or audio aides to those activities that are otherwise forgotten. Norms exploit the effects of peer pressure that exist throughout social groups. Individuals habitually act as their social circles do, despite knowledge of more effective or efficient methods. Communication methods also have the ability to severely impact behavior by maintaining dialogue about specific issues and behavior within those same social groups. Finally, incentives use motivation for activities that observe low participation or are not being performed efficiently (McKenzie-Mohr, 1999; 2000a; 2000b). In CBSM, these behavior change tools are used at the community level, utilizing social structures that leverage the individual's connections with a group to which they closely associate. This format provides great opportunity for behavior change that relates to sustainability and sustainable lifestyles, a practice that has historically lacked rapid adoption.

Traditionally, marketing has not been associated with sustainability. In many ways, marketing has been the antithesis of sustainable lifestyles when it could hold the potential to offer solutions to the issues surrounding sustainability. It is important to keep in mind that marketing, as a tool, is not "good or bad," but a neutral entity for marketers to use as they please (Peattie & Peattie, 2009). The concept of CBSM is a strategy that could very well be effective if utilized properly. Social marketing suggests that socially responsible organizations can create "curative change" (Carrigan et al., 2010). Typically, media efforts view sustainability as a product to be sold. This is good for increasing awareness, but not effective in changing lifestyle practices (McKenzie-Mohr, 2000b). Conversely, social marketing attempts to use many of the same tools traditional marketing employs, but envisioned for social or community goals as opposed to commercial outcomes, making it fundamentally different than conventional marketing (Andreasen, 1995; Monaghan, 2011; Peattie & Peattie, 2009;

Slater et al., 2000). For example, the conventional marketing mix of product, place, price, and promotion are reframed to focus on "anti-consumption," accessibility, costs of involvement, and communication (Bryant et al., 2000; Monaghan, 2011; Peattie & Peattie, 2009). Each of these factors deals with fundamental social and cultural issues ingrained into daily lives. Consumption, access, costs, and transparency in communication are all influenced by deep-seated, embedded norms. To disrupt the status quo that is traditional marketing, CBSM must strive to alter these norms and seek true behavioral change.

Verplanken and Wood (2006) and Carrigan et al. (2010) have identified behavior change as a "downstream" approach, opposed to an "upstream" approach. Upstream approaches are preemptive interventions intended to transform a behavior before its implementation (Carrigan et al., 2010). An ultimate upstream approach, for example, would be the reflection of sustainable values within policy changes (Peattie & Peattie, 2009). Often, the underlying issue requires upstream action as it combats more established habits (Carrigan et al., 2010). Behavior change tools, however, take the form of downstream approaches, as they are on-site interventions that allow an individual to choose change at the point of action where behavior is more conducive to change.

To successfully promote sustainability within a CBSM framework, a clear understanding of how behaviors can be influenced and eventually changed is the vital component in what could be the harmony of sustainability and communities (McKenzie-Mohr, 1999). Social marketing focuses on behavior change and is implemented through behavior change tools. Behavior change tools are methods that foster or promote the acceptance, rejection, or modification of individual behaviors and lifestyle practices. Kotler et al. defines the method as "the use of marketing principles and techniques to influence a target audience to voluntarily accept, reject, modify, or abandon a behavior for the benefit of individuals, groups, or society as a whole." FBM offers a method that concentrates on downstream approaches by striving for behavior acceptance, rejection, or modification. Fogg's (2009a) framework is designed to support small, but significant behavior change making it an appropriate fit for testing potential behavior change in day-to-day operations at K-State.

Applying the Fogg Behavior Model

FBM has the potential to create sustainable change in a social setting because it aligns with the CBSM framework in three primary ways. The model acknowledges CBSM in its three components of ability, motivation, and triggers as depicted in Figure 2.1. As CBSM calls for identification and removal of barriers, FBM requires simplifying behaviors by increasing ability. To reflect behavior change tool literature that is seen in the CBSM agenda, Fogg discusses motivation, which supports CBSM incentive strategies, and triggers, which align with prompt strategies. It is these three cooperating concepts that place FBM as an approach within the CBSM framework and the social marketing discussion in general.

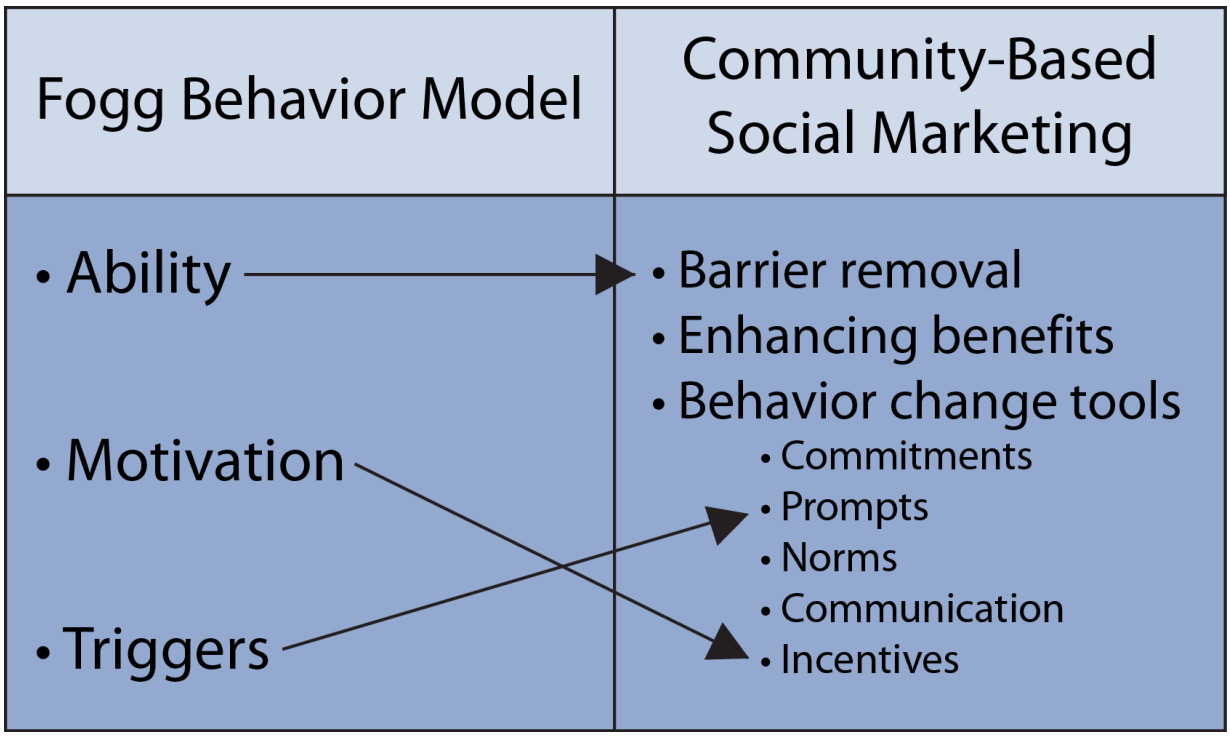

Figure 2.1 Fogg Behavior Model and community-based social marketing similarities

FBM looks to specific aspects of behaviors to assess the potential for change. Determining what elements are required to develop or maintain certain behaviors can result in an increase in sustainable consumption patterns or habits (Selvefors, Blindh Pedersen & Rahe, 2011). Fogg has stated that this is best accomplished through targeting behaviors. Persuasive power, referring to the attempts one would use to affect individuals' behaviors instead of attitudes,

can increase and be more effective if the behaviors are targeted (Fogg, 2009a; 2009b). Fogg's model (2011) is a systematic framework that strives for targeted behavior change by focusing on the factors influencing them. These influencing factors include motivation, ability, and triggers; all three must be simultaneously present if behavior change is to occur. FBM is based on the theory that behaviors need both motivation and ability. As motivation and ability increase, it is likely that the behavior will be implemented. If the user does not have the ability to perform the behavior, despite motivation level, it will not be executed (see Figure 2.2). Ultimately, motivation and ability are tradeoffs. Individuals with low motivation could possibly perform the behavior if it is easy or simple to do, and vice versa. If motivation is at a high level, some individuals might go above and beyond, despite difficulty level, to perform the behavior. Most people, however, possess a degree of flexibility in regards to motivation and ability, which can be manipulated to achieve desired behaviors (Fogg, 2009a).

In accordance with both CBSM and FBM, barriers must be treated as a principal contributing factor to behavior change. If the appropriate resources are not available, faculty and staff at K-State will not be able to integrate sustainable practices into office and department lifestyles. This issue must be eradicated if adoption of sustainable behavior is expected. Social marketers must "unfreeze habits" and "release behavioral lock-ins" that are potentially holding people back from making relatively easy lifestyle adjustments (Carrigan et al., 2010). It is crucial to take the view of the audience and identify the barriers, internal and external, within any potential behavioral change. Internal barriers occur within an individual's lifestyle. These can include lack of knowledge, non-supportive attitudes, or lack of motivation and are behavior specific (McKenzie-Mohr, 1999). External barriers may prevent the individual behaviors because of convenience or affordability (McKenzie-Mohr, 1999; 2000a; 2000b; Peattie & Peattie, 2009). Many of these barriers are present on a university campus. It is only a matter of identifying them. It is difficult to successfully design an implementation strategy for offices and departments at K-State without fully comprehending the obstacles they face. More often than not, implementing a social marketing strategy without first identifying present barriers results in little to no impact, exhibiting characteristics of social advertising, rather than social marketing (McKenzie-Mohr, 2000a; Monaghan, 2011). Instituting changes

within a community structure, in this instance, offices and departments, as if they are norms will make an impact in the name of sustainability. Collectively, behavioral changes are more likely to occur when alternatives are readily accessible or available to incorporate into daily routines, as daily routines play significant roles in shaping simple behaviors (Carrigan et al., 2010; Lomas, 1993; Selvefors, Blindh Pedersen & Rahe, 2011; Fogg, 2009a).

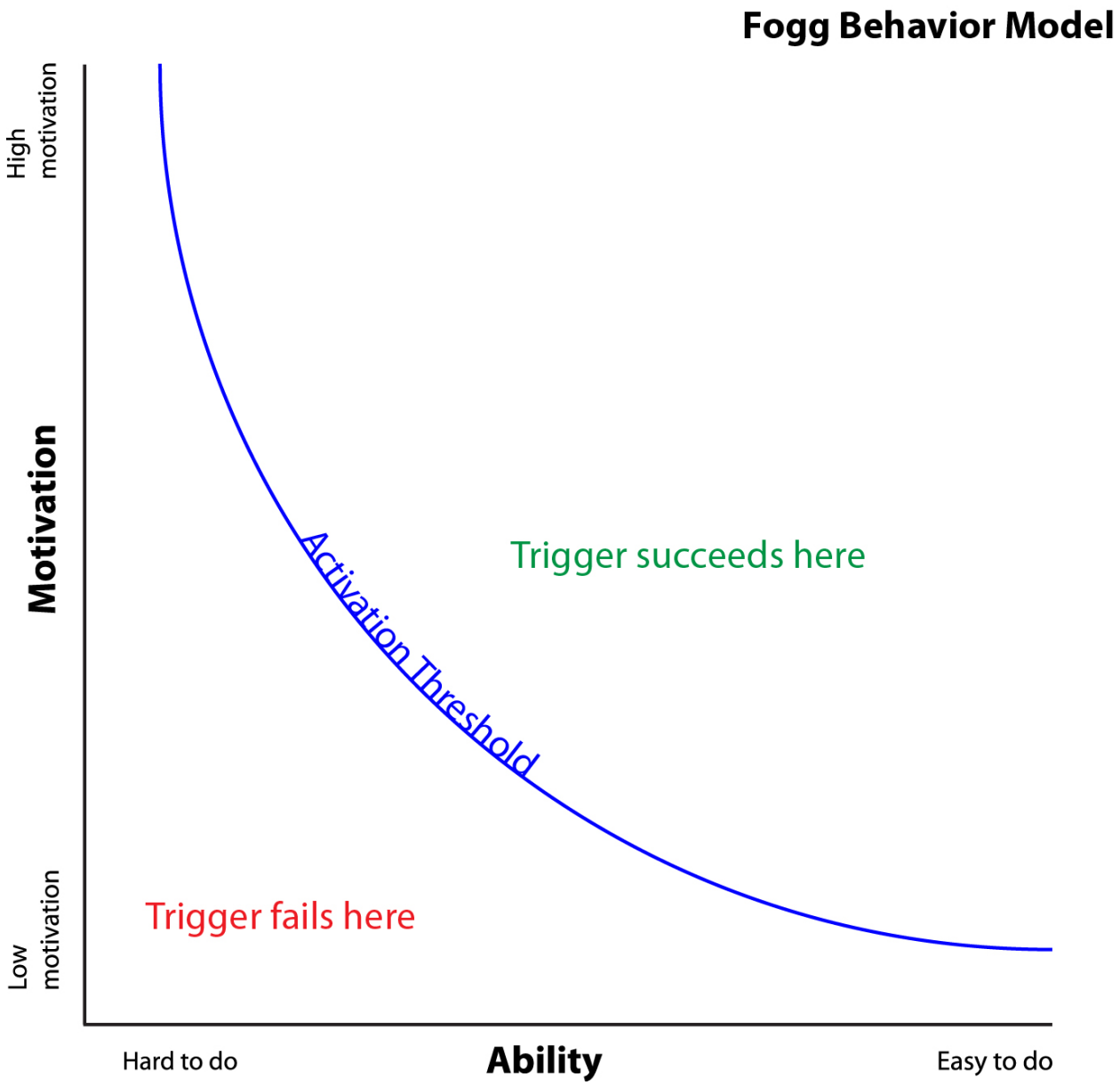

Figure 2.2 Fogg Behavior Model

Ability is a barrier that is necessary for manipulation if behavior change is expected. FBM addresses barriers head on by suggesting change among behaviors that have fewer or less severe obstacles. Specifically, FBM simplifies behavior change by examining the contributing factors. When approaching ability, it is important to remember that people are often discouraged by new information, such as teaching or training. Rather than presenting new information, make the behaviors simpler to do. Ability, according to FBM, is about simplicity. As simplicity increases, ability is likely to increase. Fogg defines simplicity as a function of a person's scarcest resource at the moment a behavior is triggered. Therefore, the audience's scarcest resource should be determined before triggering the behavior. As Fogg states, "simplicity changes behaviors" (Fogg, 2009a; 2011).

FBM breaks down simplicity into six components. If any one component ceases to exist or fails to function, the chain of simplicity is broken. The first component is time. Without time, the target behavior is not simple. The second component is money. Individuals without financial resources to complete the task or perform the behavior do not find it easy to accomplish. For those that have adequate financial resources, this link in the simplicity chain rarely breaks. It is important to note that what may be simple for some is not always simple for another, especially when considering finances. The third component is physical effort. Target behaviors that ask a great deal of physical effort may not be considered simple. The fourth component is referred to as brain cycles. Thinking hard or critically before performing a target behavior does not enhance simplicity. Typically, critical thinking is perceived as difficult. The fifth component is called social deviance, which is going against the social grain or rebelling against the norm. Target behaviors that require the individual to break the rules of society are not considered simple. Fogg refers to the final component as non-routine. Simple behaviors are routine behaviors, or activities that are done on a regular basis (Fogg, 2009a). Ability will contribute to behavior change only if the appropriate amount of money, time, physical ability, cognitive ability, and other necessary variables are present (Ferebee, 2010). As mentioned before, simplicity varies on a case-to-case basis. Individuals with different resources in different contexts will have different "simplicity profiles." Increases in motivation are not always the solution to behavior change. Often times, making tasks more simple or

increasing ability, is a more effective method (Fogg, 2009a). Individuals are practiced at resisting attempts to increase motivation levels. Instead, behavior change should be designed around simplicity. People are naturally drawn to simple behaviors (Fogg, 2011).

The second avenue of manipulation is achieved through motivation levels. When ability is high but motivation is low, users need increased motivation to have the opportunity to change behavior. Motivation can be viewed as either of intrinsic or extrinsic nature, or the result of dichotomous variables (Ferebee, 2010). In any case, Fogg explains three primary types of motivation, each with two contributing factors. The first motivator is pleasure and pain, the result of which is typically immediate. To employ this motivator, it is important to look at how pleasure or pain can be embodied. The second motivator is hope; the anticipation of good results, and fear, the anticipation of bad results. This motivator can be more powerful than pleasure or pain as evident in everyday lifestyles. Individuals often endure pain in order to avoid fear. Fogg considers hope as the most ethical and empowering motivator that exists in the model. The final motivator is social acceptance and social rejection; this controls a majority of social behavior. Motivation to be socially accepted often inspires individuals (Fogg, 2009a; 2011).

The FBM framework is depicted in Figure 2.2 (Fogg, 2011). The vertical axis on the model represents motivation. Persons possessing low motivation to perform a behavior would be placed low on the vertical axis. High motivation is placed high on the vertical axis. The horizontal axis on the model represents ability. Persons possessing low ability to perform a behavior would be placed on the left of the horizontal axis. High ability is placed on the right of the horizontal axis. A person with no motivation and no ability would register in the lower left portion of Figure 2.2. High motivation and ability levels place individuals in the upper right portion of Figure 2.2. Those registering in the lower left sector of the graph are unlikely to perform targeted behaviors. In contrast, people in the upper right corner of the graph have both the ability and the motivation to execute, and are therefore, more likely to follow through. This of course, is contingent on the fact that a proper trigger is present. Desired target behaviors should be considered in relation to the activation threshold. Fogg's (2009a)

model states, "The opportune moment for behavior performance is any time motivation and ability put people above the behavior activation threshold," (p.3). The behavior activation threshold is represented as a curved line sweeping from the upper left portion of the model to the bottom right. When motivation and ability places a person above the behavior activation threshold, a trigger can compel the individual to act on the target behavior (Fogg, 2009a).

A trigger must influence the behavior. A trigger is a mechanism that reminds individuals to perform the targeted behavior, a visible symbol that should be related to the desired behavior change and must occur when both ability and motivation exist (Ferebee, 2010; Selvefors, Blindh Pedersen & Rahe, 2011). Without a trigger, motivation and ability mean little. Even if motivation and ability are high, triggers must be present. Triggers can take many forms and be implemented in many ways. Typically, they consist of three elements, 1) they must be noticeable, 2) they must be easily associated to the targeted behavior, and 3) they must occur at the exact time when motivation and ability are at its peak. Timing is often the missing element (Fogg, 2009a).

Fogg describes three types of triggers Including sparks, facilitators, and signals. Sparks are triggers that are employed when an individual lacks motivation. They should leverage the different types of motivation, including pleasure and pain, hope and fear, as well as acceptance and rejection. If the individual possesses low motivation levels for the target behavior, a trigger will be perceived as distracting. Because sparks encourage an individual to do something they didn't initially intend to do, they can be considered distressing. Facilitators are implemented when the user lacks the ability to perform the behavior but has high motivation levels. Ultimately, facilitators should trigger the behavior while also making it easier to achieve. Occasionally, if the individual doesn't possess sufficient ability and a trigger is executed, the individual will become agitated. Signals are those triggers that should be used when the user has both ability and motivation. Essentially, signals simply serve as reminders. These strategies capitalize on tendencies to forget; serving as forms of visual or audio aides to those activities we might otherwise forget to perform (McKenzie-Mohr, 1999).

In these conditions, a spark or facilitator would be perceived as frustrating or condescending. Fogg states that signals and facilitators are primarily the triggers that are most effective (Fogg, 2009a; 2011).

FBM provides insight to the user experience, making behavior change easier to comprehend and accomplish through close examination of the framework. Simply put, all that is required is a determination of which influencing factor is not present: motivation, ability, or a trigger. While these concepts stem from CBSM, FBM allows a systematic way to examine specific behavior changes through types of motivation and ability as well as strategies or methods to trigger targeted behaviors (Fogg, 2009a; 2011). FBM was chosen for this research project for its targeted approach toward behavior change, shedding light on how sustainable behavior could be influenced on campus. Sustainable behavior adoption or change can create a user experience that encourages resource efficient behaviors and even a reduced environmental impact during usage (Selvefors, Blindh Pedersen & Rahe, 2011). For these reasons, this research aims to apply FBM to K-State faculty and staff that consider campus offices and departments their university living space by testing the potential for sustainable behavioral change among specific social networks and communities. Innovators, one of the four adopter groups, are utilized in the form of involved and interested faculty and staff to implement triggers and identify ability and motivation limiting factors within a social system. Because FBM so closely aligns with CBSM and the social marketing concept, Fogg's model could be paired with university departments and offices to serve as a living laboratory for behavior change in an environment with a high concentration of social interaction.

As a whole, an effective behavioral change campaign on the K-State campus will target specific social networks and groups among faculty and staff, evaluate the barriers of one's ability to and motivation for energy related behavior change, and determine ways to potentially create change on campus through a specific trigger (McKenzie-Mohr, 2000b, Fogg, 2009a). The following methods attempt to use university social networks and FBM as a viable adversary in the face of individual behavior and lifestyle change on campus.

Chapter 3 - Research Design

This research project tested the influence FBM could have on K-State faculty and staff for an energy related behavior on campus. In order to do so, an FBM-based process was developed in which a targeted behavior was identified, a trigger for that behavior was established, and the elements of FBM surrounding the behavior were investigated. Trigger effectiveness was tested among select university departments and limiting factors to ability and motivation that influence trigger success within those select departments were identified. Representatives from four select university departments chose turning off power strips near faculty and staff workplaces as the targeted behavior. This behavior was chosen based on faculty and staff knowledge of behavior change feasibility, meaning these representatives selected a behavior they believed would possess a significant amount of both ability and motivation. The targeted behavior trigger, an electronic calendar reminder, was also selected by the four representatives based on what they believed their coworkers would best respond to (see Figure 3.1). Participants were surveyed both before and after trigger implementation to assess trigger effectiveness and attitudes towards FBM components, ability and motivation. The surveys also allowed participants to comment on their individual practices regarding the targeted behavior. Essentially, testing trigger effectiveness and revealing barriers to ability and motivation provide a greater understanding of the role FBM could play on K-State's campus.

The act of applying FBM to K-State faculty and staff uses network analysis, or social network theory, and helps to understand how the promotion of sustainable behaviors should be conducted. This approach examines how the social and relational component of a specific individual, group, or organization affects behaviors and beliefs. In part, this evaluative research seeks to understand faculty and staff perception of behavior change on the K-State campus. Social network theory places relationships above the individual within a network framework by asserting that the groups we belong to heavily influence our behaviors (Kadushin, 2011). Utilizing faculty and staff allows the relationships and connections within and across departments, offices, and other organizations or institutions to serve as

encouragement for preferred lifestyle changes. It is important to employ the social capital that exists among these groups to influence the behavioral adoption or change process.

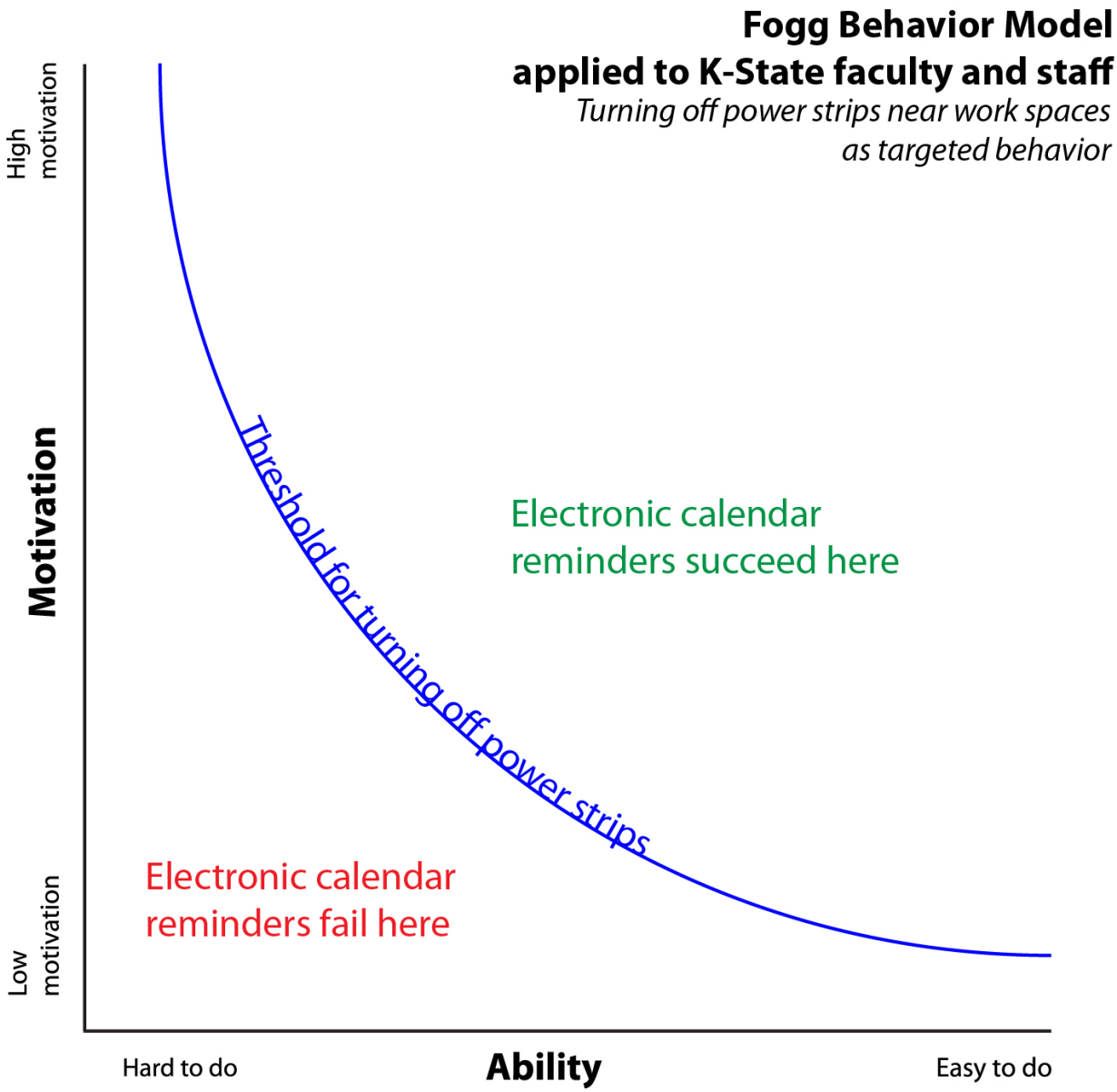

Figure 3.1 Fogg Behavior Model applied to K-State faculty and staff

Methodology

This research employs qualitative and quantitative methods in the analysis of both pre- and post-experiment surveying. A targeted behavior was selected and a trigger for the selected targeted behavior was identified. The trigger was then tested in four departments across campus. The faculty and staff within those departments were surveyed both before and after trigger implementation to test trigger success and further examine ability and motivation regarding the targeted behavior.

In order to select the targeted behavior, four faculty and staff members, each from different departments, were conveniently sampled based on previous involvement in the K-State EcoReps network. K-State EcoReps is a group of 70 university faculty and staff representing different colleges, academic units, and administrative departments that are interested in making the K-State campus a more sustainable environment. EcoReps act as communications liaisons for their departments and offices, provide feedback to improve those departments and offices, and attend regular meetings with other individuals interested in sustainability to share progress and upcoming initiatives related to their department. The EcoReps program was established at K-State with the intention of utilizing the university faculty and staff social system (Kansas State University Office of Sustainability, 2013a). A group of innovators were identified as actively involving their departments in sustainable initiatives and discussion in this network. Acting as an innovator in their department reflected the department as being innovative itself. These innovators were invited to have their department participate in the experiment. Four innovators responded and were established as the representatives from the four departments. Self-selected innovators of four different departments represented in EcoReps volunteered faculty and staff in their departments as participants for the experiment. With faculty and staff members who have shown an interest in sustainable efforts at K-State, the experiment was more likely to be implemented within their respective departments. These representatives distributed surveys to and implemented the trigger among coworkers within their departments. The experiment group included 11 faculty and staff members from Recreational Services, five from the Lafene Health Center Laboratory, and 25 from the School

of Leadership Studies for a total of 41 experiment participants. The control group consisted of 14 faculty and staff members from the Geography department.

The four department representatives worked together to select a targeted behavior to which a trigger could be implemented. The targeted behavior is one that must permit change among all departments, meaning the potential to change must be in the control of the faculty and staff within the four select departments. The four department representatives used the Greening Your Workplace checklist found in Appendix C to select a behavior. This program, supervised by the K-State EcoReps, awards points to those departments and offices that have accomplished specific behavioral changes (Kansas State University Office of Sustainability, 2013b). The behaviors on the list are specifically included as behaviors that could be common for workspaces and easily accomplished within offices or departments, making it ideal for the four department representatives' use. The list was also used because of the four representatives' familiarity with its content through K-State EcoReps.

During the behavior selection process, the four representatives considered their co-workers' ability to perform the behavior and the department or office's motivation to perform said behavior in accordance to FBM. The four department representatives selected turning off power strips as the targeted behavior. The decision was based on simplicity and faculty and staff access. The four department representatives then developed a trigger for the targeted behavior. Triggers considered were acts that the four department representatives could accomplish within their respective departments that would be associated to the target behavior. The department representatives identified an electronic calendar reminder as the trigger they would like to test for turning off power strips.

Once the targeted behavior and trigger were established, a pre-experiment survey was conducted among the four departments in which the representatives work on campus. Departments represented included Recreational Services, Lafene Health Center Laboratory, School of Leadership Studies, and the Geography department. The pre-experiment survey was issued to collect baseline data for post-experiment data comparison.

Following the pre-experiment survey, the three department representatives in the experiment group initiated the trigger implementation plan. Each representative sent an electronic calendar reminder via email the week before the experiment began. Faculty and staff were instructed to set the calendar reminder at a time that most conveniently aligned with leaving the office for the day. This format allowed the reminder to better serve faculty and staff that work different hours and addressed Fogg's suggestion to consider timing when planning triggers. After receiving the email, the reminder was set as a daily calendar item in each faculty or staff member's personal electronic calendar for one week. The calendar item could then remind individuals on computers, tablets, or phones depending on which type of device the individual had their calendars synced to.

The experiment was conducted for a one-week period in each department, with the exception of the Geography department, which served as a control group. The trigger was implemented with the intention of reaching 41 people in the experiment group that consisted of Recreational Services, the Lafene Health Center Laboratory, and the School of Leadership Studies. The control group included 14 people in the Geography department. The post-experiment survey was distributed to each of the tested departments following trigger implementation. Data collected in the post-experiment was analyzed for actual behavior change within the tested departments.

Research instruments

The research requires the use of both a pre- and post-experiment surveys to examine faculty and staff response to the target behavior trigger, measure any change that may have occurred regarding that behavior, and identify limiting factors to ability and motivation for the targeted behavior. The surveys were designed to examine the ability, motivation, and trigger regarding the targeted behavior both before and after trigger implementation. In the pre-experiment survey, participants were asked to list the frequency in which they performed the targeted behavior and describe their ability and motivation associated to the targeted behavior (see Appendix A). The post-experiment survey included the same questions as the

pre-experiment survey with the addition of a question regarding trigger success. This question asked the participants to comment on the effectiveness of the trigger in increasing the targeted behavior (see Appendix B).

Research population and sampling structure

The research population exists within Kansas State University, specifically as faculty and staff. While examining FBM, selected departments were chosen based on "innovators" among faculty and staff. The representatives from four departments were treated as innovators within departments and offices to maximize any influence they had in the social structures they work in. Leadership and interest in sustainability was key when choosing groups to work with at K-State in order to spearhead initiatives and impact attitudes.

Representatives from Recreational Services, the Lafene Health Center Laboratory, the School of Leadership Studies, and the Geography department were established as the four representatives because of their interest in sustainable behavior and behavior change discussions held during EcoReps meetings. A group of innovators that represented different departments and offices across campus in the EcoReps network were contacted and invited to include their entire department in the experiment. Faculty and staff members that represented Recreational Services, the Lafene Health Center Lab, the School of Leadership Studies, and the Geography department responded to the invitation and were established as the representatives. These four representatives served as liaisons for experiment execution including survey distribution and trigger implementation within their respective departments. This form of initial sampling was used so that trigger implementation and surveying had larger potential to succeed. Involving department representatives that have desire to promote behavior change among faculty and staff helped to ensure execution of the experiment.

The pre-experiment survey was distributed to all faculty and staff members in each of the experiment group departments. The surveys were intended to reach 11 faculty and staff members in Recreational Services, five in Lafene Health Center Laboratory, and 25 in School of

Leadership Studies employs, with a total of 41 potential K-State faculty and staff members serving in the experiment group. The pre-experiment survey was also distributed to the 14 faculty and staff members in the Geography department that served as the control group.

The population sample provided data by participating in the pre- and post-experiment surveys. The three experiment groups, faculty and staff in Recreational Services, the Lafene Health Center, and the School of Leadership Studies, were used to identify limiting factors to ability and motivation and examine the change in the targeted behavior. The control group, the Geography department, provided baseline pre-experiment data to compare the change in pre- and post-experiment data among the experiment groups. Participants remained anonymous in reporting so that behavior change and perception of behavior change cannot be linked to a specific individual.

Testing and analysis

Both the pre- and post-experiment surveys were collected after completion then coded based on type of question and survey results that reflect both a nominal and ordinal scale. Pre-experiment quantitative data were analyzed for central tendencies, frequencies, and percentages to provide insight on current number of faculty and staff that perform the targeted behavior and their motivation and ability to do so. This information was compared with identical data collected in the post-experiment survey to observe any increase in the descriptive statistics calculated prior to trigger implementation.

Closed-ended questions included in the pre- and post-experiment surveys, like those with answers based on scaled or “yes/no” responses, were coded based on the nature of the response (see Appendix D). Open-ended survey questions were examined thoroughly and analyzed for emerging themes in the form of frequent words and phrases. These words and phrases were coded into particular categories that were established after reviewing survey responses (see Appendix D). As a result, open coding categories reflected FBM and it's corresponding components. Themes, including words and phrases, were determined based on content relevant to behavior motivation, ability, and triggers.

These three categories were used as keywords when examining the frequency of such topics within the content that resulted from the pre- and post-experiment surveys. Both qualitative and quantitative methods were be used to depict data collected from survey questions. The closed and open coding results were analyzed quantitatively for central tendencies, including the most common answers or categories present. Hierarchies of most mentioned categories are listed as well as tables and figures illustrating frequencies and percentages that exist within these categories. Qualitative analysis was performed by detecting overarching themes and patterns in the content based on coding results. Trends and relationships in behavior motivation, ability, and triggers were identified through these methods.

The survey questions have been given short labels and will be referred to as the assigned question label as shown in Table 3.1.

Table 3.1 Pre and post-survey question labels

Survey question	Question label
Do you turn off power strips near your workspace daily?	"Daily behavior"
If you do not turn off power strips near your workspace daily, please list how often you do.	"Frequency of behavior"
On a scale from 1-5, rate your ability to turn off power strips near your workspace. 1 meaning hard to perform or low ability, 5 meaning to easy to perform or high ability.	"Rating of ability"
If your ability to turn off power strips near your workspace were to increase, would you do it daily?	"Increase of ability"
Please describe the reasons why your ability to turn off power strips near your workspace might be limited.	"Ability limitations"
On a scale from 1-5, rate your motivation to turn off power strips near your workspace. 1 meaning low motivation, 5 meaning high motivation.	"Rating of motivation"
If your motivation to turn off power strips near your workspace were to increase, would you do it daily?	"Increase of motivation"
Please describe the reasons why your motivation to turn off power strips near your workspace might be limited.	"Motivation limitations"
Did the trigger assist you to increase frequency of targeted behavior performance?	"Trigger success"

Survey question	Question label
Please explain any additional thoughts regarding turning off power strips near your workspace.	"Additional thoughts"

Survey data do not include personal identification in any way. Specific individuals were not asked to include their names on either survey administered to maintain anonymity so responses could not be connected to a specific faculty or staff member. All data is graphically displayed in the form of figures and tables. As a whole, the research results speak to what behavior change components both help and hinder sustainable behavior among faculty and staff and if FBM is a plausible approach on K-State's campus.

Chapter 4 - Findings

Both pre- and post-experiment surveys were collected after completion. 24 of the 41 surveys distributed to the experiment groups were completed providing a 59% response rate. 20 completed post-experiment surveys were returned providing a survey response rate of 49%. Because survey distribution and collection was anonymous, consistency in respondents for the 24 pre-experiment surveys returned and the 20 post-experiment surveys returned was not confirmed.

Pre-experiment survey data provides an understanding of response category frequencies, percentages of those categories, and average responses among participants for select questions. Frequencies and percentages illustrate the most common trends and behaviors amongst participants while averages of select questions clarify central tendencies within scales like those seen in questions regarding "Frequency of behavior," "Rating of ability," and "Rating of motivation." The number of responses per type of answer and percentages of responses for those answers for all pre-experiment questions are shown in Table E.1 of Appendix E. An average response rate for "Frequency of behavior," "Rating of ability," and "Rating of motivation" questions within the pre-experiment survey are shown in Table E.2 of Appendix E.

Of the 14 faculty and staff members in the control group, five completed pre-experiment surveys providing a survey response rate of 36%. Post-experiment surveys were not collected, as the control group did not undergo analysis of targeted behavior change. Control group data is also displayed in frequencies, percentages, and averages as shown in Table E.3 and E.4 of Appendix E.

Pre-experiment survey data shows that K-State faculty and staff are not accustomed to turning off power strips near their workspace on a daily basis. On average, respondents do not currently turn off power strips. When asked the "Frequency of behavior" question, approximately 91% of participants indicated they "Never" include this practice in their daily

routines while the remaining 9% claimed to "Rarely" include it (see Table E.1). Control group data suggests that the Geography department is more attuned to the issue of energy savings as 40% of survey participants include turning off power strips in their daily routines. Of the 60% who do not always participate in the targeted behavior daily, 20% indicated they "Never" do, 20% indicated "Rarely," and another 20% indicated "Often" (see Table E.3).

In order to determine if FBM is an effective method to trigger the targeted behavior, information about faculty and staff ability and motivation is necessary. Respondents were asked to rate both, in regards to the targeted behavior, on a scale from 1-5, 1 representing low ability and motivation while 5 represented high ability and motivation in the "Rating of ability" and "Rating of motivation" questions. Responses showed a wide variety of ratings as shown in Figure 4.1 and Figure 4.2. An average of these ratings illustrated a combined ability rating of 3.77 and a combined motivation rating of 2.27 (see Table E.2). The standard deviation for ability is 1.24 and the standard deviation for motivation is 1.51. While these averages indicate that participants are significantly less motivated to turn off power strips than they are able to do so, the standard deviations show that experiment participants possessed varied attitudes toward the targeted behavior. This could make understanding department behavior change trends and how they can be accomplished more difficult.

To address these varied ratings, participants described those factors that hinder or obstruct their ability and motivation towards the targeted behavior in the "Limitations to ability" and "Limitations to motivation" questions. As shown in Figure 4.3, K-State faculty and staff members identified several barriers to ability. These barriers were sorted into five common themes and concepts that describe participants' attitudes or beliefs in relation to the targeted behavior including "Not limited," "Never conceptualized," "Not in an easily accessible location/requires undesirable physical activity," "Institutional requirements/rhetoric," and "Other" (see Appendix D). "Not limited" content indicated respondents that felt their ability to turn off power strips near their workspace had no limitations. The "Never conceptualized" category consisted of responses that indicated respondents had never thought to turn off power strips. "Not in an easily accessible location/requires undesirable physical activity"

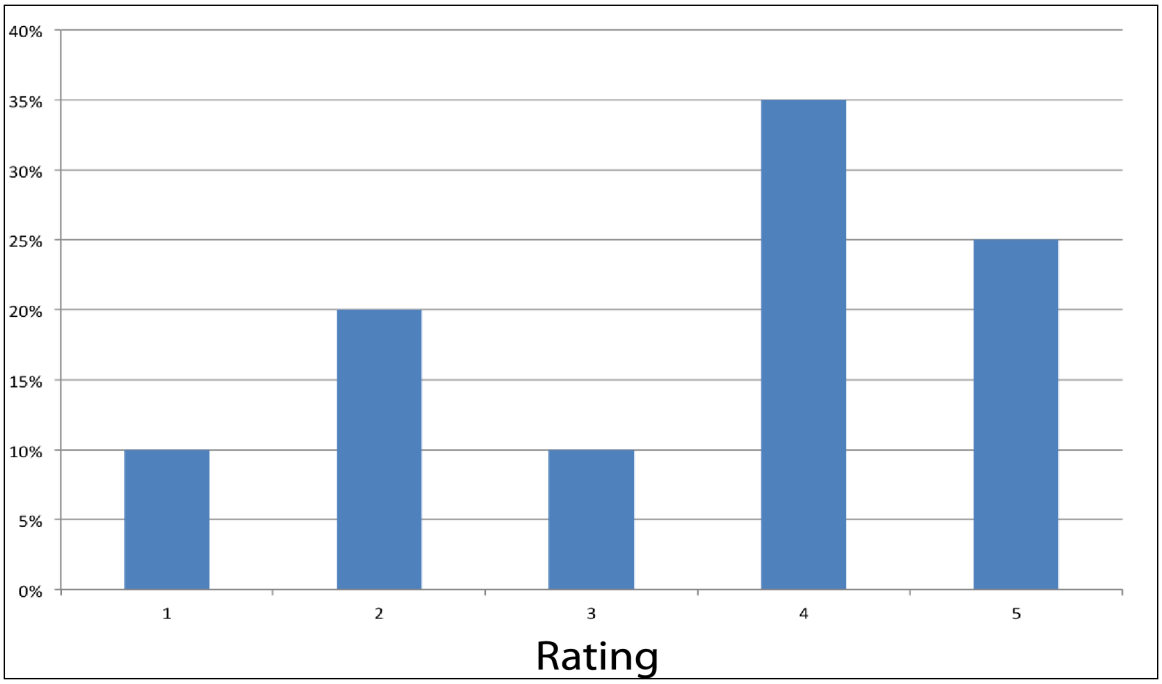

Figure 4.1 Pre-experiment rating of ability on a scale from 1 to 5, 1 meaning low ability and 5 meaning high ability

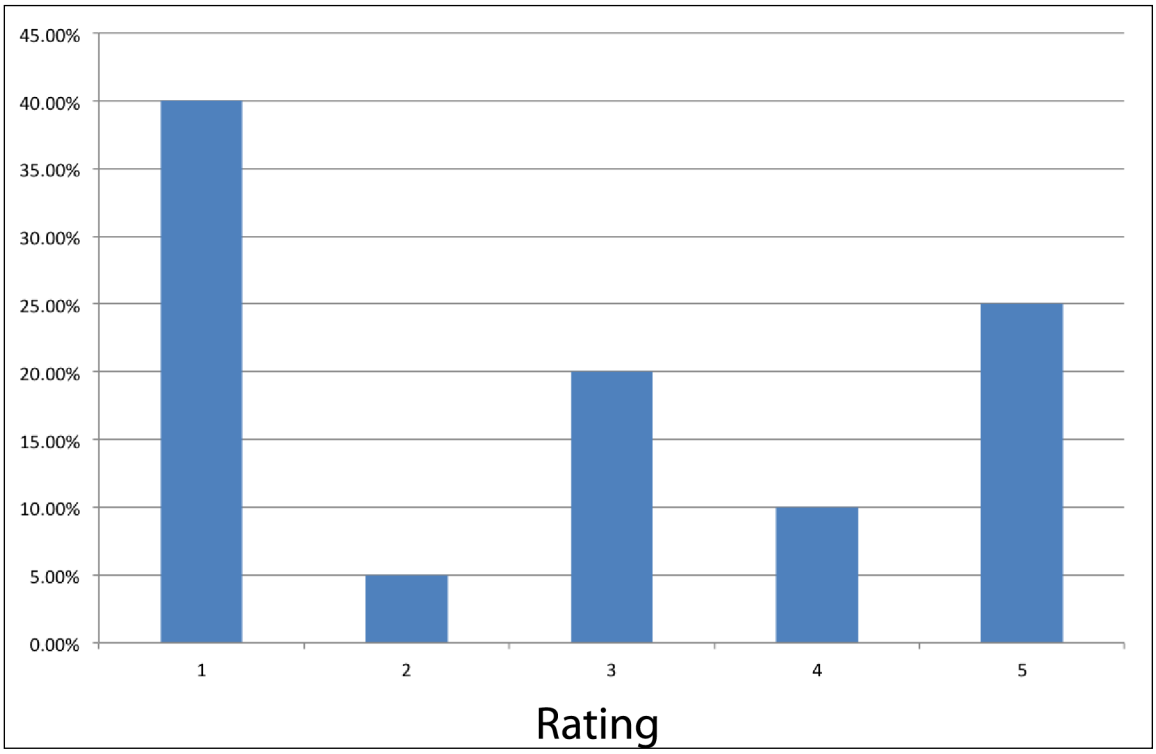

Figure 4.2 Pre-experiment rating of motivation on a scale from 1 to 5, 1 meaning low motivation and 5 meaning high motivation

includes answers from respondents' that feel their power strips are not within reach, hard to access, require physically straining movement, and other similar barriers. Responses that cited issues with turning off power strips because of department technology needs or administrative reasoning were grouped together in "Institutional requirements/rhetoric." "Other" includes all other responses that did not fit into a common theme.

Regarding ability, 60% of respondents mentioned issues with access and mobility. Several offices and departments have power strips placed in inconvenient, inaccessible locations that require undesirable physical activity. "Getting on my hands and knees to reach under my desk," (Anonymous survey respondent, March 2014) was cited as a primary obstacle to access. 16% of participants said their ability was not limited and 12% implied they never think to turn off power strips. Additionally, 8% of respondents named institutional requirements or rhetoric as their source of inability. For many, this consisted of IT services instructing faculty and staff members to not turn off power strips or that it is unnecessary for energy savings. A significant amount of participants mentioned overnight computer updates and other technology needs that would require power strips to remain on. The remaining 4% of participants suggested other reasons for limited ability (see Figure 4.3). When asked if participants would perform the targeted behavior if ability were to increase in the "Increase to ability" question, about 67% responded positively.

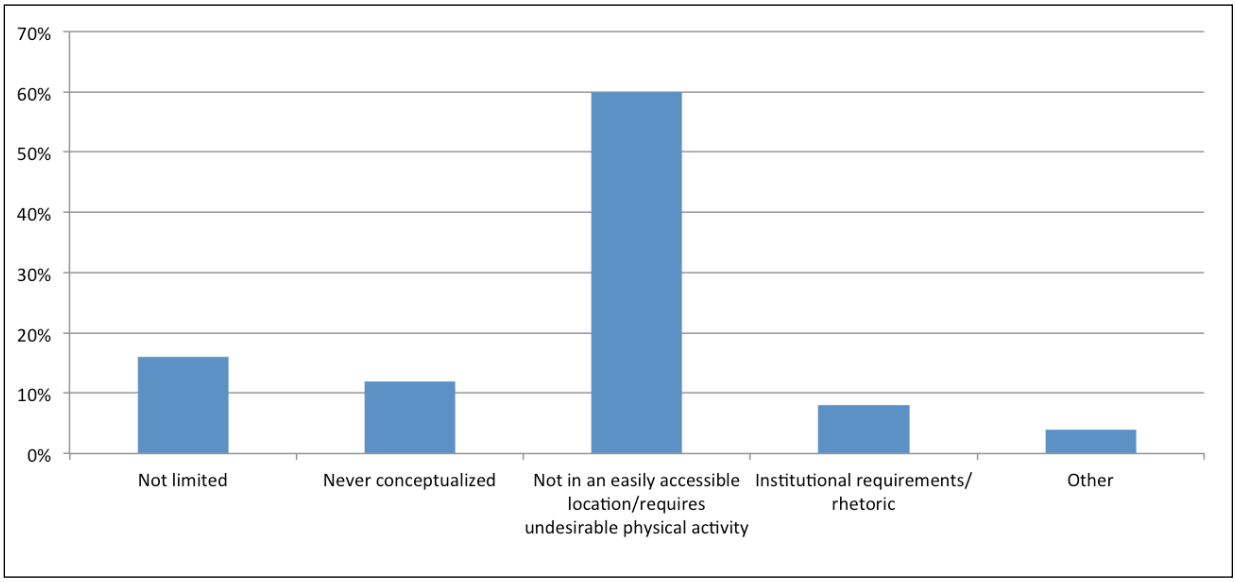

Figure 4.3 Pre-experiment limiting factors to ability

Similar to ability, motivation barriers were discovered in the pre-experiment survey as can be seen in Figure 4.4. Seven categories were established including "Never conceptualized," "Operational/institutional purposes," "Positive impacts unknown," "Believe current behavior is sufficient," "Limited access," "Pre-existing daily routines," and "Other" (see Appendix D). The "Never conceptualized" category consisted of responses that indicated respondents had never thought to turn off power strips. "Operational/institutional purposes" content indicated respondents felt their department functionality deterred them from turning off power strips. "Positive impacts unknown" includes answers from respondents' that felt their motivation would increase if the benefits of turning off power strips were better communicated. Others felt their current energy saving related behaviors were sufficient and appropriately categorized as "Believe current behavior is sufficient." Responses that cited accessibility issues were grouped together in "Limited access" and responses that took issue with the added task of turning off power strips were grouped as "Pre-existing daily routines." "Other" includes all other responses that did not fit into a common theme.

The majority of survey responses depicted unawareness as the chief complication for motivation. Almost 29% of respondents said they never think to turn off power strips. Similar to data collected for ability, approximately 24% named limited access as the key reason for hindering motivation while 14% cited operational and institutional purposes. This indicates that departments and offices are not actively encouraging such behavior and, in some cases, are discouraging it as illustrated in the following comment:

> *"The reason why I do not turn off power strips is because of my mind set to think that leaving power strips on is a better practice than turning it off daily. At least that's what the computer technician has told me"* (Anonymous survey respondent, March 2014).

Not understanding or being provided the positive impacts of the targeted behavior and not wanting to add another task to pre-existing daily routines were each represented with nearly 10% of the participant base. Roughly 5% of respondents believed their current behavior was sufficient for energy savings. Some participants mentioned turning off computers or monitors

at the end of the day without realizing turning off power strips could potentially save energy as well. Finally, almost 10% mentioned other reasons for limited motivation (see Figure 4.4).

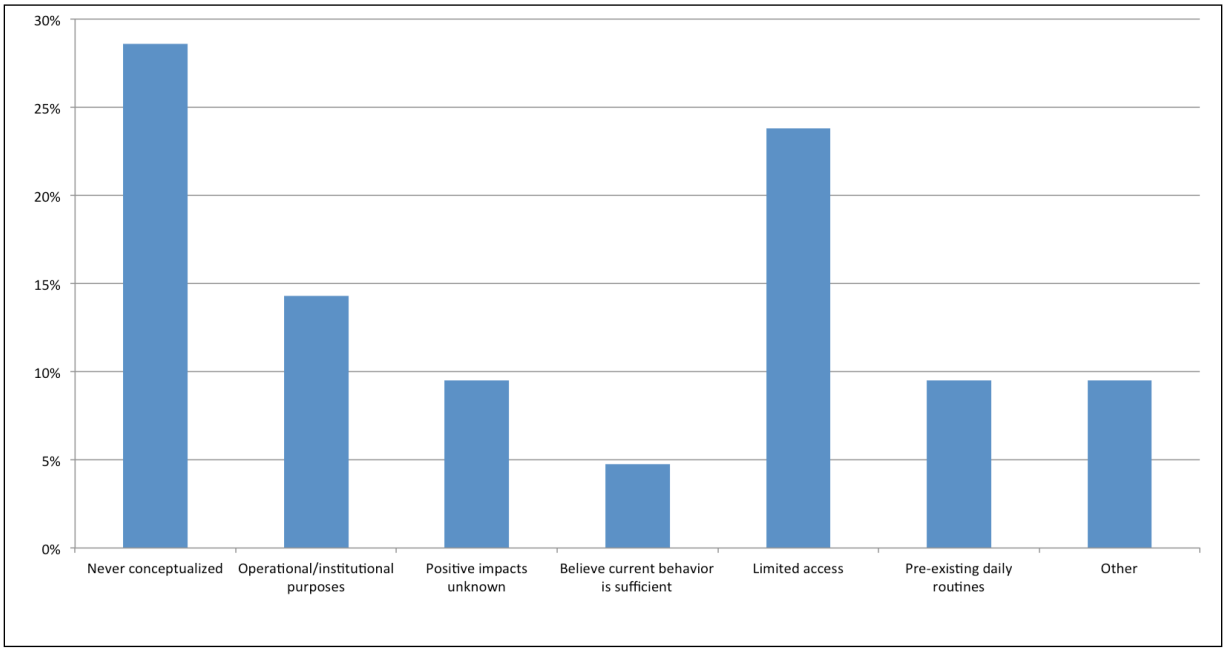

Figure 4.4 Pre-experiment limiting factors to motivation

Post-experiment survey data for all questions is also shown in frequencies, percentages, and averages. Frequencies and percentages are shown in Table E.5 of Appendix E and averages calculated for the "Frequency of behavior," "Rating of ability," and "Rating of motivation" questions are shown in Table E.6 of Appendix E.

Comparing pre-experiment survey data to post-experiment survey data provides promise for FBM. The average of responses increased in their practice of turning off power strips near their workspace to "Rarely" from "Never." In pre-experiment survey data, all respondents stated they did not perform the targeted behavior daily. After the electronic calendar reminder was established and executed as the trigger, only 80% of respondents said they did not perform the behavior daily, meaning 20% of participants began including turning off power strips into their daily routines. One respondent stated, "We will likely start including this in our daily routine," (Anonymous survey respondent, March 2014). The post-experiment survey included an additional question regarding trigger implementation. In the "Trigger

success" question, survey participants were specifically asked if the trigger assisted them in performing the targeted behavior. Approximately 47% responded that the electronic calendar reminder increased the frequency of turning off power strips near their workspace (see Figure 4.5).

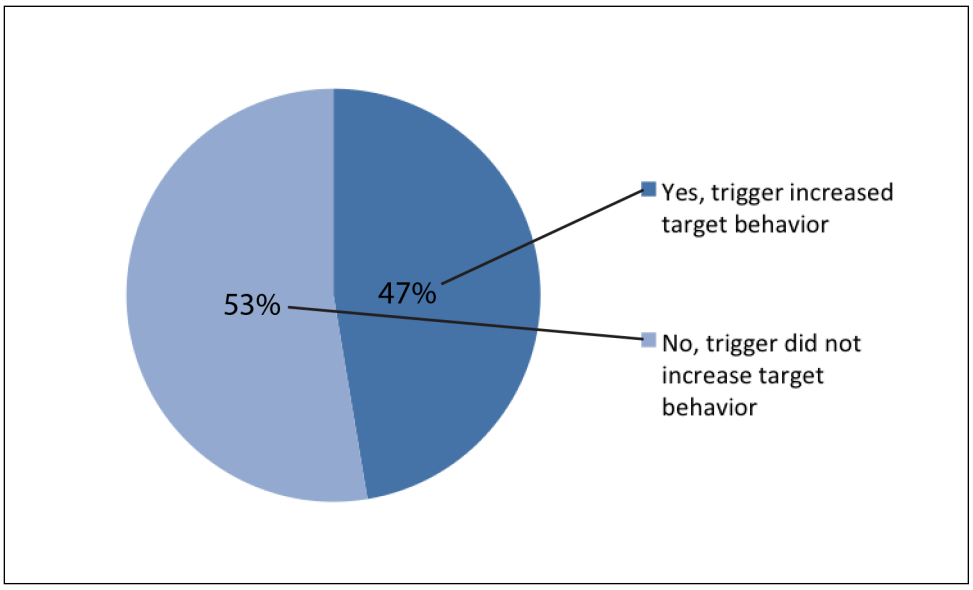

Figure 4.5 Post-survey responses to increase in targeted behavior due to trigger implementation

Because the trigger did create an increase in the targeted behavior, a closer look at ability and motivation factors is appropriate to determine what could potentially generate a larger increase. The post-experiment surveys provided similar data to pre-experiment surveys in regards to ability and motivation barriers. As shown in Figures 4.6 and 4.7, several themes emerged from the "Ability limitations" and "Motivation limitations" questions that asked for explanations of barriers to both. Categories identical to pre-experiment survey results were used to assess limiting factors. Limited ability was attributed to access and mobility issues by nearly 39% of participants. Approximately 22% of respondents continued to mention institutional requirements, like the departmental technology and procedural needs mentioned previously, as the source of their inability. Further, around 6% said that they were not limited and another 6% said they did not think to turn off power strips. Finally, almost 28% cited other reasons for limited ability (see Figure 4.6).

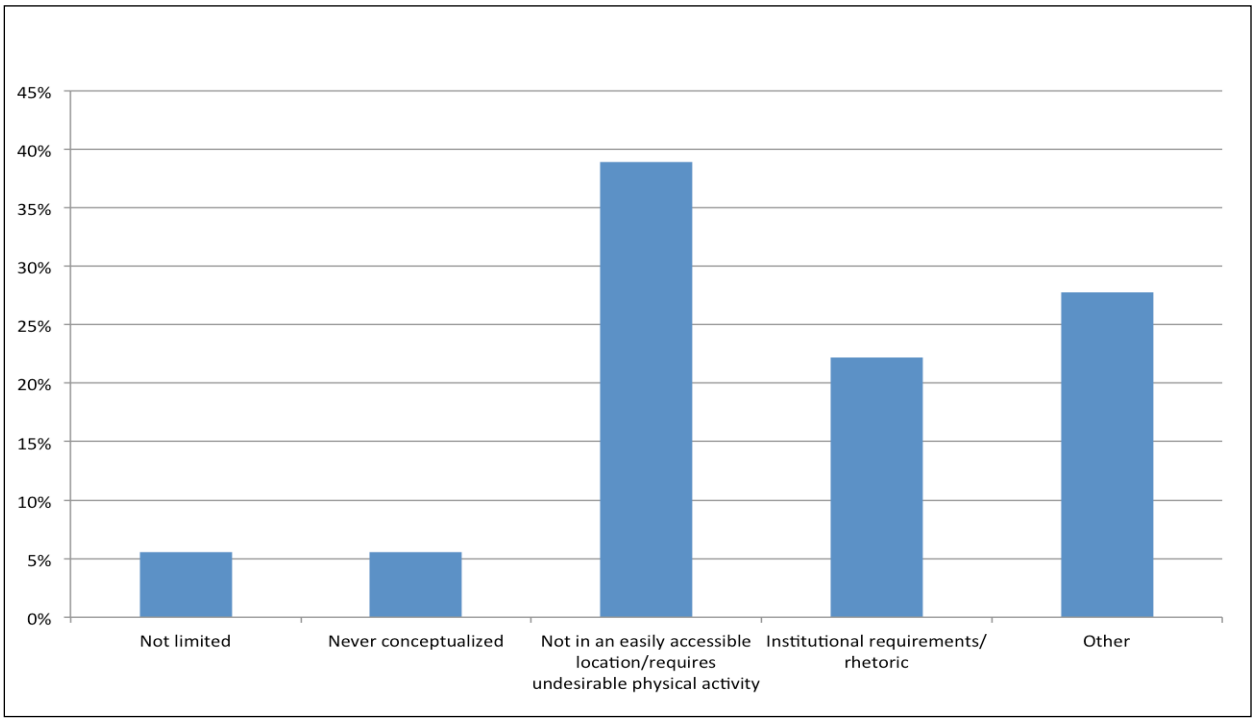

Figure 4.6 Post-experiment limiting factors to ability

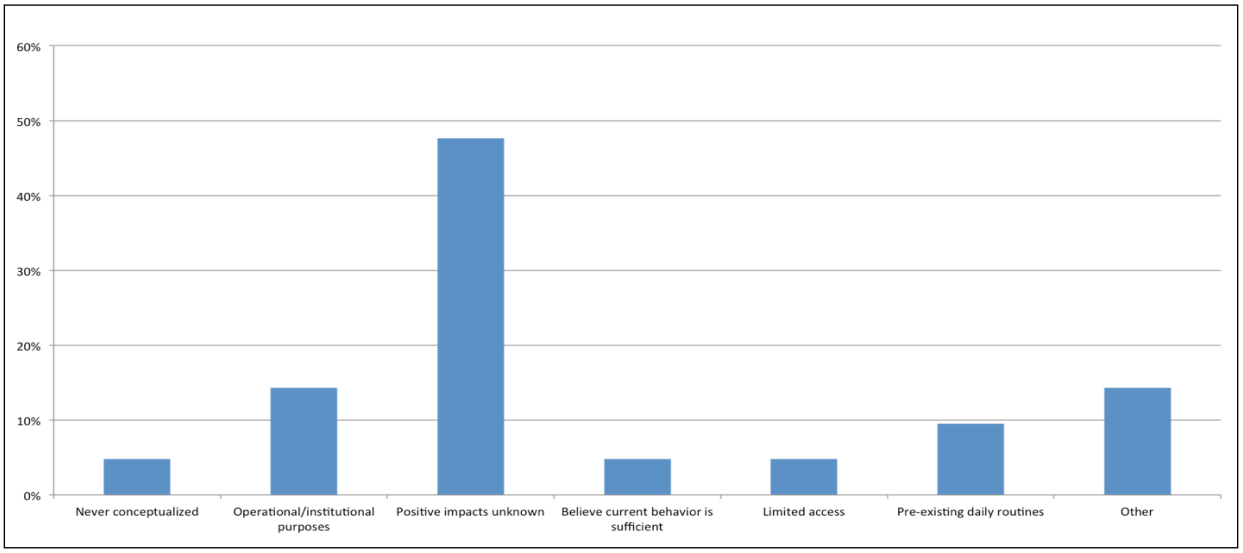

Figure 4.7 Post-experiment limiting factors to motivation

Obstacles for motivation were attributed to the unknown benefits or positive impacts that turning power strips off could deliver with almost 48% of responses. Roughly 14% of responses mentioned operational and institutional purposes while approximately 9%

mentioned its inconvenient addition to pre-existing daily routines. Those who never thought to execute the targeted behavior, believed their current behavior to be sufficient for energy savings, and claimed limited access to power strips each represented nearly 5% of participants. Those citing other reasons for motivation made up around 14% of respondents (see Figure 4.7).

Both pre- and post-experiment survey data provide an opportunity to analyze the overall success of the FBM-based process among K-State faculty and staff and the potential of a larger-scale, wider-reaching FBM campaign. This is primarily accomplished by measuring the increase in targeted behavior and theorizing a feasible continuous increase in said behavior when considering changes made to or barriers removed from specific influencing factors to ability and motivation.

Combining results from both the pre- and post-experiment surveys to examine overall limiting factors for ability and motivation, it is clear that limited access to power strips and the lack of benefits and positive impacts education are the primary barriers to the targeted behavior (see Figures 4.8 and 4.9). Decreasing the prevalence of these barriers could lead to trigger, and ultimately FBM, success. Several survey participants described the difficulties they have in accessing the power strips with the following comments:

> *"I can't easily reach it. I have to get on my hands and knees."*
>
> *"It is on the floor near the wall and desk. Some days I have limited mobility to crawl on the floor to reach the power strips."*
>
> *"The strip is out of sight. I must go beneath the desk to reach the switch"* (Anonymous survey respondents, March 2014).

Older faculty and staff are at a disadvantage as described by this respondent:

> *"Power strips are located on the floor and behind file drawers beneath my work space. It is not easily accessible for anyone, especially at age 61"* (Anonymous survey respondent, March 2014).

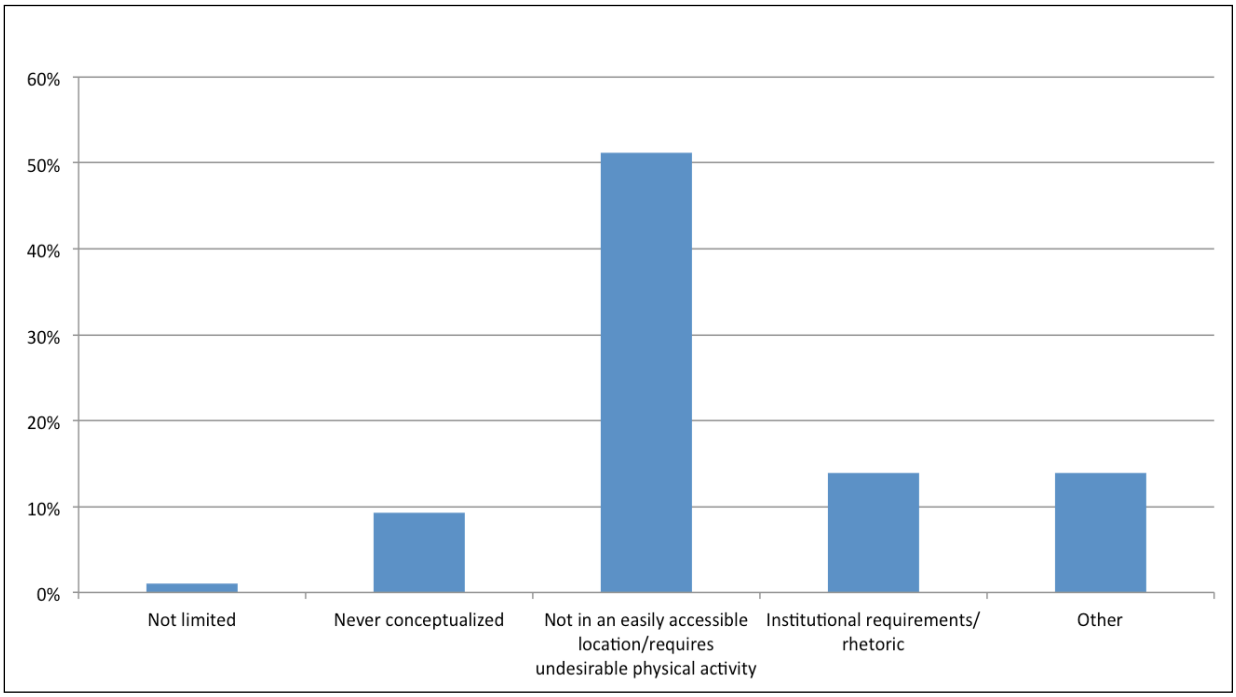

Figure 4.8 Overall limiting factors to ability

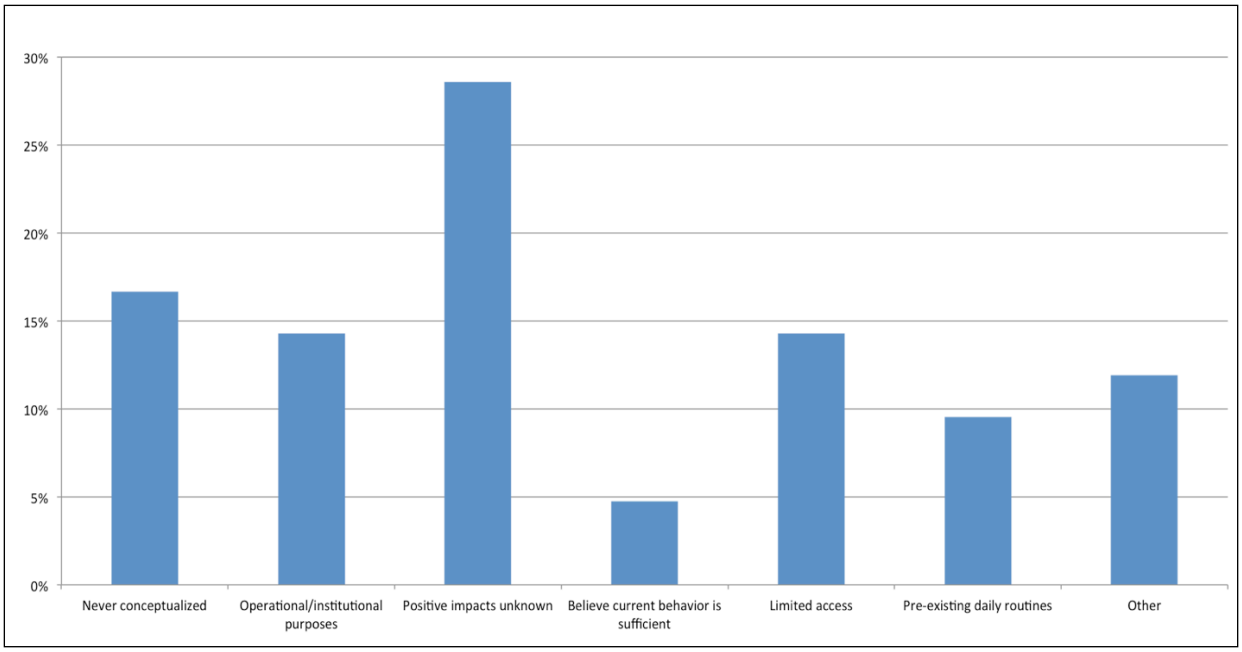

Figure 4.9 Overall limiting factors to motivation

Repositioning power strips could be a potential solution to achieve the targeted behavior. The comments from the pre- and post-experiment surveys align with FBM in that the target behavior must be simple and easily accomplished if the trigger is to succeed. If power strips are made more accessible, it is possible an increase in targeted behavior could be observed.

Developing materials and information about the benefits of turning off power strips also has potential for increasing targeted behavior. When asked why their motivation was limited, participants responded with the following comments:

> *"I need education on why it's important…"*
>
> *"I need a reason why I should turn it off."*
>
> *"Does it really make a difference? [Other appliances] are off so why would turning off the power strip do anything"* (Anonymous survey respondents, March 2014)?

Faculty and staff are more inclined to participate in the targeted behavior if they are given a reason to do so. Examples of motivation stemming from benefits awareness can be found in the following statements:

> *"If you could show me concretely how it would benefit [my department], the environment, etc., then I would be more motivated to do it."*
>
> *"I'm not sure of the benefit of shutting them off. If I had an understanding as to how much power was being wasted, I may change my actions."*
>
> *"If the results from this experiment shows that turning off power strips helped save power significantly, I would feel motivated to continue the practice of turning off power strips daily"* (Anonymous survey respondents, March 2014).

As the two components of FBM, ability and motivation cannot be ignored when studying trigger effectiveness. With 51% of all participants citing limited access as the primary barrier to their ability and 29% naming the lack of benefits awareness as the principal impediment to motivation, the future of FBM at K-State could start with adjustments to these two factors. It could be theorized that if inadequate access to power strips was eliminated, approximately 47% of the 51% of participants that mentioned access as a limiting factor for ability would

participate in the targeted behavior due to the trigger success rate. Similarly, it can be theorized that if benefit and positive impact education was made available, approximately 47% of the 29% of participants that named this as a limiting factor to motivation would include the targeted behavior in their individual routines.

The other limiting factors mentioned in both pre- and post-experiment surveys are worth further examination as well. If the cited limiting factors can be assessed, trigger success could potentially provide some change in the targeted behavior. Because experiment participants possess varied perceptions of the targeted behavior, solutions for the cited limiting factors may be difficult to develop. Without an understanding of the relationship between those factors, it is hard to determine how effective FBM can be as model on its own. Instead, FBM could be treated as a contributing component of CBSM. Additional pilot tests on FBM and its role in CBSM could be of great value.

Chapter 5 – Discussion and Conclusions

Discussion

The FBM-based process implemented in this research points to the model's contributions to CBSM. As the three components of Fogg's model reflect three of the discussion points in the concept of CBSM, this FBM-based process has provided a deeper understanding of how Fogg supports the CBSM discussion. The trigger effectiveness of this study has shown the potential results prompt strategies could provide when attempting to foster sustainable behavior change. But because prompt or trigger strategies are only a portion of both FBM and CBSM, the other contributing factors require analysis as well. Limiting factors to ability and motivation do provide an understanding of the barriers social groups are faced with when striving for a desired behavior change. In this case, limiting factors results showed several issues that stand in the way of behavior change, most of which can be further questioned.

The primary barriers to the specific targeted behavior of turning off power strips in this study were limited access or mobility and a lack of benefits or positive impacts education. It could be questioned that another identified limiting factor would become an issue if these barriers were minimized or eliminated. For example, if power strips were moved to provide better access or information regarding the sustainable impact of turning off power strips was distributed, institutional or operational issues might then become the primary limiting factor to the targeted behavior. The same could be said for other limiting factors, including "Never conceptualized" or "Believe current behavior is sufficient." Conversely, if the limiting factors of "Institutional requirements/rhetoric" or "Operational/institutional purposes" were addressed, it is possible that other factors such as "Limited access" or "Pre-existing daily routines" would then become the primary barriers to the targeted behavior. This study did not address the relationship between these various factors. This question is especially evident in the "Never conceptualized" responses. If this limiting factor were to be addressed and participants became aware of the ability to turn off power strips, other limiting factors could play a larger role in hindering their ability and motivation, namely issues with access and departmental

policies and procedures. Once a limiting factor is remedied, a separate limiting factor could then hinder ability or motivation.

Without knowing the relationship between limiting factors, FBM omits valuable strategies that CBSM includes. While FBM's three components of ability, motivation, and trigger successfully reflect barrier removal, incentive, and prompt strategies in the CBSM literature, the remaining components of activity benefit enhancement, commitment, norms, and communication strategies are not included. FBM can provide information for the three components that closely align with CBSM and be effective in working toward sustainable behavior change utilizing those three strategies. A fully developed effort for actual sustainable curative change, however, could be more effective if all components of CBSM are employed.

The wide range of attitudes toward this specific targeted behavior that is shown in Figure 4.1 and Figure 4.2 make it difficult to implement a simple, targeted approach like FBM. The attempt to change behavior can be met with a variety of obstacles when the behavior change being sought varies from individual to individual. FBM is faced with limitations when the social groups it is tested on posses diverse opinions and perceptions of the targeted behavior.

Research limitations

An FBM-based process is difficult to implement with different department cultures. Administrative voice differs depending on the department or office, making support for the experiment difficult to measure. The inability to directly contact all study participants served as a limitation in ensuring high faculty and staff involvement during survey distribution and trigger implementation. With more direct contact, a larger sample population could be tested. Furthermore, future research would benefit from a more diverse control group in order to collect baseline data with higher validity. Because the control group consisted of a department that was somewhat accustomed to the targeted behavior, it is hard to draw conclusions from experiment and control group data comparisons.

With so many variables present within different departments and offices, it was also impossible to eliminate any departmental or institutional barriers to targeted behavior. The surveys were designed to identify these issues and were fairly successful in doing so. Several respondents noted institutional or operational issues associated to turning off power strips such as over night computer updates or other technological needs that prohibited faculty and staff from performing the targeted behavior on a daily basis. The following statements illustrate this barrier further:

> *"I believe my printer needs to have power all the time in case another staff member who is networked to this printer wants to print something. Turning off power strips would disrupt their ability to print."*
>
> *"Our updates to our computers happen at night so we have to keep our computers powered on. It also charges our walkie talkies at night."*
>
> *"We have been instructed by our IT Manager to leave computers on etc. due to downloads done overnight"* (Anonymous survey respondents, March 2014).

Finally, trigger implementation slightly suffered from different department and office procedures and policies. Because these entities operate differently, some faculty and staff noted not being in their office or near the device to which the electronic calendar reminder was synced to receive its notification. To combat this, the designated department representatives asked each faculty and staff member to set the reminder to a time most convenient to their daily office departure time. A study of this nature will continue to have several variables that will be difficult to control making it a perfect candidate for future investigation on this campus.

Future research

With a 20% increase in daily targeted behavior and nearly half (47%) of all respondents declaring an increase in targeted behavior because of trigger implementation, there is value in additional execution of FBM strategies. The results of the FBM-based process designed for K-State's faculty and staff suggest that the three components of FBM could be effective in achieving a comprehensive CBSM campaign at a university. This research project used FBM

concepts to develop a process that was appropriate for the culture within K-State offices and departments and resulted in findings that provide hope for a large-scale implementation of CBSM, which should drive K-State to study the process further. Collecting more information about attitudes towards target behavior triggers, ability, and motivation is crucial. A wider audience must be captured in additional testing of trigger effectiveness to comprehend how broad the influence could be on K-State's campus. A deeper understanding of how limited access and benefits awareness could contribute to trigger success and overall FBM achievement in regards to turning off power strips near workspaces is key for this specific type of behavior change at K-State. To understand the role FBM may play in CBSM, the relationship between barriers to ability and motivation needs to be examined with additional measurement of where or when other barriers may ultimately hinder true behavior change. This study provided a number of limiting factors for the targeted behavior, all of which could be used in additional testing to further understand how the factors relate to one another.

While turning off power strips was used as the target behavior in this pilot test, other energy saving behaviors can be studied using FBM. Before declaring FBM an appropriate method for use in a CBSM behavior change campaign at K-State, more data needs to be collected that speaks to its effectiveness for other daily practices and investigates common attitudes and beliefs among departments and offices. Additional pilot tests of the method on larger sample populations, including trigger effectiveness studies and examination of ability and motivation limiting factors, could point to impending success for the implementation of FBM as a part of a long-term CBSM behavior change campaign at K-State.

Conclusions

Studying FBM and its components among K-State faculty and staff has shed light on the possibilities of behavior change within social networks. Developing and investigating the three components of FBM has the potential to contribute to a larger CBSM effort that could create change within daily routines and practices on campus. If social networks, in the form of departments and offices, are leveraged properly, minor operational changes or small shifts in attitudes and beliefs could result in significant benefits for the university. With additional and

thorough investigations into trigger effectiveness and ability and motivation limiting factors, FBM could be considered an appropriate method to lead K-State toward a CBSM campaign aimed at sustainable behavior change.

Sustainability as an issue on university campuses is one that needs more attention in the form of education, awareness, and most importantly, action. Continuing pilot tests and studies of this nature on effective behavior change models is a necessary plan of action for higher education if these institutions wish to maintain a status of learning, growing entities. Ultimately, universities have the potential to foster leaders for sustainable lifestyle changes. The potential success inherent in using FBM has opened wide, several windows of opportunity for sustainable change at the university level.

Universities serve as a valid testing ground for the socially motivated behavior change discussion. The diversity that exists on a college campus provides an environment similar to a community to address behavior change issues that exist in our towns and cities. Looking beyond universities and educational institutions, the concept of FBM holds a relevant place in the community as a whole. Because the components of FBM fit within the broader concept of CBSM, data collected about ability, motivation, and triggers can be utilized within social networks. The goal is to use this information to confront the social system, encouraging behavior change that enhances community capitals.

These enhancements depend on community involvement. Social behavior change requires a community spirit that allows citizens and individuals to collectively take ownership of their behaviors (Monaghan, 2011; Slater et at. 2000). Networks of like-minded people are more effective for curative change (Carrigan et al. 2010). With groups of community members participating in social behavior change, community action becomes the face of sustainability, giving it a generative environment in which to succeed. As CBSM points out, behaviors of peers deeply influence the behavior of the individual. People are prone to act as their friends do. In CBSM, behavior change is addressed at the community level through social structures and networks that leverage relationships, connections, and interactions (McKenzie-Mohr,

1999; 2000a; 2000b). Applying FBM in a social setting utilizes the social component of CBSM and actively implements the three strategies that are reflected in both concepts. This suggests FBM is a possible avenue to take when using CBSM for achievement of sustainable behavior change in community enhancement and development.

Sustainable behavior change is an important component of community development. Natural, social, and financial capital are all vital pillars on which communities stand and their health must be considered when development is discussed. Most importantly, their health must be treated equally. Sustainability does just that by balancing environment, economy, and society. Without sustainable decision-making, community development suffers. Those pillars become less stable. FBM, as it exists within CBSM, can help to prop up those pillars and build communities with community members that work together to collectively exercise sustainable lifestyles.

FBM can serve as a facet of CBSM that should be employed throughout the community development field. Community enhancements need community members that approach development with balance in mind. This means behavior change must be managed with a balanced, community-based approach. Utilizing FBM among social networks could construct a community-based behavioral change campaign aimed at creating sustainable change within our communities, giving them a foundation on which to further develop.

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Appendix A - Pre-experiment survey

Do you turn off power strips near your workspace daily?

___ Yes

___ No

If you do not turn off power strips near your workspace daily, please list how often you do.

_____

On a scale from 1-5, rate your ability to turn off power strips near your workspace. 1 meaning hard to perform or low ability, 5 meaning to easy to perform or high ability.

___

If your ability to turn off power strips near your workspace were to increase, would you do it daily?

___Yes

___No

Please describe the reasons why your ability to turn off power strips near your workspace might be limited.

_____

_____

_____

_____

_____

On a scale from 1-5, rate your motivation to turn off power strips near your workspace. 1 meaning low motivation, 5 meaning high motivation.

___

If your motivation to turn off power strips near your workspace were to increase, would you do it daily?

___Yes

___No

Please describe the reasons why your motivation to turn off power strips near your workspace might be limited.

_____

_____

_____

_____

_____

Please explain any additional thoughts regarding turning off power strips near your workspace.

_____

_____

_____

_____

_____

_____

_____

Appendix B - Post-experiment survey

Do you perform the targeted behavior daily?

___ Yes

___ No

If you do not perform the targeted behavior daily, please list how often you do perform the targeted behavior.

_____

On a scale from 1-5, rate your ability to turn off power strips near your workspace. 1 meaning hard to perform or low ability, 5 meaning to easy to perform or high ability.

___

If your ability to perform the targeted behavior were to increase, would you perform the targeted behavior daily?

___Yes

___No

Please describe the reasons why your ability to perform the targeted behavior might be limited.

_____

_____

_____

_____

_____

On a scale from 1-5, rate your motivation to perform the targeted behavior. 1 meaning low motivation, 5 meaning high motivation.

___

If your motivation to perform the targeted behavior were to increase, would you perform the targeted behavior daily?

___Yes

___No

Please describe the reasons why your motivation to perform the targeted behavior might be limited.

_____

_____

_____

_____

_____

Did the trigger assist you to increase frequency of targeted behavior performance?

___Yes

___No

Please explain any additional thoughts regarding the targeted behavior.

_____

_____

_____

_____

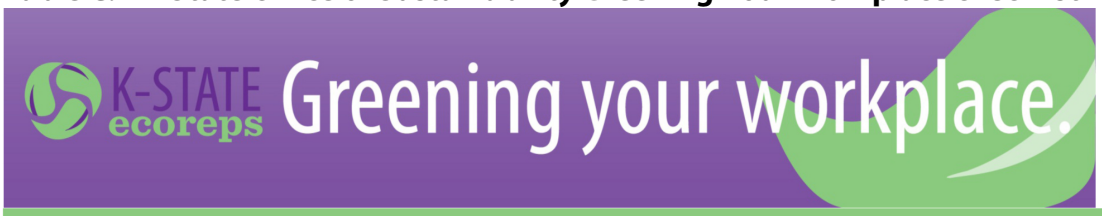
_____

_____

_____

Appendix C - Greening Your Workplace checklist

Table C.1 K-State Office of Sustainability Greening Your Workplace checklist



Sustainability Action Squad Scorecard — **Total Points: 0**

energy.

		Subtotal for section: 0	Achieved
General		0	
E.1	We have control over our thermostat and keep it set at 68 for heating and 78 for cooling.	3	
E.2	We have coordinated with our Building Administrator to identify areas that do not require heating, cooling, or lighting during off-hours, breaks or other periods of time.	3	
E.3	We leave clear space in front of all of our radiators and vents.	3	
E.4	We have designated a person to report all complaints and temperature fluctuations in our office.	1	
Printers and Copiers		0	
E.5	We examined our office's use of networked printers and other electronic devices, and worked with IT to consolidate use.	3	
E.6	We have sleep mode enabled on all copiers and all printers.	1	
Computers and Related Equipment		0	
E.7	We enabled power management settings on our computers. If changing these setting requires administrative rights, we've contacted our IT group for assistance.	2	
E.8	We shut off our monitors and/or manually send our computers into energy saving modes (standby or hibernate) when not in use.	1	
E.9	We have arranged with our IT group to be able to shut down our computers at night and it is now office policy to shut down computers at the end of the work day.	4	
E.9b	If we require computers to run during off-hours, we use programs or timers to shut them off for as long as possible.	2	
E.10	We have converted our office to virtual desktops.	4	
E.11	We use power strips and surge protectors with an on/off switch or "smart strips" for electronics, chargers, and appliances/devices with digital clocks **and** switch them off each night.	4	
E.12	We encourage our staff to get rid of "old" computer equipment that no longer meets power standards.	3	
E.13	We send, or will send, an e-mail to our staff before holidays and breaks containing an energy saving checklist for leaving their office.	1	
Lights		0	
Lights are turned off when not in use during the day and at night, including in common areas such as kitchens, conference rooms, storage closets, and bathrooms:			
E.14a	We have posted prompts near light switches to encourage energy conservation.	1	
E.14b	We have occupancy controlled lighting in all restrooms and hallways	3	
E.14c	We have worked with facilities to determine other locations that could benefit from occupancy controls (motion sensors).	3	
E.15	Hard-wired lights without on/off switches have been retrofitted to be controllable and provide the appropriate lighting levels.	4	
E.16	We have worked with our building administrator to assess overhead lighting lumens/foot-candles in the office and switch to more energy efficient bulbs where possible	2	
E.17	All of our workstations and desks have task lights fitted with CFLs or LEDs, which we use when working afterhours, times that the office is mostly empty, or other times when full overhead lighting is not necessary.	3	
E.18	We worked with Facilities to replace inefficient fluorescent lighting with energy-efficient T-8 or T-5 fixtures with electronic ballasts or other equivalent efficacy lighting.	4	
E.19	We turn off lights and use natural lighting when possible.	3	
Windows		0	
E.20	We have an office policy that blinds/shades will be closed during peak summer to reduce heat coming in windows.	3	

E.21	We have an office policy that blinds/shades will be closed at the end of every day during winter heating season. We have appointed an individual to be responsible for closing them every day.	3	
Other Energy Actions		0	
E.22	Microwaves, coffee makers, small appliances, printers, copiers etc are unplugged at night by a designated person or are programmed to shut off through a timer or plug load controller.	3	
E.23	We have received 95% participation in the Office Comfort Questionaire.	3	
E.24	We have a policy prohibiting the use of space heaters and no one in our office uses a space heater	4	

waste.

	Subtotal for section:	0	Achieved
General		0	
W.1	We conducted an audit of our waste stream in the last year.	4	
W.2	We have held at least one Office Clean Out Day that promoted recycling and reuse in the past year.	1	
W.3	We list any used equipment, furniture and supplies on Craigslist or donate before disposing of furniture.	1	
Paper and Office Supply Waste		0	
W.4	We set double-sided printing as a default on our office computers, and we placed a visual prompt on our copy machine to remind members of our office to double-side copy.	2	
W.5	We have an office policy to use reduced paper margins where possible in order to decrease the length of documents we print.	2	
W.6	We hold zero-waste staff meetings (at least 80% of the staff meetings are zero-waste).	2	
W.7	We use an electronic timesheet system.	2	
W.8	We use electronic financial reports.	3	
W.9	We keep a stack of previously used paper near printers to be used for scratch paper or internal memos, made into notepads, or loaded into a designated a bypass tray on printer for printing internal or draft single-sided documents.	1	
W.10	We have a designated area in our supply closet, or elsewhere in our office, for sharing office supplies that can be re-used (file folders, binders, pens, paper clips, etc).	1	
We have a designated person in our office who unsubscribes people from:			
W.11a	Receiving multiple copies of the K-State Collegian and the Manhattan Mercury.	2	
W.11b	Junk mail.	2	
Mugs, Dishware, Utensils and Food Waste		0	
W.12	We remind staff to bring their own mugs and have reusable mugs available for attendees to meetings in our office.	1	
At our events and meetings:			
W.13	We use reusable cups, dishware, and utensils.	3	
W.14	We compost all of our compostable organic waste.*	4	
W.15	In the lunch/break room, we have replaced disposables with permanent ware (mugs, dishes, utensils, etc.) and use refillable or bulk containers for sugar, salt & pepper, ketchup, etc. to avoid individual condiment packets.	3	
W.16	We have eliminated office purchases of bottled water, using a filter on the tap if necessary.	3	
Recycling		0	
W.17	We reviewed proper recycling practices at a recent staff meeting or through an office email to ensure that all members of our office are aware of the rules and had their questions answered.	1	
W.18	We provide recycling bins in our meeting, conference, and class rooms.	1	
W.19	There are recycling bins in all common areas where trash bins are present, such as kitchens, break rooms, mailrooms, and copy rooms.	1	
W.20	We have eliminated desk-side trash containers and switched to desk-side recycling and with central trash locations.	4	
W.20a	We have eliminated liners in desk-side recycling bins.	1	
W.21	In our office, recycling signs are clearly posted on or near recycling bins.	1	
W.22	We recycle inkjet and laser jet cartridges.	3	
W.23	We do a large e-waste drive annually or more frequently.	3	

W.24	We recycle all electronics that leave our office.	4	
W.25	We provide a box or bin for writing implement recycling. These collection areas have been publicized and there are signs indicating what can be recycled. *	1	
W.26	We provide a box or bin for cell pnone recycling. These collection areas have been publicized and there are signs indicating what can be recycled.*	2	
W.27	We have purchased a battery recharger for the office. We use rechargeable (instead of disposable) batteries for our portable electronics.	3	
W.29	There are at least two reusable bags in the kitchen or break room for our staff to use in place of plastic bags when shopping or buying lunch, supplies, etc. Alternatively, we store used plastic bags for reuse.	1	

purchasing.

		Subtotal for section: 0	Achieved
General		0	
P.1a	We have created a comprehensive inventory of office and other consumable supplies to avoid over-ordering.	4	
P.1b	We have reviewed the purchasing guidelines at a staff meeting in the last 12 months.	1	
Paper Products and Office Supplies		0	
We commit to consolidate orders so that we do not make purchases:			
P.2a	Less than $50	2	
P.2b	Less than $100	3	
We purchase copy, computer and fax paper with a minimum:			
P.3a	30% post consumer waste content	1	
P.3b	100% post consumer waste content	3	
P.3c	Chlorine free (can be in addition to other points)	1	
P.3e	Forest Stewardship Council (FSC) certified (can be in addition to other points)	1	
We purchase letterhead, envelopes and business cards with minimum			
P.4a	30% post consumer waste content	1	
P.4b	100% post consumer waste content	3	
P.4c	Chlorine free (can be in addition to other points)	1	
P.4d	Forest Stewardship Council (FSC) certified (can be in addition to other points)	1	
We purchase folders, notepads, post-its or other paper products with a minimum of:			
P.6a	10% post consumer recycled content.	1	
P.6b	30% post consumer recycled content.	2	
P.7	We have replaced solvent-based permanent ink markers/pens with water-based ones.	2	
P.8	We purchase only recycled or remanufactured laser and copier toner cartridges.	3	
Printing & Publications		0	
We require our external printing contractor to use:			
P.9a	Vegetable-based inks for all publications.*	4	
P.9b	Paper with 30% post consumer waste content.	1	
P.9c	Paper with 100% post consumer waste content.	3	
P.9d	Forest Stewardship Council (FSC) certified (can be in addition to other points).	1	
P.10	We ask our designer to design publications that require fewer varnishes and coatings, and can be easily recycled.	3	

Food Purchases for Events		0	
P.11	We use either our caterer's reusable dinnerware or compostable event options.	3	
P.12	We have the caterer provide drinks and snacks in bulk rather than individual containers.	2	
P.13	We purchase food in bulk trays and avoid purchasing cardboard and plastic-boxed meals.	2	
Furniture and Equipment		0	
For new office furniture:			
P.14a	We reuse furniture from campus surplus before purchasing new office furniture.*	4	
P.14b	We buy refurbished furniture.	3	
P.14c	We buy new furniture with at least 50% recycled content.	2	
P.15	Any new equipment we purchase is ENERGY STAR rated, if applicable. If ENERGY STAR is not available, we work with our vendor to purchase the most efficient option.	1	

water.

	Subtotal for section:	0	Achieved
General		0	
WR.1	We have had Facilities install a kitchen sink aerator with on/off lever that does not exceed 1.5 gallons per minute.	2	
WR.2	We have designated a person to report any sink leaks (kitchen, bathroom or lab) to Facilities immediately.	1	

iaq and human health.

	Subtotal for section:	0	Achieved
General		0	
In our kitchen, we use:			
H.1a	Environmentally preferable dishwashing soap	1	
H.1b	Environmentally preferable all-purpose cleaner in place of harsh chemical cleaners	2	
We have at least:			
H.2a	1 plant per 5 people in our office	1	
H.2b	1 plant per 2 people in our office	3	
H.3	We have walkoff mats at the entrance to our office or department.	3	

transportation.

	Subtotal for section:	0	Achieved
Commuting		0	
T.1	Members of our office are aware of K-State/Manhattan's alternative transportation programs and the associated resources regarding bus service, carpool/vanpool, Bike State, and transit news. Information about the applicable programs (including bike maps, car share info, etc.) is displayed permanently in the office.	2	
T.1a	If there are incentive programs available for taking public transportation, carpooling, or bike riding, we post information to help interested employees enroll.*	1	
T.2	There is bicycle parking located convenient to our building. If not, we contacted Facilities/Operations at our school/unit to see if relocating existing bike racks or obtaining new racks is a possibility.	1	
T.3	We offer telecommuting opportunities and/or flexible schedules so workers can avoid heavy traffic commutes.	4	
The following % of our office has filled out the K-State Transit Commuter and Parking Survey:			
T.4a	50 percent	1	
T.4b	75 percent	3	
Work –related Travel		0	
T.5	When planning work-related travel, we consider greener transport options.	2	
T.6	When choosing lodging, we give preference to lodging with one of the following certifications: US EPA Energy Star Label for Hospitality, LEED, Green Hotels Association or EcoRoom.	3	
T.7	We offset our travel using a carbon offset program. Note: to receive these points, copies of receipts showing the amount of carbon offset must be submitted to the Office of Sustainability.	4	

involvement.

		Subtotal for section: 0	Achieved
General		0	
I.1	This office has at least one Eco-Rep.	4	
I.2	This office has a Green Team that works with a Staff Eco-Rep in our department.	4	
I.3	We have information about our office's environmental efforts and what we are doing to meet the Green Office program standards posted in an easily visible location for staff and visitors to see.	1	
I.4	We have a designated section of an office bulletin board, or have a separate board for posting tips and information about green practices, events, and groups.	1	
I.5	We recognize staff members for their environmental stewardship efforts.	2	
I.6	Our office has hosted a Sustainability 101 presentation at a staff meeting or sent staff from our office to an external Sustainability 101 presentation in the past two years.	2	
I.7	We have shown a sustainability-focused video to our staff in the past two years.	1	
I.8	We have participated in the most recent and will continue to participate in RecycleMania.	3	
I.10	We have participated or plan to participate in a local, regional, national or international day of action, such as PARK(ing) Day, Bike-to- Work Day, Earth Day, Game Day Recycling, etc.	3	
I.11	as lighting retrofits, occupancy sensors, dual-flush toilet retrofits, aerators on sinks, etc. A member of our office has shared this feedback with our Eco-Rep in writing.	2	
I.12	We inspired another office, _____, to pursue K-State Green Office Certification.	2	
I.13	Someone in our office has submitted a story for K-State's sustainability blog about this experience or similar sustainability efforts in their life during the past 12 months.	2	
I.14	We figured out how to complete one of the starred items and shared our technique in the sustainability blog.	TBD by DoS	
I.15	Our office nominated somebody for an EcoRep Award	1	
I.14	We have successfully implemented additional green projects not listed here (points for additional projects will be determined by the sustainability staff reviewing the submission)	TBD by DoS	

Appendix D - Pre- and post-experiment coding results

Table D.1 Pre- and post-experiment type of responses and coding values

Response	Type of response	Coding value
Question 1	**Yes/no**	
Yes		1
No		2
Question 2	**Open-ended**	
Never		1
Rarely		2
Often		3
Daily		4
Question 3	**Scaled**	
1		1
2		2
3		3
4		4
5		5
Question 4	**Yes/no**	
Yes		1
No		2
Question 5	**Open-ended**	
Not limited		1
Never conceptualized		2
Not in an easily accessible location/requires undesirable physical activity		3
Institutional requirements/rhetoric		4
Other		5
Question 6	**Scaled**	
1		1
2		2
3		3
4		4
5		5
Question 7	**Yes/no**	
Yes		1
No		2
Question 8	**Open-ended**	

Response	Type of response	Coding value
Never conceptualized		1
Operational/institutional purposes		2
Positive impacts unknown		3
Believe current behavior is sufficient		4
Limited access		5
Pre-existing daily routines		6
Other		7
Question 9	**Yes/no**	
Yes		1
No		2

Appendix E - Pre- and post-experiment survey data

Table E.1 Frequencies and percentages for pre-experiment survey data

Pre-experiment survey responses	Number of responses	Percentage of responses
"Daily behavior"		
Yes	0	0%
No	1	100%
"Frequency of behavior"		
Never	20	90.9%
Rarely	2	9.1%
Often	0	0%
Daily	0	0%
"Rating of ability"		
1	1	4.6%
2	3	13.6%
3	5	22.7%
4	4	18.2%
5	9	40.9%
"Increase of ability"		
Yes	14	66.7%
No	7	33.3%
"Ability limitations"		
Not limited	4	16%
Never conceptualized	3	12%
Not in an easily accessible location/requires undesirable physical activity	15	60%
Institutional requirements/rhetoric	2	8%
Other	1	4%
"Rating of motivation"		
1	10	45.5%
2	5	22.7%
3	2	9.1%
4	1	4.5%
5	4	18.2%
"Increase of motivation"		
Yes	21	95.5%
No	1	4.5%
"Motivation limitations"		
Never conceptualized	6	28.6%

Pre-experiment survey responses	Number of responses	Percentage of responses
Operational/institutional purposes	3	14.3%
Positive impacts unknown	2	9.5%
Believe current behavior is sufficient	1	4.8%
Limited access	5	23.8%
Pre-existing daily routines	2	9.5%
Other	2	9.5%

Table E.2 Averages of select pre-experiment survey data

Pre-experiment survey responses	Coding value	Number of responses	Average of responses
"Frequency of behavior"			
Never	1	20	
Rarely	2	2	
Often	3	0	
Daily	4	0	
			1.09
"Rating of ability"			
1	1	1	
2	2	3	
3	3	5	
4	4	4	
5	5	9	
			3.77
"Rating of motivation"			
1	1	10	
2	2	5	
3	3	2	
4	4	1	
5	5	4	
			2.27

Table E.3 Frequencies and percentages of control group survey data

Control group survey responses	Number of responses	Percentage of responses
"Daily behavior"		
Yes	2	40%
No	3	60%

Control group survey responses	Number of responses	Percentage of responses
"Frequency of behavior"		
Never	1	20%
Rarely	1	20%
Often	1	20%
Daily	2	40%
"Rating of ability"		
1	0	0%
2	0	0%
3	0	0%
4	0	0%
5	4	100%
"Increase of ability"		
Yes	2	50%
No	2	50%
"Ability limitations"		
Not limited	2	28.6%
Never conceptualized	0	0%
Not in an easily accessible location/requires undesirable physical activity	2	28.6%
Institutional requirements/rhetoric	1	14.2%
Other	2	28.6%
"Rating of motivation"		
1	2	40%
2	0	0%
3	0	0%
4	0	0%
5	3	60%
"Increase of motivation"		
Yes	5	100%
No	0	0%
"Motivation limitations"		
Never conceptualized	1	20%
Operational/institutional purposes	0	0%
Positive impacts unknown	1	20%
Believe current behavior is	0	0%

Control group survey responses	Number of responses	Percentage of responses
sufficient		
Limited access	2	40%
Pre-existing daily routines	0	0%
Other	1	20%

Table E.4 Averages of select control group survey data

Control group survey responses	Coding value	Number of response	Average of responses
"Frequency of behavior"			
Never	1	1	
Rarely	2	1	
Often	3	1	
Daily	4	2	
			2.80
"Rating of ability"			
1	1	0	
2	2	0	
3	3	0	
4	4	0	
5	5	4	
			5.00
"Rating of motivation"			
1	1	2	
2	2	0	
3	3	0	
4	4	0	
5	5	3	
			3.40

Table E.5 Frequencies and percentages for post-experiment survey data

Post-experiment survey responses	Number of responses	Percentage of responses
"Daily behavior"		
Yes	4	20%
No	16	80%
"Frequency of behavior"		
Never	8	47.2%

Post-experiment survey responses	Number of responses	Percentage of responses
Rarely	3	17.6%
Often	3	17.6%
Daily	3	17.6%
"Rating of ability"		
1	2	10%
2	4	20%
3	2	10%
4	7	35%
5	5	25%
"Increase of ability"		
Yes	14	73.7%
No	5	26.3%
"Ability limitations"		
Not limited	1	5.6%
Never conceptualized	1	5.6%
Not in an easily accessible location/requires undesirable physical activity	7	38.9%
Institutional requirements/rhetoric	4	22.2%
Other	5	27.7%
"Rating of motivations"		
1	8	40%
2	1	5%
3	4	20%
4	2	10%
5	5	25%
"Increase of motivation"		
Yes	16	84.2%
No	3	15.8%
"Motivation limitations"		
Never conceptualized	1	4.8%
Operational/institutional purposes	3	14.3%
Positive impacts unknown	10	47.6%
Believe current behavior is sufficient	1	4.8%
Limited access	1	4.8%
Pre-existing daily routines	2	9.4%
Other	3	14.3%

Post-experiment survey responses	Number of responses	Percentage of responses
"Trigger success"		
Yes	9	47.4%
No	10	52.6%

Table E.6 Averages of select post-experiment survey data

Post-experiment survey responses	Coding value	Number of responses	Average of responses
"Frequency of behavior"			
Never	1	8	
Rarely	2	3	
Often	3	3	
Daily	4	3	
			2.06
"Rating of ability"			
1	1	2	
2	2	4	
3	3	2	
4	4	7	
5	5	5	
			3.45
"Rating of motivation"			
1	1	8	
2	2	1	
3	3	4	
4	4	2	
5	5	5	
			2.75