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A Secure Behavior Modification Sensor System for Physical Activity Improvement

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A Secure Behavior Modification Sensor System for Physical Activity Improvement

BY

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APPROVAL OF THE REVIEW COMMITTEE

This dissertation has been duly read, reviewed, and critiqued by the Committee listed below, which hereby approves the manuscript of Alan Price as fulfilling the scope and quality requirements for meriting the degree of Doctor of Philosophy in Information Systems and Technology.

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Abstract of the Dissertation

A Secure Behavior Modification Sensor System

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Claremont Graduate University: 2011

Today, advances in wireless sensor networks are making it possible to capture large amounts of information about a person and their interaction within their home environment. However, what is missing is how to ensure the security of the collected data and its use to alter human behavior for positive benefit.

In this research, exploration was conducted involving the "infrastructure" and "intelligence" aspects of a wireless sensor network through a Behavior Modification Sensor System. First was to understand how a secure wireless sensor network could be established through the symmetric distribution of keys (the securing of the infrastructure), and it involves the mathematical analysis of a novel key pre-distribution scheme. Second explores via field testing the "intelligence" level of the system. This was meant to support the generation of persuasive messages built from the integration of a person's physiological and living pattern data in persuading physical activity behavior change associated with daily walking steps. This system was used by an elderly female in a three-month study.

Findings regarding the "infrastructure" or the novel key pre-distribution scheme in comparison to three popular key distribution methods indicates that it offers greater network resiliency to security threats (i.e., $\frac{1}{2^{32}}$ times lower), better memory utilization (i.e., 53.9% less), but higher energy consumption (i.e., 2% higher) than its comparison group.

Findings from the "intelligence" level of the research posit that using a person's physiological and living pattern data may allow for more "information rich" and stronger persuasive messages. Findings indicate that the study participant was able to change and improve her average daily walking steps by 61% over a pre-treatment period. As the study participant increased her physical activity, changes in her living pattern were also observed (e.g., time spent watching television decreased while time spent engaged in walking increased by an average of 15 minutes per day). Reinforcement of these findings were noted between a pre and post-study survey that indicated the study participant moved from a *contemplation* stage of change where physical activity engagement was intended but not acted upon to an *action* stage of change where physical activity engagement dominated the new behavior.

Dedication

My life, love, and all that I have ever accomplished and will ever become is dedicated to my mother.

My Mother Kept A Garden

"My Mother kept a garden,
a garden of the heart.
She planted all the good things
that gave my life its start.
She turned me to the sunshine
and encouraged me to dream,
fostering and nurturing
the seeds of self-esteem...
And when the winds and rain came,
she protected me enough
but not too much because she knew
I'd need to stand up strong and tough.
Her constant good example
always taught me right from wrong,
markers for my pathway
that will last a lifetime long.
I am my Mother's garden...
I am her legacy
and I hope today she feels the love
reflected back from me."

Author Unknown

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One never makes an academic journey alone. A big thank you is given to Dr. Kristie Kosaka and Dr. Vince Polito. Their lead ahead of me made the Ph.D. trail easier to find and more enjoyable to walk. Their support with all aspects of this dissertation was invaluable. I also thank Dr. Amir H. Nilipour, who encouraged me to start a doctoral program and for his incessant push to see me complete it. Lastly, very special thanks are given to the Medina family and especially Brenda, whom I have told many times how much they are appreciated and loved. My success in finishing another chapter in my education could not have been accomplished without their support. *"Oh I'm lookin' for my missin' piece. I'm lookin' for my missin' piece. Hi-dee-ho, here I go, lookin' for my missin' piece"* (Silverstein, 1976). In my search, I found it with them.

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CHAPTER 1 – INTRODUCTION

1.1 Motivation and Problem Statement

Wireless sensor networks (WSNs) have emerged as an innovative class of networked embedded systems due to the union of ever smaller, less costly embedded processors and wireless interfaces (Peters, Smith, Medeiros, & Rohrer, 2001). WSNs are composed of small autonomous devices, or sensor nodes, with each node equipped with one or more environmental sensors, storage and processing resources, and a communication subsystem. A typical sensor node is an eight bit microprocessor operating with limited processing power (e.g., 4 MHz), limited storage memory (e.g., 4 kilobytes), and limited communication range (e.g., less than 1000 feet). Most sensor nodes are battery powered and often placed in an operating space that is typically unattended. Due to the limitations found with WSNs, protocols and applications associated with standard computer systems cannot be applied (Akyildiz, Su, Sankarasubramaniam, & Cayirci, 2003).

Research in wireless sensor networks has been active since early 2000. Some researchers are striving to develop improved WSN protocols. Others are attempting to improve node design; still others are working to resolve security issues including the main WSN security threat of insecure radio links with eavesdropping and information corruption possible. Protecting confidentiality, integrity, and availability of the communications and computations poses additional challenges (Chan, Perrig, & Song, 2003; Stankovic, 2003). This study focused on one aspect of security: "*How to establish secure communication links within a wireless sensor network through the distribution of keys?*" This question supported part one of a two-part exploration that was conducted involving the "infrastructure" and "intelligence" aspects of a wireless sensor network. The first part of this research was to understand how a secure wireless sensor network could be established through the symmetric distribution of keys (i.e., the securing of the infrastructure), and it involved the mathematical analysis of a novel key pre-distribution algorithm that was posited to provide better network security and lower memory utilization over existing key pre-distribution schemes.

Wireless sensor networks have been found to support a myriad of uses including applications within military, commercial, environmental, and healthcare domains. With the rise in the number of baby boomers in the United States, whose population that belongs to the 65+ category predicted to be greater than 18% by 2025 (Al-Omari & Shi, 2007), research is actively being conducted on in-residence monitoring that can assist senior adults in maintaining a more healthy and independent life. These smart homes leverage technology including WSNs to provide peace of mind for adult children who can remotely monitor their loved ones, collect real-time logs of physical activities and health parameters for examination by health professionals, and for the detection of anomalous patterns in behavior or physical conditions that may forewarn of an impending health problem (Fogarty, et al., 2005).

Advances in WSNs are now making it possible to capture large amounts of data about a person's daily life. However, what is limited is how to use the collected information to alter human behavior for positive benefit? This question supported part two of the exploration that looked at the "intelligence" aspect of a wireless sensor network (i.e., a technology infrastructure used for knowledge obtainment) and its support in a Behavior Modification Sensor System (BMSS) that was used to understand the generation of persuasive messages built from the integration of a person's physiological and living pattern data. Persuading physical activity behavior change associated with daily walking steps was the research goal. This persuasive computing technology was used by an elderly Hispanic female in a three-month field experiment.

Persuasive computing technology is a computing system, device, or application intentionally designed to change a person's attitude or behavior in a predetermined way (Fogg, 2003). Figure 1 shows a simple framework that was co-developed by this author or referred to as "the researcher" from this point forward; it exemplifies how persuasive computing technologies can impact health and healthcare (Chatterjee & Price, 2009). The framework shows three overlapping circles: 1) technology that is the driver for persuasive change and has to be selected or designed carefully to impact health; 2) persuasion strategies that must be employed with an intent to change behavior, attitude, or motivation; and, 3) the sub-domains within healthcare that support potential applications bounded by disease, life style, or the natural cycle from birth to death.

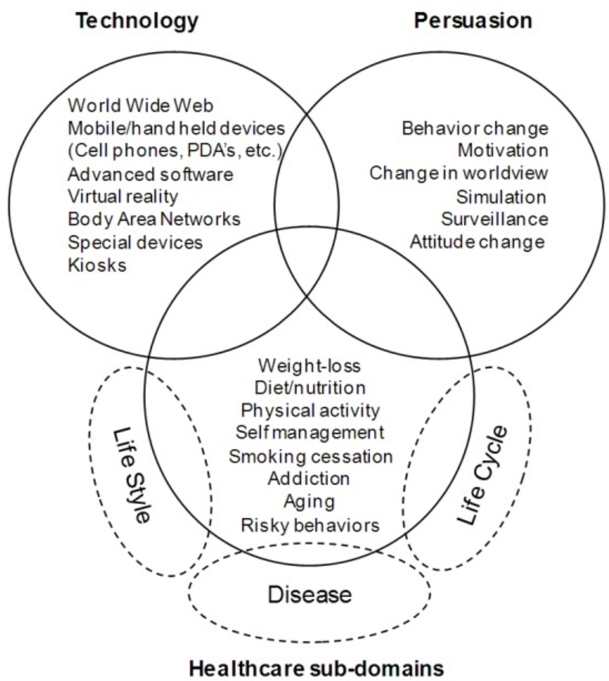


Figure 1: Simple Framework

In relationship to the simple framework, this study worked in the technology domain of wireless sensor networks with a developed Behavior Modification Sensor System that drove a persuasion strategy of behavior change related to physical activity improvement. Bounding the healthcare sub-domains (i.e., physical activity), the study participant showed a limited active lifestyle and was diagnosed with pre-diabetes and told by her physician to improve her physical activity as a preventative response to a worsening state.

While low external validity is noted with use of one study participant, through an exploratory understanding of how a Behavior Modification Sensor System might be used to persuasively change human behavior and how knowledge of a persons living pattern might predict negative health behavior, further research can be done to strengthen or expand the findings reported in this dissertation. Assuming the research findings are confirmed, generalizing the conclusions with greater external validity should be possible.

1.2 Problem Domain

According to a recent report from the United States Department of Health and Human Services (USDHHS), one in four adults are inactive in any form of physical activity with just one in five adults classified as being highly engaged. The majority of adults fall into a low to moderate classification when it comes to being physically fit (USDHHS, 2003). This report identified physical inactivity as a major risk factor that compounds healthcare and its associated cost, which was over $2.1 trillion in 2006 (Prevention Institute, 2007). The magnitude of health problems associated from a lack of physical inactivity has been well documented including its attribute to the increase in obesity prevalence among U.S. adults (Buckworth & Dishman, 2002; Clement, Schmidt, Bernaix, Covington, & Carr, 2004; Dallow & Anderson, 2003). With physical activity shown to improve health and lower healthcare cost, research has increased on physical activity promotion and, especially in the case of the elderly, modes of physical activity assistance that can support more independent, healthier, and happier lives (Dishman, 2004).

The keystone to better health and health management is healthy living, which are the “steps, actions, and strategies one puts in place to achieve optimum health“ (Healthy Holistic Living, 2009, ¶2). Healthy living, as exemplified in Figure 2, is the responsibility assumed by a person in making smart health choices—e.g., eating right, being physically fit, and managing mental, emotional, and spiritual wellness — for today and for the future (Healthy Holistic Living, 2009).

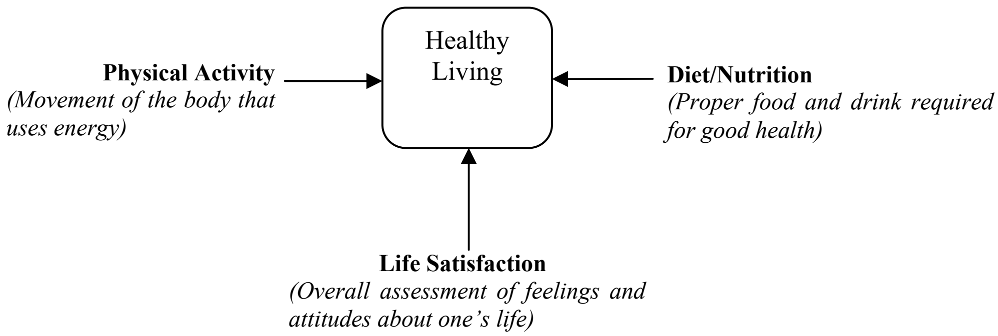


Figure 2: Healthy Living Framework

While many people may consider this common knowledge, they often fail to act on this responsibility due to either a lack of motivation or a lack of time to properly monitor their health. Hence, the Behavior Modification Sensor System in this dissertation can be considered a virtual coach that uses persuasive computing technology to provide the needed motivation and support for better health.

1.3 Research Questions

With increased attention by the research community on healthy living and specifically on physical activity promotion, the fundamental question of "*How can we effectively use technology to improve health and long-term healthy living?*" remains open. This study attempted to understand this and three related questions:

- How can technology be used to persuade human behavior change in the promotion of physical activity?

- What impact and/or level of effectiveness does persuasive computing technology play in promoting human behavior change?

- How can a secure wireless sensor network—a technology that can provide a foundation to persuasive computing—be instantiated in a "Smart Home" configuration to support healthy living strategies and to promote healthier user living? The goal being not to make a smart home but to make "smart people" through use of technology.

Specifically, this study explored the sufficiency of a novel key pre-distribution algorithm that can be used to secure a wireless sensor network in a Behavior Modification Sensor System to explore the effectiveness of persuasive messages in persuading physical activity behavior change associated with daily living—as exemplified by walking inside or outside the home and not linked to a sports-based activity. It included the design, development, and implementation of hardware and software applications under an architecture that provides for the collection of disparate health and home environmental data by means of different computing-based technologies and medical monitoring devices. Integrating health and physical activity data with a person's home living pattern was hypothesized to support a richer information base that could be used to validate the motivational drivers for physical activity change and to support better decision making associated with health by the stakeholders who rely on this information.

Instantiation of the complete Behavior Modification Sensor System was used to explore whether the following conditions would apply:

- Instantiation and use of a Behavior Modification Sensor System for in-home monitoring of domain living patterns, physical activity, and physiological states would improve daily physical activity levels in a user of the system.

- Event-driven persuasive messages built from the combining of physiological and microenvironment data would improve daily physical activity levels in a user of the system.

Positive research outcomes will indicate further external validity support that persuasive computing technology can promote health and healthy living for users that use it.

The work embodied in this research considers the development of the key pre-distribution algorithm as a major contribution of new knowledge to the field of computer science. Development of the Behavior Modification Sensor System and its use to study the impact of information rich persuasive messages on physical activity behavior change was considered complimentary and applications-oriented that was needed to align this dissertation with a Ph.D. in Information Systems and Technology versus one that fits into the field of computer science alone. While the key algorithm was not used in this research to establish a secure BMSS network, it is expected to support future studies that may expand on the results and lessons learned. Once an understanding of how a wireless sensor network can be built and used to capture information about a person's daily living rhythm or pattern, the novel key distribution algorithm can be added to support the security of a much larger wireless sensor network than the one used in this study. Both were considered parts of a whole that, due to a limited understanding of each, had to be first studied independently before they can be integrated and used in future research.

This research was segmented into two parts: 1) the mathematical analysis of the PKC algorithm that tested its validity and 2) the design, development, and implementation of a Behavior Modification Sensor System that was used to answer the questions being explored to establish a connection between persuasive messages and their impact on physical activity. Both parts were considered mutually exclusive since the validation of the PKC algorithm was not required in the BMSS; therefore, work between the two parts was done in parallel.

The research methodology selected for this study was based on Design Science (Hevner, Salvatore, March, & Ram, 2004) and done quantitatively, deductively, and experimentally. Design Science was chosen since the nature of the research was exploratory, prescriptive, and emphasized artifact instantiation and model development.

1.4 Organization of the Dissertation

This dissertation is structured sequentially: Chapter 2 briefly surveys the current research in the use of wireless sensor networks and persuasive computing technology in healthcare and highlights the challenges in establishing a secure WSN associated with key distribution. Chapter's 3 and 4 posits a novel key pre-distribution algorithm and the results of analysis of the algorithm that can be used in a Behavior Modification Sensor System that, for this study, was used to drive physical activity improvement through behavior change strategies. Chapter's 5 and 6 describes the BMSS and the analysis of results from an experiment that was conducted to test its validity against a set of hypotheses. Finally, Chapter 7 concludes with the premises of why this dissertation expands new knowledge and justifies merit at a doctoral level.

CHAPTER 2 – LITERATURE REVIEW

2.1 Persuasive Computing

The idea that information technology can be used to persuade behavior change has been well documented in research literature (Etter, le Houezec, & Landfeldt, 2003; Kroeze, Werkman, & Brug, 2006; Lenert, Munoz, Perez, & Bansod, 2004; Obermayer, Riley, Asif, & Jean-Mary, 2004). Kroeze et al. (2006) conducted a systematic review on the effectiveness of computer-tailored education to change physical activity and dietary behaviors. In their review of 30 publications over a 35 year period, tailored intervention delivered with computers or other media devices without person-to-person interference of a counselor was found to have significant effects in changing physical activity and dietary behaviors. Obermayer et al. (2004) evaluated the use of cell phone text messaging on smoking-cessation improvement among college-aged adults. Study participants received individually tailored messages at smoking risk points specified by the participant and were provided with suggestions for smoking reduction appropriate to the risk situation. For example, participants that indicated they typically smoke after breakfast would receive a morning message encouraging them to engage in physical activity as a way to reduce cigarette cravings. Etter et al. (2003) evaluated the impact of email on the use of nicotine replacement therapy and Lenert et al. (2004) looked at the impact of an automated email system that sent individually timed educational messages on smoking rates. Each study concluded that smoking reduction was comparable or superior to typical self-help and non-text or email message smoking-cessation interventions.

Further support that computer-mediated interventions can impact behavior change is seen in Richardson, Brown, Foley, Dial, and Lowery (2005), Hurling et al. (2007), Consolvo, Everitt, Smith, and Landay (2006), and Consolvo, Roessler, Shelton, LaMarca, and Schilit (2004). Sensor technologies used to monitor physical activity, mobile phones that allow users to record workouts and determine caloric expenditures, and other monitoring devices like the *BodyMedia's BodyBugg* (BodyMedia, 2008) that resides on a users arm and uses physiological sensors and data modeling to measure health routines are leveraged in the studies to support the change. Each study validated the effectiveness of simple communications on behavior modifications and the efficacy of technology to support behavior change interventions.

While most research studies cite custom technological applications and designs, commercial products do exist to provide personal awareness of activity level or determination of health state. The Kogan GPS watch allows an owner to monitor heart rate (Kogan Technologies, 2007). Omron manufactures pedometers that allow users to track step-counts and several models support activity tracking and analysis with health management software (Omron Healthcare, 2010). For the runner, the Nike+iPod uses an accelerometer embedded in a shoe and communicates with an Apple iPod to report workout states (e.g., the distance and pace of a walk or run) and to provide positive feedback for goal-oriented workouts with pre-recorded congratulation messages provided by notable athletes at the achievement of a workout milestone (Nike, 2007).

Each of the studies or products above further validate that information technology can be used to persuade behavior change; however, philosophers and scholars to date have failed to articulate a singular universal agreement as to what persuasion really means. For this study, persuasion is defined as a deliberate attempt to change behavior that is intended and not accidental. Additionally, it does neither connotate coercion nor deception. Coercion implies force; and while it may change behavior, it is not the same as persuasion—which implies voluntary change (Fogg, 2003).

2.2 Behavioral Theories and Models

At its core, behavior change is tied to modifying a person's general evaluation of stimuli through awareness or knowledge driven by education, influence, or, to a lesser extent, various forms of operant conditioning (Olson & Fazio, 2001, 2002) where research shows that preferences can be learned below conscious awareness and support formation but not change (Cacioppo, Marshall-Goodell, Tassinary, & Petty, 1992; Till & Priluck, 2000; Walther, 2002; Winkielman & Cacioppo, 2004).

Various frameworks are available to gain an understanding of behavior change and were used to guide the thesis set in this research.

Self-Determination Theory

Self-Determination Theory (SDT) (Deci & Ryan, 1985; Ryan & Deci, 2000b) provides a framework for the study of motives associated with behavior change including motivation linked with physical activity. Deci and Ryan (1985) developed SDT to examine how different types of motivation leads to a person's varying degree of self-determination to engage in a behavior change program. According to Deci and Ryan, intrinsic and extrinsic motivation make up a continuum that distinguishes individual self-determination with amotivation—the absence of motivation for an activity—at one end of the continuum and intrinsic motivation—or the motivation to engage in an activity for its own sake or the pleasure it provides—at the other end. Extrinsic motivation falls between these two extremes.

Most individuals who engage in physical activity are more likely to do so for extrinsic reasons that are driven for some received benefit (e.g., appearance, opportunities of better health, social recognition, extrinsic reward, etc.) or to avoid negative consequences such as guilt, poor health, or social stigmas if engagement is low (Deci & Ryan, 1985; Ryan & Deci, 2000a; Vlachopoulos, Karageorghis, & Terry, 2000). Extrinsic motivation is multidimensional that is categorized by four levels of regulation: *external regulation, introjected regulation, identified regulation*, and *integrated regulation*. At the lowest end of the continuum and closest to amotivation is external regulation where motivation is spurred solely by rewards or avoidance to punishment. Following external regulation is introjected regulation where action is more internalized but still linked to external reasons. Activity begins to take on value but individuals engage out of obligation or guilt rather than internalized choice (Deci & Ryan, 1985). Next is identified regulation that occurs when individuals freely choose to participate in an activity because of its self importance or benefit value. The highest form of extrinsic motivation and closest to internal motivation is integrated regulation. While both are similar, integrated regulated individuals engage in a behavior to achieve some outcome. In physical activity, individuals who are motivated at this level often exercise to improve or maintain health, improve physical appearance, derive social benefit, or obtain other internal rewards instead of the enjoyment of the physical activity itself. Research has shown that behavior change adherence linked to extrinsic motives may not be as enduring as those individuals with intrinsic motivations (Vlachopoulos et al., 2000).

Wilson and Rogers (2002) cited extrinsic motivation as a way to understand why people participant in physical activity without enjoying it. Mullan and Markland (1997) contended that the extrinsic motivation continuum demonstrates how an individual can feel self-determined in his/her regulation of physical activity yet be driven by extrinsically motivated drivers from participation in an exercise program. The goal of any behavior change program—supported by persuasive computing or not—is to identify an individual's current motivation state and to help them move towards more internalized forms of self-determination (Biddle, 1999; Carron, Hausenblas, & Estabrooks, 2003; Ryan & Deci, 2000b).

Deci and Ryan (1985) identified three important psychological needs—*autonomy, competence, and relatedness*—that facilitate self-determination movement between regulated states. The extent that these needs are met describes an individual's motivational state, regardless of their position along the self-determination continuum (Kilpatrick, Hebert, & Jacobsen, 2002).

Autonomy is the independent choice made by an individual to engage in a behavior or activity (Levesque, Stanek, Zuehike, & Ryan, 2004). Autonomy supports the need for an individual to feel in control versus being controlled and when linked to exercise motives explain the reasons why an individual engages in higher levels of physical activity (Mullan & Markland, 1997). While an individual needs to feel in control, they must also feel capable of producing the desired outcome garnered by the attributed action. This belief is labeled as *competence* (Ferrer-Caja & Weiss, 2000). Lastly, *relatedness* refers to the connectedness or closeness an individual feels to others. Described by Ryan and Deci (2000b) as a bidirectional construct that encompasses the need of being cared for and also the caring for others, Markland (1999) concluded that relatedness when combined with autonomy and competence can create self-determining conditions needed for effective shifts in the motivation continuum. One framework that is used to examine the shift from extrinsic to intrinsic motives is Prochaska and DiClemente's Transtheoretical Model (Prochaska & DiClemente, 1982; Mullan & Markland, 1997).

Transtheoretical Model

The Transtheoretical Model is a psychological framework that evaluates an individual's readiness to behavior change (Glanz, et al., 1994). It is a model of intentional change that is composed of four dimensions: *stages of change, processes of change, self-efficacy*, and *decisional balance* (Cardinal & Kosma, 2004; Cardinal, Tuominen, & Rintala, 2004). Of the four dimensions, stages of change have been shown to be the organizing variable of the model.

Recognizing that behavior change requires both time and motivation, Prochaska and DiClemente (1982) identified five stages of change: *precontemplation* where an individual has not considered a benefit of behavior change and therefore has not engaged in a change strategy*; contemplation* where an individual considers the benefit(s) of a change strategy but fails to act on change action; *preparation* where an individual is prepared to engage but is action-neutral in a behavior change program; *action* where an individual is engaged in a change program; and, lastly, *maintenance* where an individual maintains action that supports behavior change outcomes while often experiencing relapses to prior stages (DiClemente, 1993; Mullan & Markland, 1997).

Supporting progression through the stages of change, *decisional balance* reflects an individual's internalization of the cost and benefits (or pro's and con's) of engaging in an activity or changing of an activity (Velicer, DiClemente, Prochaska, & Brandenburg, 1985). It has been shown that movement between stages of change occurs when benefits outweigh cost thus supporting a shift to a new stage (Glanz, et al., 1994). Most behavior change programs are difficult to initiate or sustain since the sacrifices or cons of a behavior change are immediate and the benefits are often not. During precontemplation, an individual may be easily persuaded by the cons of physical activity—e.g., they may feel that exercise is too hard or does not provide any benefits. Providing motivation and reasons for physical activity can reduce the barriers within precontemplation and help move an individual to contemplation and preparation. Once an individual moves to action, the benefits of exercising begin to outweigh the cons on the decisional balance scale (Plotnikoff, Blanchard, Hotz, & Rhodes, 2001). Each success reinforces the benefits of behavior change and further supports stage changes. Finally, as an individual moves to maintenance, focus must be placed on the pros of exercise to prevent the tipping of the scale to an earlier state (Plotnikoff, et al., 2001).

The decisional balance or cost-benefit analysis tenet also shows up in the Health Belief Model that was developed to understand human behavior related to health and healthy living (Janz & Becker, 1984; Rosenstock, Strecher, & Becker, 1988). The Health Belief Model stipulates that a person's health behavior is a function of the perception that an individual has of any potentially adverse health conditions, severity of current health conditions, benefits of taking preventive actions, and any barriers to healthy living such as cost, effort, and time associated with a health behavior action. This model incorporates cues to action that refers to the strategies to activate readiness to perform preventative and positive behavior change. Supporting the Health Belief and Transtheoretical Models is the construct of *self-efficacy* (Maheshwari, 2008).

Self-efficacy is a person's perception of their ability to perform an action; if a person feels they can perform a behavior, engagement in the behavior is often high. Otherwise, engagement in the behavior is often low (Leenders, Silver, White, Buckworth, & Sherman, 2002). Bandura (1985) showed that motivation for behavior action was based on two factors: expectations of outcomes and cognitions about self-efficacy. Research has shown that self-efficacy is the strongest predictor of exercise behavior and increases significantly as one moves through the stages of change (Buckworth, Granello, & Belmore, 2002; Marcus & Owen, 1992; Sullum, Clark, & King, 2000). Those individuals with low perceived confidence are more likely to be inactive and thus fail to move to higher stages of change than those individuals with higher levels of perceived confidence.

Research now indicates that behavior change should not viewed as the consequence of an externally provided message or trigger but rather as the consequence of the thoughts, ideas, and arguments that recipients themselves generate when presented with an attitude stimulus (Cacioppo, Petty, & Crites, 1994). The standard models of change, which continue to garner considerable attention, takes a basic position that messages are presented, processed, and if successful, move recipients' attitudes toward an advocated position. The revised attitude, in turn, may influence subsequent behavior under appropriate conditions (Petty & Cacioppo, 1986).

Early work by Carl Hovland and Weiss (1952) focused on the determinants of message learning and persuasion through evaluation of several independent variable factors: source factors, message factors, recipient factors, and modality of channel factors;

dependent variables were associated with measures of attention, comprehension, and retention. The attention to, comprehension of, and retention of the arguments contained in a persuasive message were thought to be the information processing stages underlying attitude and behavior change.

Hovland's work has evolved into two popular dual-process models: the Elaboration Likelihood Model (ELM) and the Heuristic/Systematic Model (Petty & Cacioppo, 1986). Both models hold that if a message recipient is able and properly motivated, they will elaborate, or systematically analyze, persuasive messages. If a message is well reasoned, data-based, and logical, it will persuade; if it is not, it will fail (Crano & Prislin, 2006). Auxiliary features of context will have little influence on these outcomes for the motivated recipient. However, if message targets are unmotivated (or unable) to process a message, they will use auxiliary features vis-à-vis "peripheral cues" or heuristics to short circuit the more effortful elaboration process in forming an attitudinal response. Examples of peripheral and heuristic cues include views of physical beauty, internal messages like "dad is always right", etc. Such attitudes are less resistant to counter pressures, less stable, and less likely to impel behavior change than are those attitudes formed by thorough elaboration processing (Crano & Prislin, 2006).

A challenge in persuasive computing research is how to design, develop, and implement technology that supports behavior change? Reinforcement can be enhanced with B.J. Skinner's learning theory (Skinner, 1953), which posits that behavior change should be broken down into a series of small steps or goals. Incremental increases in change (referred to by Skinner as shaping) sets realistic goals for a targeted behavior. For example, setting a daily walking goal of 40 minutes is a drastic change for a person who has been sedentary. Skinner would argue that it is more effective to start with a few minutes of walking and gradually increase it to the targeted behavior.

Fogg (2009) in an attempt to scope down the determinants of human behavior proposed the Fogg Behavior Model that can be used to guide the design and development of effective persuasive technology. According to Fogg, behavior can be impacted by three factors: (1) *motivation*, (2) *ability*, and (3) *trigger*. Fogg asserts that for behavior to happen, a person must have sufficient motivation, sufficient ability, and an effective trigger. All three factors must be present at the same instant for optimal behavior change to occur.

Regardless of the behavior change theory adopted, research in technology and associated applications used to persuade have been active in recent years (Hassan, 2008; Maheshwari, 2008; Ulm, 2007). This includes work with wireless sensor networks that are finding greater use in healthcare applications today.

2.3 Wireless Sensor Networks in Healthcare

Healthcare applications using wireless sensor networks are exemplified in various real-time patient monitoring projects. They include UbiMon (Ubiquitous Monitoring

Environment for Wearable and Implantable Sensors), whose goal is to provide continuous and unobtrusive patient monitoring for the capture of life threatening events (Van Laerhoven, et al., 2004), and CodeBlue, a WSN model that supports a range of medical applications including in-hospital emergency care, stroke patient rehabilitation, and disaster response scenarios (Shnayder, Chen, Lorincz, Fulford-Jones, & Welsh, 2005; Dagtas, Natchetoi, & Wu, 2007). WSNs are also finding use in applications outside of direct patient monitoring.

According to Mukhopadhyay, Gaddam, and Gupta (2008, p. 35), "Sensor networks permit data gathering and computation to be deeply embedded into the physical environment." These technologies manifest context-aware systems that deduce a person's activity from their environmental state. Context-aware systems are exemplified in Hassan and Chatterjee (2008) that evaluated the impact of persuasive messages triggered by knowledge of a user's location on a college campus and in Chen, Yang, Malkin, and Wactlar (2007) that used visual and audio sensors to track social interaction patterns among geriatric patients in a nursing home. Their study noted that changes in behavioral patterns are often signs of changes in mental and physical states that typically do not get detected or recorded during brief examinations by physicians. For example, some early predictors of dementia may be simple changes in walking speed, changes in room movement, or changes in social interaction behaviors.

Examples of wireless sensor networks used in "smart homes" are further noted in literature. Under a pilot program at the Oregon Health & Science University, 300 homes in the Portland area have been wired with tiny sensors that track elderly to validate movement changes as signs of early clues of dementia and the impending disease of Alzheimer's (Neergaard, 2007). CAST—Center for Aging Services Technology—has developed several projects including a home that integrates various environmental sensors to help debilitated elderly track their normal movement activity and a sensor-based bed that tracks sleep patterns for evaluation of possible health problems (CAST, 2010). Both projects provide alerts when non-normal living is detected. The Center for Future Health at the University of Rochester has built a five-room house with various infrared sensors, monitoring devices, and biosensors with the goal to provide seniors with the data that they need to manage their health and to forecast living changes as a sign of an immediate or future health issue (University of Rochester, 2010); and, the MobiHealth project at Georgia Tech is working on a system for the remote collection of body signals, thereby allowing health professionals to easily monitor patients in their homes (Ahamed, Haque, & Stamm, 2007). Each of these projects and associated studies highlights the use of technology to improve health monitoring by having real-time data of relevant health states.

While studies involving smart homes typically dealt with the use of technology to monitor activities within a closed environment, none addressed the use of technology to directly persuade behavior change; data collected was typically analyzed ex-post to an action or used to trigger an alert only—e.g., a subject has fallen, which may indicate a medical emergency. The use of technology to monitor activity within an environment and to drive real-time behavior change is first seen in Hassan (2008) and Hassan and Chatterjee (2008). While their work considered a user in a macroenvironment—i.e., outside the home, this study looked at a user in a microenvironment, or within a home or closed space, through intensive monitoring.

Regardless of the type of persuasive computing technology used, when supported by a wireless sensor network, protecting the confidentiality and integrity of the data—especially of information that is health related, is critical. Due to the limitations associated with WSNs, establishing secure communication links by first distributing an encryption/decryption key remains an open challenge.

2.4 Key Distribution Schemes

Wireless sensor networks are typically deployed in unfriendly operating spaces and are subjected to greater security risk. Due to the constraints—i.e., low power, low memory, and low processing rates, found with sensor nodes, establishing secure communications involving the setup and distribution of secret keys is an open problem for WSN researchers. Currently, there are three general key agreement or distribution schemes discussed in literature. They include the trusted-server or arbitrated protocol, the self-enforcing scheme, and the key pre-distribution scheme (Du, Ding, Han, & Varshney, 2003). The arbitrated protocol scheme requires a trusted server to establish a shared-session key between sensor nodes. Examples include the Security Protocols for Sensor Networks (SPINS) and Kerberos (Massachusetts Institute of Technology, 2010; Perrig, Szewczyk, Culler, & Tygar, 2001). Since Kerberos is commonly known, it is not discussed.

SPINS: Security Protocols for Sensor Networks

SPINS is composed of two secure building blocks: SNEP and μTesla, with both used to manage data confidentiality, two-party data authentication, data freshness, and authenticated broadcast (Perrig, et al., 2001). Figure 3 shows the SPINS key negotiation protocol with the assumption that node A wants to establish a shared session key denoted as S_{KAB} with node B. Node A sends a request to node B who, upon receiving the request, sends a message to a trusted third party key distribution center *S*. This server manages authentication and key distribution between node A and node B. Upon contact by node B, the key distribution center generates a shared session key that is sent to both nodes. SPINS provides several advantages including low communication overhead and strong data authentication but, as with other schemes that utilize a singular key distribution node, problems do exist.

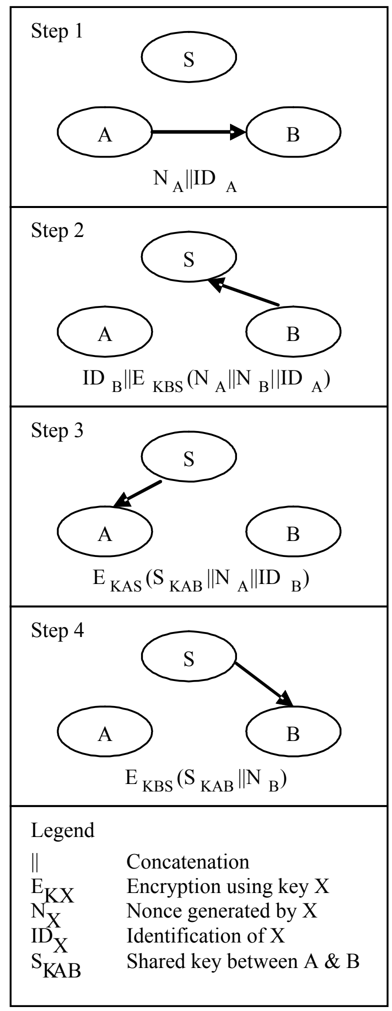


Figure 3: SPINS

The trusted-server model is prone to directed attacks against this point of weakness in the cryptographic system. Furthermore, due to the ad-hoc nature of wireless sensor networks with their network topology unknown prior to deployment, limited communication power, and intermittent sensor-node and dynamic network operations, key distribution schemes based on a trusted-server model are not optimal for distributed wireless sensor networks (Akyildiz, et al., 2003; Eschenauer & Gligor, 2002).

A second key agreement scheme commonly mentioned in wireless sensor network literature is the self-enforcing scheme, which depends upon asymmetric protocols and algorithms with examples including Diffie-Hellman key agreement and RSA signatures (Schneir, 1996). However, as mentioned earlier, sensor node constraints of low memory and energy, and further limited by non-probabilistic distribution and network operation, public-key algorithms common in asymmetric cryptography limits real-world usage of this key distribution scheme.

Presently, the most commonly used key distribution method in large WSNs is through key pre-distribution, where key information is installed in each sensor node prior to a network deployment (Xiao, et al., 2007). Typically, two solutions have been used: 1) a single mission key where all nodes carry a master key and 2) a set of separate n – 1 keys (where n is the number of nodes in the network), each being a pairwise key that is privately shared between two nodes (Du, Fang, Wang, & Chen, 2003; Eschenauer & Gligor, 2002). Both are inadequate for use in WSNs since conciliation of the single mission key may compromise the entire network and the storage of n – 1 keys in each sensor node or $\frac{n(n-1)}{2}$ per sensor network bounds practical adoption. Furthermore, the addition of new sensor nodes or re-keying of existing nodes within a wireless sensor network is too costly and complex thereby limiting its use as a practical scheme (Eschenauer & Gligor, 2002; Xiao, et al., 2007). To overcome the challenges and limitations of both schemes, several other key management protocols have been proposed.

Eschenauer and Gligor's Random Key Pre-Distribution Scheme

Eschenauer and Gligor (2002) proposed a random key pre-distribution scheme based on probabilistic key sharing and utilization of a simple shared-key discovery protocol for key distribution, key revocation, and node re-keying. Ex-ante to a wireless sensor network deployment, each sensor node receives a key ring with a randomly chosen subset of keys selected from a large key pool and a common "master key" that can be used for key revocation. After deployment and network initialization, sensor nodes can probabilistically establish a set of secure communication links given that a shared key exists between two or more sensor nodes. Due to the random distribution of keys to each sensor node, it is probable that a shared key may not be available, necessitating an intermediary node with a common key between two sensor nodes to establish a usable session key. Eschenauer and Gligor found that to establish "almost certain shared-key connectivity for a 10,000-node network, a key ring of only 250 keys randomly selected from a 100,000 key pool has to be pre-distributed to every sensor node" (Eschenauer & Gligor, 2002, p. 2).

Q-Composite Scheme

Chan et al. (2003) further extended the random key pre-distribution idea of Eschenauer and Gligor in their q-composite key pre-distribution scheme. Their approach increases the amount of key overlap required in the establishment of a set of secure communication links. This improves network resilience to link compromise at the expense of network formation since a pair of nodes must share a defined number of keys (i.e., two or more keys) denoted by q to establish a link.

Polynomial Pool Scheme

Liu et al. (2005) proposed two pairwise key pre-distribution schemes: a random subset assignment scheme and a grid-based scheme, both that combines the polynomial-based key pre-distribution scheme of Blundo, De Santis, Gargano, and Vaccaro (1992) with the key pool idea in Eschenauer and Gligor (Eschenauer & Gligor, 2002). Using a polynomial pool instead of a key pool, keys on each sensor node are generated from a subset of polynomials in the pool. Two nodes that share the same polynomial can establish a pairwise key.

From Blundo et al. (1992), a key setup server randomly generates a bivariate t-degree polynomial $f(x, y) = \sum_{i,j=0}^{t} a_{ij} x^i y^j$ over a finite field F_q, where q is a prime number large enough to accommodate a cryptographic key, such that it has the property of $f(x, y) = f(y, x)$. Liu et al. (2005) assumed that each sensor node has a unique ID that for each node a setup server computes a *polynomial share* of $f(x, y)$. This polynomial share is pre-distributed to each node. Thus, for any two sensor nodes (e.g., i and j), node i can compute a key $f(i, j)$ by evaluating $f(i, y)$ at j, and node j can compute the same key $f(j, i) = f(i, j)$ by evaluating $f(j, y)$ at i. As a result, nodes i and j can establish a common key $f(i, j)$.

Liu et al.'s (2005) random subset assignment scheme assigns the secrets generated from a random subset of polynomials in the polynomial pool to each sensor node while the grid-based scheme associates polynomials with the rows and columns of an artificial grid. Secret keys are generated from the corresponding row and column polynomials to each node placed in a unique coordinate on the grid. Based on a predefined grid, each sensor node can identify a pairwise key establishment with another node and if not, what intermediate nodes can be used to indirectly establish a pairwise key. Liu et al. posited that location information vis-à-vis grid coordinates can help to provide better network connectivity.

Multiple-Space Key Pre-Distribution Scheme

Du et al. (2003) proposed a key pre-distribution scheme that adapted ideas from Blom's symmetric key generation scheme (Blom, 1985) and Eschenauer and Gligor's algorithm previously discussed. Using Blom's method, any pair of nodes can calculate a secret pairwise key between them using a data set derived from several linear algebra operations and distinct data elements stored in $\lambda + 1$ memory spaces in each node. Blom showed that as long as no more than λ nodes are compromised, the network is perfectly secure (referred to by Blom as the λ-secure property). Increasing λ leads to greater network resiliency but also leads to higher memory utilization within each sensor node. Figure 4 exemplifies Blom's symmetric key generation scheme (Blom, 1985). Shown are two nodes able to calculate a unique key by multiplying a unique row from matrix A with a unique column from matrix G (e.g., $K_{ij} = K_{ji}$ = Matrix A(i) · Matrix G(j)).

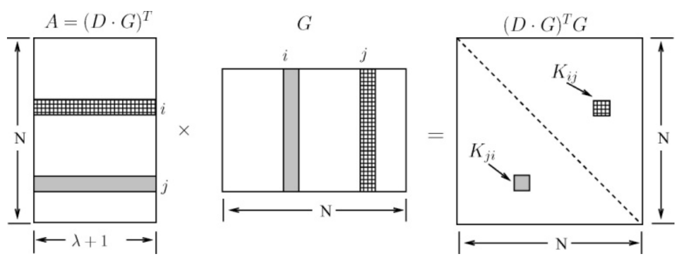


Figure 4: Blom's Symmetric Key Generation Scheme

Under Du et al. (2003) multiple key spaces generated from Blom's λ-secure symmetric key generation system (Blom, 1985) are randomly assigned to each sensor node. This is similar to Eschenauer and Gligor's assignment of randomly generated keys from a large key pool (Eschenauer & Gligor, 2002). Two nodes are able to calculate a unique pairwise key if and only if both nodes share a common key space.

2.5 Conclusion

Wireless sensor networks are finding more applications within healthcare and persuasive computing; yet, with its hardware and software limitations, methods and protocols found in traditional networks cannot be applied. With these limitations, the need to ensure data security, especially with records associated with health, is critical. While establishing a secure wireless sensor network is viable with the key algorithms previously discussed, they have limitations when energy, memory, and computational complexity is considered. Eschenauer and Gligor's key distribution scheme (Eschenauer & Gligor, 2002) is the simplest to instantiate but it requires higher memory utilization than the others. The q-composite scheme (Chan, et al., 2003), in comparison, reduces the amount of memory that a sensor node needs to store keys but the probability of network connectivity is lower since node-pairs must share two or more keys to establish a secure link. Lastly, the polynomial-pool scheme of Liu et al. (2005), while showing higher network security, requires greater computational complexity to adopt. Finding a key distribution algorithm that balances security with the limitations of energy, memory, and computational complexity was the goal of this research.

CHAPTER 3 – DEVELOPMENT AND RESEARCH METHODOLOGY FOR THE PRICE, KOSAKA, AND CHATTERJEE KEY PRE-DISTRIBUTION ALGORITHM

3.1 Introduction

A novel key pre-distribution scheme for wireless sensor networks was co-developed by the researcher (Price, Kosaka, & Chatterjee, 2004, 2005). The Price-Kosaka-Chatterjee key pre-distribution algorithm or PKC algorithm from this point forward leverages the probabilistic sharing of keys between sensor nodes, as first proposed by Eschenauer and Gligor (2002). However, unlike Eschenauer and Gligor's need to store *k*, 64-bit keys, the PKC algorithm stores *k*, 32-bit keys in each node. This is posited as one benefit in adopting its use as a key pre-distribution scheme.

Following Eschenauer and Gligor (2002), the PKC algorithm assumes that two nodes within wireless communication range and with a shared key can establish a secure communication link. This secure link is created with support from Blom's symmetric key generation scheme (Blom, 1985) that is used by a node-pair to calculate a duplicate half-key (i.e., a 32-bit key). This key is concatenated or joined with a shared key (i.e., a common key between a node-pair) to create a temporary session key (i.e., a 64-bit key), which is used to encrypt or decrypt a secret message that contains a randomly generated 32-bit key. This key is used as one-half of a permanent key to establish a secure communication link. The permanent key is generated by concatenating the randomly generated 32-bit key with a shared key between two nodes. Its length is 64-bits long.

Lastly, the PKC algorithm is supported by the ideas of key splitting, authentication, and key exchange from the Yahalom protocol (Schneir, 1996).

3.2 Research Question and Hypotheses

The PKC algorithm provides support in addressing a fundamental research question: "*How do you effectively distribute keys needed to establish secure communication links within a wireless sensor network (WSN)?*" The PKC algorithm is posited to provide greater benefit over three prevalent key pre-distribution schemes in use today. They include the Eschenauer and Gligor scheme (Eschenauer & Gligor, 2002), the q-composite scheme of Chan et al. (2003), and the random polynomial-pool scheme of Liu et al. (2005). Combined they are referred to in this dissertation as the 3-P schemes.

The benefits posited by the PKC algorithm include higher network resiliency to the potential compromise of secure communication traffic by an adversary who has an intent to break the network (i.e., through an attempt to obtain secret information from one or more nodes within the WSN), lower memory requirements to store keys used in a key pre-distribution protocol, and lower energy consumption by node-pairs when establishing a secure communication link.

To substantiate or reject a premise of greater benefit, three hypotheses were established and codified in Table 1.

Table 1: PKC Key Pre-Distribution Algorithm Hypotheses

	Network Resiliency	Memory	Energy
Hypothesis	The PKC algorithm **has greater** network resiliency to link compromise than the 3-P schemes.	The PKC algorithm **has lower** memory utilization requirements than the 3-P schemes.	The PKC algorithm **has lower** energy usage requirements than the 3-P schemes.
Null Hypothesis	The PKC algorithm **has equal or lower** resiliency to link compromise than the 3-P schemes.	The PKC algorithm **has equal or greater** memory utilization requirements than the 3-P schemes.	The PKC algorithm **has equal or greater** energy usage requirements the 3-P schemes.

3.3 Artifact Development

The details of the PKC algorithm are discussed in relationship to the three basic phases of key pre-distribution and network connectivity as first described by Eschenauer and Gligor (2002). They include the key pre-distribution, the shared-key identification, and the path-key establishment phases.

Key Pre-Distribution Phase

The *key pre-distribution phase* begins with the pre-loading of secret information into each sensor node and prior to their deployment in a defined operating space or environment. In a secure location where keys can be generated freely and without threat of compromise, a large pool of keys and their associated key identifiers (i.e., an integer that uniquely identifies each key) are randomly generated. From this key pool, each sensor node receives a subset of randomly chosen keys plus a set of distinct data elements generated from Blom's symmetric key generation scheme (Blom, 1985). The purpose of this phase is to ensure that each node has a small number of shared keys to probabilistically establish one or more secure communication links during the shared-key identification phase. The details of the key pre-distribution phase are described below:

I. Generation of a Large Key Pool. A large pool of 32-bit keys denoted by *P* and their associated integer identifiers denoted by ID_{KX}, where $x = 1$ to *P*, is randomly generated (e.g., assumed by a computer that is also used to program each sensor node). Each key is identified by an integer of 1 to the number of keys generated. The size of *P* should be sufficiently large (e.g., 100 – 1,000 times the deployed network size) to ensure that non-probability key attacks are minimized (Eschenauer & Gligor, 2002). This type of attack can occur when an adversary obtains a key from a compromised node and uses the key to compromise one or more secure links within the network (referred to as *link compromise*). The larger the pool, the smaller the risk that one key can be captured and used to break a secure communication link. This risk reduction comes at the expense of a lower probability that two or more nodes will share a key and thus a lower probability that network connectivity will occur.

II. Generation of a Set of Blom's System Matrices (Blom, 1985). A $(\lambda + 1) \; x \; N$ matrix denoted by *G* over a finite field *GF(q)* is constructed, where *q* is an element within a finite field. The size of the matrix is $\lambda + 1$ rows by *N* columns, where λ is the security parameter that was previously discussed in Chapter 2 and *N* is the number of keys in *P* (i.e., $N = P$). To meet the λ-secure property posited by Blom (1985), *G* must be linearly independent (Du, Ding, et al., 2003). It has been shown that a Vandermonde matrix is linearly independent when its elements $s, s^2, s^3, \ldots, s^N$ are all distinct (MacWilliams & Sloane, 1977). A Vandermonde *G* matrix over a finite field *GF(q)* can be constructed as depicted in Equation 1 (Du, Ding, et al., 2003; MacWilliams & Sloane, 1977).

Equation 1: Vandermonde Matrix

$$G = \begin{bmatrix} 1 & 1 & 1 & \cdots & 1 \\ s & s^2 & s^3 & \cdots & s^N \\ s^2 & (s^2)^2 & (s^3)^2 & \cdots & (s^N)^2 \\ & & & \vdots & \\ s^\lambda & (s^2)^\lambda & (s^3)^\lambda & & (s^N)^\lambda \end{bmatrix}$$

According to Du et al. (2003), a Vandermonde matrix should be constructed with a primitive seed element (denoted by *s*) such that it is a prime number within 2^n, where n is equal to an integer. Once a seed value has been selected, a random $(\lambda + 1) \times (\lambda + 1)$ symmetric matrix denoted by *D* over *GF(q)* is generated and used to compute an $N \times (\lambda + 1)$ matrix that is the transpose of matrix *D* times matrix *G*. This matrix is denoted by *A* and can be written as $A = (D \cdot G)^T$. All elements in each matrix are considered private information and must be kept secret. Failure to do so may allow an adversary to obtain the information (i.e., the data elements within each matrix) needed to break the PKC algorithm and allow a wireless sensor network supported by its use to be compromised.

III. Node Assignment of Keys. For each sensor node in the network, *K* randomly selected keys from *P* and their associated identifiers are assigned to memory. These keys represent one-half of a pairwise key that will be used by two nodes to establish a secure communication link, provided that both nodes share the same key. Each node is assigned one non-duplicate row from matrix *A,* corresponding to one key and its associated key identifier. This row-key pair is used as the primary identifier of a sensor node. Lastly, the primitive seed element *s* selected in step II is stored in each sensor nodes memory. This element is used to calculate the corresponding column elements from matrix *G* for each key identifier selected. A general memory map for each sensor node is shown in Figure 5, where A_x is the row assigned from matrix *A*, ID_{NX} is a nodes key and primary identifier, and $key(k_x)$ are *K* randomly selected keys and their associated integer identifiers over $1 \leq x \leq K$.

Node 1	**Node 2**		**Node N**
Primary Key $A_{1,}$ ID_{N1}, $key(k_1)$	**Primary Key** $A_{2,}$ ID_{N2}, $key(k_2)$		**Primary Key** $A_{N,}$ ID_{NN}, $key(k_N)$
Randomly selected key with identifier	Randomly selected key with identifier		Randomly selected key with identifier
Randomly selected key with identifier	Randomly selected key with identifier		Randomly selected key with identifier
Seed element, *s*	Seed element, *s*		Seed element, *s*

Figure 5: General Memory Map

IV. Shared-Key Identification Phase

After all sensor nodes have been pre-loaded with their secret information (e.g., a subset of keys from P, a unique row from matrix A, and a primitive seed element s), they are deployed into an operating environment. Deployment can occur randomly or with pre-thought of their placement. Since a random deployment strategy was adopted by the authors of the 3-P schemes, this study assumed the same strategy (Eschenauer & Gligor, 2002; Tague & Poovendran, 2007).

After deployment, each sensor node will attempt to establish a secure communication link with its shared-key neighbor(s). Since each node is limited in its communication range, due to the inherent limitations in available transmission power and the attenuation of wireless communication transmission signals, not all nodes within a network will be reachable (i.e., a message transmitted by a node will not be received by all nodes). Therefore, a sensor node will only be able to communicate with a subset of N nodes within the wireless sensor network.

The shared-key identification phase begins with each node broadcasting a message that contains its primary key identifier, the key identifiers associated with the randomly selected keys in its memory, and a randomly generated nonce value denoted by N_x. A nonce is used to reduce the possibility of replay attacks that can occur when an adversary intercepts a transmission and retransmits it for malicious or fraudulent purposes (Schneir, 1996).

Assuming that two nodes (e.g., *Node A* and *Node B*) are neighbors within communication range, and both have received the broadcast of each other's primary and randomly selected key identifiers, each sensor node will check its memory map to determine if a key is shared. If false, then each node will ignore the transmission. If true, then each node will calculate a pairwise secret key using the methods based on Blom's symmetric key generation scheme (Blom, 1985). This calculated key will be concatenated with the shared key between both nodes. This temporary key will be used to encrypt a message that contains a new nonce value associated with the responding node, an identification value used to uniquely identify the communication link between both nodes, and a randomly generated 32-bit key denoted by S_k that will be used as the second-half of a permanent key. The permanent key is built from the concatenation of the shared key and S_k. Its length is 64-bits long and it is used to encrypt and decrypt communication messages between the two sensor nodes after the key exchange has occurred.

Assuming that Node A and Node B each share a key, and each has received the transmission of key identifiers and nonce values (e.g., Node A: $ID_{NA},N_A,$*{random set of key identifiers}* and Node B: $ID_{NB},N_B,$*{random set of key identifiers})*, the details of the steps that both will take in establishing a secure communication link is described below:

1. Node A broadcasts $ID_{NA}, ID_{NB}, ID_{KAB}, N_B$, where N_B is the nonce value generated by Node B, ID_{KAB} is the identifier of the shared key between node A and B, and

ID_{NA} and ID_{NB} are the identifiers of each node (i.e., an integer that was assigned to each node and represents their primary key and node identifier).

2. Node B receives ID_{NA}, ID_{NB}, ID_{KAB}, N_B from the broadcast channel and checks it memory map to determine if it shares a key with Node A. Upon verification, Node B generates and sends back ID_{NB}, N_A, $E_{KAB}(ID_{AB}, N_{AB}, S_k)$, where ID_{AB} is a random number used as a unique link identifier between both nodes, N_{AB} is a new nonce value, S_k is a randomly generated 32-bit key, and $E_{KAB}(\ )$ is a symmetric encryption function such as Blowfish, RC4, or DES (Schneir, 1996). Since this research was interested in the mathematical analysis of the algorithm and not its instantiation, the selection of a specific symmetric encryption function was ignored. The encryption key for $E_{KAB}(\ )$ is calculated using Blom's symmetric key generation scheme (Blom, 1985):

    a. Using the Vandermonde matrix in Equation 1, Node B calculates the matrix *G* column elements associated with Node A by using its stored primitive seed element *s* and setting *n* to Node A's integer identifier.

    b. Node B calculates the pairwise secret key between Node A and itself by using $Key_{AB} = Key_{BA} = Matrix\ A(B) \cdot Matrix\ G(A)$, where *Matrix A(B)* is the assigned row associated with Node B from matrix *A* and *G(A)* is Node A's column data that was calculated in step a.

c. Node B generates an encryption key for $E_{KAB}(\ )$ by concatenating the shared key between both nodes with Key_{AB}.

d. Node B sends $ID_{NB}, N_A, E_{KAB}(ID_{AB}, N_{AB}, S_k)$ to Node A.

3. Node A, upon receiving $ID_{NB}, N_A, E_{KAB}(ID_{AB}, N_{AB}, S_k)$ and using the node identifier associated with Node B, calculates the key for $E_{KAB}(\ )$ by following steps 2a-2c and swapping Node B with Node A in the steps. Using $Key_{AB} = Key_{BA} = Matrix\ A(A) \cdot Matrix\ G(B)$, Node A decrypts $E_{KAB}(\ )$ and retrieves ID_{AB}, N_{AB}, *and* S_k.

4. Node A finalizes the link establishment by sending an acknowledgement message of $ID_{AB}, E_k(N_{AB})$ to Node B. The permanent key used by the symmetric encryption function $E_k(\ )$ is created by the concatenation of the shared key between both nodes and the randomly generated key S_k. This completes the authentication and key exchange between Node A and Node B.

V. Path-Key Establishment Phase

In the event that nodes within communication range do not share a key, a session key can be generated provided that one or more intermediary nodes exist and can generate a *path-key* between the two unconnected sensor nodes. Path-keys do not have to be generated by an intermediary, as a number of keys are available on a sensor nodes key ring after the shared-key identification phase is finished (Eschenauer & Gligor, 2002). Since the first two phases were the primary mechanisms in the distribution of keys for the schemes evaluated in this study, the path-key establishment phase was ignored in this research.

3.4 Research Methodology

The research structure for this study was based on the Design Science methodology (Hevner, et al., 2004). This research method has become accepted by researchers in the information systems community as an alternative to the traditional behavioral science research paradigm. In traditional behavioral science, the emphasis of research is less on the design of technology and more on its use to support an understanding of how it can affect an organization or its users (Bryant, 2008). In contrast, research based on Design Science is concerned with the building of novel technology that does not presently exist and is needed to solve a real-world problem (Hevner, et al., 2004). Design Science takes a "*build and evaluate*" approach to research. Under this methodology, an artifact is built to solve a novel problem or used to provide greater understanding of a problem that could not be known without its use (Hevner & Chatterjee, 2010; Hevner, et al., 2004).

In their seminal work on Design Science Research for Information Systems, Hevner et al. (2004) provided the reasons for and the basic guidelines to performing Design Science research. Their main focus was on the construction of the "information technology artifact", which they defined as the constructs, models, methods, or instantiations that can be built and evaluated in an environment that determines its efficacy and utility. Since their initial publication, Design Science has been used as a viable research methodology in a number of doctorial-level studies (Bryant, 2008; Hassan, 2008; Kosaka, 2008; Maheshwari, 2008).

Table 2 summarizes the Hevner et al. (2004) guidelines to Design Science research and the approach taken in this study to meet those guidelines.

Table 2: Design Science Research Guidelines (PKC Algorithm)

Guideline	Description	PKC Algorithm
Guideline 1: Design as an Artifact	Design Science research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation.	The PKC algorithm was posited as a viable model to support the effective distribution of keys needed by WSNs to establish secure communication links. While analysis in this research was limited to the mathematical analysis of the algorithm, instantiation of the artifact in a real-world wireless sensor network is planned for future studies.
Guideline 2: Problem Relevance	The objective of Design Science research is to develop technology-based solutions to important and relevant business problems.	The PKC algorithm was posited to support a greater understanding in answering the fundamental research question of *"How do you effectively distribute keys needed to establish secure communication links within a wireless sensor network?"* Sensor nodes are typically limited in their processing power, memory availability, and their use of finite power needed to operate. An effective key algorithm must balance all three constraints to produce a solution that is viable in a real-world application (Hwang, Lai, & Verbauwhede, 2004).

Guideline	Description	PKC Algorithm
Guideline 3: Design Evaluation	The utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation methods.	The PKC algorithm was designed as an extension or variation of several published key pre-distribution schemes (Du, Ding, et al., 2003; Eschenauer & Gligor, 2002). Analysis of its efficacy, quality, utility and associated results were evaluated using a published set of mathematical models (Tague & Poovendran, 2007).
Guideline 4: Research Contributions	Effective Design Science research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies.	Mathematical analysis of the PKC algorithm provides evidence that it is sufficient in meeting lower memory needs and higher link compromise resiliency to the 3-P key schemes discussed in this study.
Guideline 5: Research Rigor	Design Science research relies upon the application of rigorous methods in both the construction and the evaluation of the design artifact.	The PKC algorithm design was based on published key pre-distribution algorithms ((Du, Ding, et al., 2003; Eschenauer & Gligor, 2002) and evaluation of its usage was supported by the mathematical analysis of its outcomes (Tague & Poovendran, 2007). Research rigor was followed using deductive reasoning and proper research methods to ensure validity, reliability, and sound conclusions were maximized (Trochim, 2001).
Guideline 6: Design as a Search Process	The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.	The PKC algorithm was designed iteratively with the needs and requirements pre-determined to ensure the effective design and outcomes met a defined problem statement. The problem definition was clearly established prior to the developing the artifact and was set by identifying weaknesses in the current literature (Eschenauer & Gligor, 2002; Stankovic, 2003).

Guideline	Description	PKC Algorithm
Guideline 7: Communication of the Research	Design Science research must be presented effectively to both technology and management-oriented audiences.	Preliminary discussions of the PKC algorithm have been presented at research-oriented conferences and published in associated papers for the purpose of obtaining feedback of the efficacy and utility of the artifact and to validate the goals of this study (Price, et al., 2004, 2005).

3.5 Study Procedures, Methods, and Analysis

Network Connectivity and Resiliency

Work done by Tague and Poovendran (2007) was used to model the probability that wireless network connectivity can occur between sensor nodes that have been assigned a random subset of keys from a larger key pool and to model the impact of the compromise on the network by an adversary that captures one or more sensor nodes and obtains their secret key information (referred to as *link compromise* within the network). Their mathematical models were selected as they could be applied to all the random key pre-distribution schemes compared in this study. Following is a summary of their mathematical models with the reader referred to their paper for the details of their derivation.

Tague and Poovendran (2007) developed their models based on the field of spatial statistics and bounded by the asymptotic properties of geometric random graphs where communication between sensor nodes is restricted by a defined communication range. Their models assumed the probabilistic existence of shared keys between two or more sensor nodes and a wireless sensor network that is made up of N nodes deployed randomly and uniformly over a region $A \subseteq$ R. The resulting location of a node i can be written by $x_i \in A$ for $i = 1, \ldots, N$. They further assumed that each sensor node is equipped with an omni-directional radio with a fixed communication range r, and a pair of nodes can establish a secure link if and only if one or more keys are shared between them. These assumptions were also adopted in this study.

Network connectivity was modeled and expressed by a probability function of the minimum number of vertices k that leaves a disconnected graph when removed (referred to as k-connected), the expected node degree D of a graph, the total number of nodes N in a deployment area A with node density $\rho = \frac{N}{A}$, and a node communication range r. Equation 2 expresses this function mathematically.

Equation 2: Model of k-Connectivity for WSNs

$$P_G(k) = \left(1 - e^{-\rho\frac{D+1}{N}\pi r^2} \sum_{i=0}^{k-1} \frac{(\rho \frac{D+1}{N} \pi r^2)^i}{i!}\right)^N$$

The expected node degree D in Equation 2 is a function of N (i.e., the number of nodes deployed in the network), the number of randomly assigned keys K from a key pool P, and the mean μ of the assignment distribution of keys selected for a key pre-distribution scheme. According to Tague and Poovendran (2007), any random key pre-distribution scheme, as are the ones in this study, induces a binomial assignment distribution $\beta\left(N, \frac{K}{P}\right)$ on the number of nodes that share a key. Equation 3 expresses the expected node degree function mathematically.

Equation 3: Expected Node Degree

$$D = (N-1)\left(1 - \left(\frac{N-\mu}{N-1}\right)^{K}\right)$$

The results from Equation 3 can be used with Equation 2 to yield the probability $P_G(k)$ that a graph *G(N, A, r)* is *k*-connected. Hence, given *N*, key storage *K*, desired connectivity *k*, deployment density ρ, and radio range *r*, the mean μ of the binomial distribution $\beta\left(N, \frac{K}{P}\right)$ can be chosen to guarantee the *k*-connectivity of a network with a desired probability $P_G(k)$ (Tague & Poovendran, 2007).

According to Tague and Poovendran (2007), network resiliency to link compromise is dependent upon the number of nodes, denoted by λ (and not to be confused with λ that represents a security threshold in Blom's symmetric key generation scheme (Blom, 1985)), that share a given key. Intuitively, if the number of nodes λ is small, the probability that one of the nodes will share a key with a neighboring node will be small. Conversely, if the number of nodes λ is large, the number of secure links that can be established using a shared key will be large. Therefore, an adversary with knowledge of any key can thus potentially compromise a large number of secure links within the network (Du, Fang, et al., 2003; Liu, et al., 2005; Tague & Poovendran, 2007). Algorithms based on a random key assignment scheme therefore become a tradeoff between the number of keys assigned to each node, the size of the key pool, and the desired connectivity of the network (Eschenauer & Gligor, 2002).

In this study, the impact of the number of nodes λ that share a key was investigated for the following metrics: the probability that a pair of nodes would share at least one key, the probability that no node-pairs would share a key, and the potential number of secure links that could be established using a shared key between two or more sensor nodes. If $P(\lambda)$ denotes the probability that a given key is shared by λ nodes and $H(\lambda) = PP(\lambda)$ denotes the expected number of keys shared by exactly λ nodes, then P and H denotes the *probability distribution* and *expected histogram* of λ, respectively. When each node is assigned a random subset of keys K from a key pool P such that $P >> K$, each key will have a probability of $\frac{K}{P}$ of being selected (Eschenauer & Gligor, 2002). This probability function can be modeled as a Bernoulli random variable with binomial distribution $\beta\left(N, \frac{K}{P}\right)$. Mathematically, $P(\lambda)$ and $H(\lambda)$ can be expressed by Equation 4 and Equation 5 (Devore, 2004; Tague & Poovendran, 2007).

Equation 4: Binomial Probability Distribution of λ

$$P(\lambda) = \binom{N}{\lambda}\left(\frac{K}{P}\right)^{\lambda}\left(1-\frac{K}{P}\right)^{N-\lambda}$$

Equation 5: Expected Histogram of λ

$$H(\lambda) = P\binom{N}{\lambda}\left(\frac{K}{P}\right)^{\lambda}\left(1-\frac{K}{P}\right)^{N-\lambda}$$

where $\binom{N}{\lambda}$ can be expressed in a general form by $\binom{N}{\lambda} = \frac{N!}{\lambda!(N-\lambda)!}$

Since keys are randomly assigned to multiple nodes, the probability that one key can exist among many sensor nodes is high. Thus, an adversary who captures and obtains one or more keys may be able to decrypt the secure communication between uncaptured nodes (Liu, et al., 2005). The average probability of link compromise $f(x)$ due to the capture of x nodes often depends on the underlying structure of the key pre-distribution scheme. Hence, a primary security metric when evaluating a key pre-distribution scheme is the probability $p(m, x)$ that exactly m of the x captured nodes contain a given key (Tague & Poovendran, 2007).

According to Tague and Poovendran (2007), given a set of uncaptured nodes (e.g., node u and node v) that share a key, the probability $p(m, x)$ that exactly m of x captured nodes contain a key between them can be approximated by Equation 6.

Equation 6: Probability of Sharing a Key

$$p(m,x) \approx \binom{x}{m}\left(\frac{\mu-2}{N-2}\right)^{m}\left(\frac{N-\mu}{N-2}\right)^{x-m}$$

Equations 2-6 were used in this research as the mathematical models to analyze the impact of network connectivity and resiliency to link compromise of the PKC algorithm in comparison to the 3-P schemes. Slight variations were made to the equations, as dependent upon the specific algorithm being studied, but all variations followed the work set by Tague and Poovendran (2007).

Energy Model and Analysis

Modeling the energy needed to establish a secure link between two sensor nodes requires the use of a low-energy radio model and the establishment of assumptions of the number of bytes of data to be sent and received between them (Hwang, et al., 2004). Currently, there is active research in the area of low-energy radios used in wireless sensor networks but different assumptions about their radio characteristics, including energy dissipation in a transmit or receive mode, often changes the advantages of a key distribution protocol being modeled (Heinzelman, Chandrakasan, & Balakrishnan, 2000). In this study, the first order radio model, as first proposed by Pottie (1998) and later used by others (Salhieh, Weinmann, Kochhal, & Schwiebert, 2001; Sha & Weisong, 2005), was adopted and is shown in Figure 6.

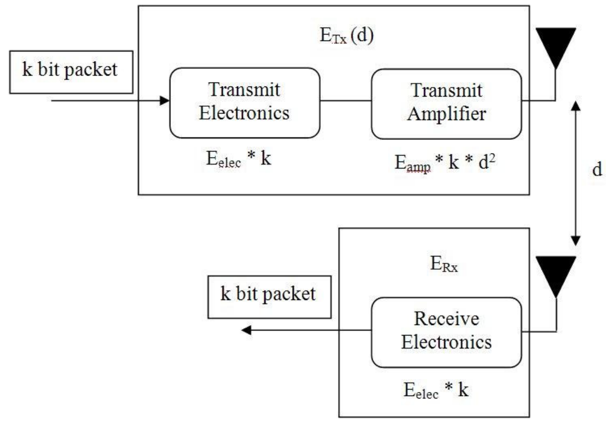


Figure 6: First Order Radio Model

The first order radio model posits that the energy consumed when a sensor node transmits and receives a message of size k can be expressed by Equation 7.

Equation 7: Energy Utilization of the First Order Radio Model

Energy (Receive): $E_{Rx}(k) = E_{elec} * k$

Energy (Transmit): $E_{TX}(k, d) = E_{elec} * k + E_{amp} * k * d^2$

In this model, E_{elec} and E_{amp} are parameters set by the designer and d is the transmission distance between the transmitting and receiving nodes.

The first order radio model assumes that transmission energy is a square function of the distance d between the transmitter and receiver. Therefore, most of the energy is expended during the transmission of a message and prior research has validated this premise (Pottie, 1998). In a study of energy consumed in a wireless sensor network, Wander, Gura, Eberle, Gupta, and Chang-Shantz (2009) conducted current-draw measurements on the Berkeley/Crossbow Mica2dots sensor nodes—a common mote used by researchers working with WSNs (Fogarty, et al., 2005; Shnayder, et al., 2005). They determined that the cost of receiving one byte of data (one byte is equal to eight bits) is roughly half the transmission energy needed to transmit the same information. Furthermore, they showed that the power required to transmit one bit of information is equivalent to roughly 2090 clock cycles of execution power on the sensor nodes microprocessor alone. Therefore, they concluded that the energy cost of computation is low when compared to the energy cost of transmission and thus can be ignored when analyzing the energy consumed in a wireless sensor network. This assumption was also adopted in this study.

The researcher decided against adopting the E_{elec} and E_{amp} values that were used in other studies (Heinzelman, et al., 2000; Hwang, et al., 2004) and opted instead to use the measured results from Wander et al. (2009). They found the energy to transmit and receive one byte of data was equal to 59.2μJ and 28.6μJ, respectively. Since their study did not mention a transmission distance, it was assumed in this study that the transmission amplifier E_{amp} of the first order radio model was variable and could be adjusted by a sensor nodes software code to ensure that the adopted reception energy was met for any distance within the maximum communication range of a transmitting node.

This allowed the researcher to work with the first order radio model at a macro level and exclude the need to calculate discrete values within the model.

Having established the transmission and reception energies needed for one byte of data, assumptions were made by the researcher on the size of a packet of data that could be sent and received by a sensor node. This study assumed a maximum packet size of 41 bytes and a packet structure that followed the TinySec protocol (Karloff, Sastry, & Wagner, 2004). This protocol is part of the TinyOS operating system (TinyOS, 2010), which is commonly known among researchers who work with wireless sensor networks (Fogarty, et al., 2005; Shnayder, et al., 2005; Walker, Polk, Hande, & Bhatia, 2006). It is also included in the MoteWorks™ software bundle (Crossbow Technology, 2010) that was used to instantiate the WSN of the Behavior Modification Sensor System and discussed in Chapter 5. The packet structure shown in Figure 7 sets a maximum payload size of 29 bytes, a fixed four byte Message Authentication Code (MAC) space used for message integrity (i.e., TinySec does not require a CRC), and a fixed eight byte preamble or header. The elements of the header consist of the source address of the sender (Src), the destination address of the receiver (Dest), the length of the data payload (Len), a 16 bit counter when encryption is used (Ctr), and an active message (AM) handler.

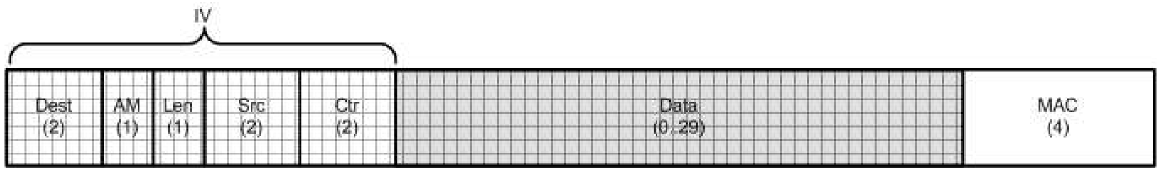


Figure 7: TinySec Packet Structure

Additional assumptions were also made by the researcher of the overall communication protocol:

1. All sensor nodes broadcast only when the radio frequency communication channel is clear.
2. During the shared-key identification phase, where sensor nodes attempt to determine neighbors with shared keys, all nodes first broadcast their pre-assigned node identifier (e.g., a sensor nodes ID) and followed by the sequential transmission of all key ID's stored in their memory. The destination of each packet (i.e., Dest) contains a standard hexadecimal value (e.g., FFFF) to denote a multicast transmission.
3. All nodes in a non-transmit state remain open and ready to receive channel transmissions.
4. Adversaries can eavesdrop and record transmissions throughout the WSN and can randomly and independently capture any sensor node in any part of the network.
5. Hardware protection methods are available on all nodes to minimize the compromise of keys stored in memory and to protect their programming

information. This assumes the use of methods that erase a sensor nodes memory upon the detection of tampering by an adversary.

6. Network attacks including hostile flooding, node replication, sleep deprivation, Sybil, wormhole, etc. are non-existent during any phase or operation of the network. Since network attacks were not assumed to exist, they are not discussed. Instead, the reader is referred to published literature for a comprehensive survey and possible countermeasures to such attacks (Newsome, Shi, Song, & Perrig, 2004; Walters, Liang, Shi, & Chaudhary, 2007).
7. An acknowledgement of a received message occurs only when two nodes share a common key and completes the link establishment protocol.
8. Dropped packets or packet errors are non-existent during any phase of the link establishment protocol. Therefore, the impact of packet retransmission was not considered in this study.
9. All sensor nodes are of the same product type with equal operating characteristics (e.g., power, memory, and computational capability).
10. All 3-P schemes evaluated follow a basic PKC algorithm structure. While the authors of the 3-P schemes specified a link establishment protocol specific to their algorithm, one based on the PKC algorithm was adopted and used to assess their energy expenditure. This decision was made to ensure an equal comparison between the 3-P schemes and the PKC algorithm could be made. Table 3 shows the assumed protocol for all calculations associated with the energy to send and

receive an acknowledgement message and for the setup of a secure communication link (based on two nodes denoted by A and B that share a key).

Table 3: Key Pre-Distribution Protocols for Energy Analysis

Scheme	Protocol Steps (From $\rightarrow$ To)	Notes
E&G and Poly	1. $A \rightarrow B$: ID_{NA}, ID_{NB}, ID_{KAB}, N_{BX}	$E_{KAB}(\ )$ = Symmetric encryption function using the shared key between node A and B
	2. $B \rightarrow A$: ID_{NB}, N_{AX}, $E_{KAB}(ID_{AB}, N_{AB})$	
	3. $A \rightarrow B$: ID_{AB}, $E_{KAB}(N_{AB})$	
q-Comp, $q = 2$	1. $A \rightarrow B$: ID_{NA}, ID_{NB}, ID_{KAB1}, ID_{KAB2}, N_{BX}	ID_{KAB1} and ID_{KAB2} identify the two shared keys between node A and B
	2. $B \rightarrow A$: ID_{NB}, N_{AX}, $E_{KAB}(ID_{AB}, N_{AB})$	
	3. $A \rightarrow B$: ID_{AB}, $E_{KAB}(N_{AB})$	
PKC	1. $A \rightarrow B$: ID_{NA}, ID_{NB}, ID_{KAB}, N_{BX}	$E_K(\ )$ = Symmetric encryption function using a permanent key created by the concatenation of the shared key between node A and B and a randomly generated 32-bit key by node B
	2. $B \rightarrow A$: ID_{NB}, N_{AX}, $E_{KAB}(ID_{AB}, N_{AB}, S_K)$	
	3. $A \rightarrow B$: ID_{AB}, $E_K(N_{AB})$	

All assumptions were applied equally to each key pre-distribution scheme evaluated in this research. Changing any assumption with the exception of the possibility of network attacks or dropped packets, which would require retransmission and therefore higher energy usage, should have little or no effect on changing the conclusions made in this study.

Memory Utilization Analysis

Volatile and non-volatile memory used by a sensor node for program code and software operating requirements is a non-commodity that must be considered when evaluating a key pre-distribution scheme and to ensure that the key distribution algorithm is viable for its practical use in a wireless sensor network (Hwang, et al., 2004). The PKC algorithm posits greater memory savings over the 3-P schemes. To explore the memory utilization of each algorithm, the following assumptions were made:

1. All sensor nodes are of the same product type with each having eight kilobytes of read only memory (ROM) and four kilobytes of random access memory (RAM). This assumption follows a typical sensor node that is commercially available including the one used in the Behavior Modification Sensor System that is discussed in Chapter 5 (e.g., the wireless sensor network in this study used the IRIS sensor mote manufactured by Crossbow Technology, Inc. (Crossbow Technology, 2008)).

2. All sensor nodes store its program code, its node ID, all key ID's and keys, and all ancillary information needed by a key pre-distribution scheme (e.g., all matrix elements of the Blom key generation scheme (Blom, 1985)) in ROM. All other data that require memory is stored in RAM.

3. All node and key ID's are 16 bits (two bytes) and all keys are 64 bits (eight bytes), with the exception of the PKC algorithm that initially uses 32 bits (four bytes) for each key.

Data Analysis

Matlab (Mathworks, 2010), a numerical computing environment software package, was used to test the mathematical assumptions and hypothesis associated with the network connectivity and link compromise efficacy of the PKC algorithm. Software code used by Matlab and associated with a specific equation being evaluated was written in the C-programming language and is detailed in Appendix A. Validation of the code was first done against a pre-evaluated network example found in Tague and Poovendran (2007) and listed below. The replication of their results ensured that the software code needed by Matlab was correct and could be used for evaluation purposes. Only after validation of the code was met did a formal analysis of the key pre-distribution schemes begin.

The following network example was evaluated and used to assess all key pre-distribution schemes in this study:

Network Example used for Evaluation

A WSN of $N = 5,000$ nodes is deployed over a region A of area $|A| = 0.5km^2$ with each node assigned 100 random keys K from a pool P. Each node has an omni-directional radio with a transmission range of $r = 40m$ and forms a network that is 2-connected with probability 0.999. It is assumed that nodes sharing at least one key can establish a secure link vis-à-vis a link-key. Lastly, link compromise is possible as soon as a key is captured.

Using the assumed network example, network connectivity and the resiliency to link compromise was analyzed mathematically. Equations 2-6 supported the analysis and began with the simulation of the established network example using Equation 2 for an evaluation of $P_G(k)$ versus D. This was done to determine D, or the expected node degree of the graph, required to meet the conditions of the network example (i.e., obtain a 2-connected wireless sensor network using only secure single-hop links with a probability of 0.999). Once D was determined, Equation 3 was used to determine the average mean μ of the binomial distribution function for each key pre-distribution scheme. Knowing μ, the key pool size P for each scheme was calculated by $P \geq \frac{NK}{\mu}$. Equation 4 and 5 was used to determine the probability distribution and expected histogram of each key pre-distribution scheme. To determine the resiliency to link compromise, Equation 6 supported the determination of the probability of the number of links that could be compromised if an adversary captured m nodes from x nodes containing a shared key.

Energy analysis of all key pre-distribution schemes evaluated in this study ignored the energy expended from all computations needed to instantiate a key pre-distribution scheme by a sensor nodes microprocessor. This decision was supported by work done by Wander et al. (2009) that found computation energy when compared to transmission energy could be ignored when assessing the total energy used by a sensor node. Therefore, *transmission* and *reception* energy were the primary variables used to determine the energy used by a sensor node.

The total energy needed by a sensor node in establishing a set of secure communication links (bounded by the steps of the PKC algorithm) was assumed to equal the summation of the energy needed to transmit its node and key ID's, the energy needed to receive the ID's from all neighbors within communication range, and the energy needed in establishing a probable set of communication links with all neighbors that shared one or more keys. The energy required to transmit and receive information was assumed to be bounded by the maximum payload size of the TinySec protocol (i.e., 29 bytes out of a maximum packet size of 41 bytes (Karloff, et al., 2004)). Since the number of node and key ID's set by the network example (i.e., K = 100) exceeded the space allotment of one packet, multiple packets were assumed to be needed in their distribution. Therefore, the total energy function needed to describe the above assumptions was established and codified by the researcher in Equation 8, where e_{xmit} denotes the energy of transmission, B_{packet} denotes the number of bytes in one packet, and $N_{packets}$ denotes the total number of packets needed to send all key and node ID's.

Equation 8: Total Transmission Energy (Key and Node ID's)

$$emit_{TOT(key\ and\ node\ ID's)} = N_{packets}\ x\ B_{packet}\ x\ e_{xmit\ one\ byte}$$

Since each sensor node is limited in its communication range, not all nodes within the network are reachable upon the transmission of a message by one node. Reception energy is thus a function of the average number of nodes within communication range of a transmitting sensor node, the total number of packets needed to receive all key and node

ID's, the number of bytes in one packet, and the energy expended to receive one byte of information. Therefore, the total energy expended by a sensor node in receiving all key and node ID's from an average number of neighbors within communication range was is expressed by Equation 9, where N_{avg} denotes the average number of nodes within communication range, $N_{packets}$ denotes the total number of packets needed to receive all key and node ID's, B_{packet} denotes the number of bytes in one packet, and $e_{rcv\ one\ byte}$ denotes the energy expended to receive one byte of information. This function was established by the researcher.

Equation 9: Total Reception Energy (Key and Node ID's)

$$ercv_{TOT(key\ and\ node\ ID's)} = N_{packets}\ x\ N_{avg}\ x\ B_{packet}\ x\ e_{rcv\ one\ byte}$$

Since all nodes within communication range of a transmitting node may not share one or more keys, the probable number of established links will limit the total energy needed in setting up a secure wireless sensor network. Therefore, the total energy required for one node to transmit and receive all node and key ID's from an average number of neighbors within communication range of a transmitting node is added to the energy used by a node in establishing a probable number of secure links to determine the total energy needed by a sensor node. Equation 10 expresses this statement mathematically. This function was established by the researcher and it includes the variables $emit_{TOT(key\ and\ node\ ID's)}$, or the energy expended by a sensor node in transmitting its node and key ID's, $ercv_{TOT(key\ and\ node\ ID's)}$, or the energy expended by a sensor node in receiving all node and key ID's from an average number of nodes within communication range, N_{Links}, or the probable number of secure links established by one node, and $elink_{ONE}$, or the energy expended by a sensor node in establishing one secure link.

Equation 10: Total Sensor Node Energy (Transmission, Reception, and Link)

$$Total\ Node\ Energy = \sum (emit_{TOT(key\ and\ node\ ID's)}, ercv_{TOT(key\ and\ node\ ID's)}, N_{Links}\ x\ elink_{ONE})$$

Memory usage by a sensor node was also analyzed mathematically. The total memory needed by a sensor node in supporting a given key pre-distribution scheme was assumed to be a function of the total bytes per key $Tot_{Bytes/key}$, the number of randomly assigned keys K to each node, the identification of each key ID_{KX}, the identification of each node ID_{NX}, and any ancillary information X that may be required by an algorithm (e.g., the discrete matrix elements generated by the Blom symmetric key generation scheme (Blom, 1985) and needed by the PKC algorithm only).

The total memory requirements function based on the above assumptions was established by the researcher and codify by Equation 11.

Equation 11: Total Sensor Node Memory Utilization

$$\textbf{\textit{Total storage}} = (Tot_{Bytes/key} + ID_{KX})\ x\ K + ID_{NX} + X$$

3.6 Study Limitations

The evaluation of the PKC algorithm against the 3-P schemes was limited to the mathematical analysis of the network connectivity, the resiliency to link compromise, the energy consumed in the transmission and reception of information, and the total memory requirements of a sensor node to store a random subset of keys from a large key pool. Evaluation using other methods including network simulation or test bed implementation methods was beyond the scope of this study. This limitation was acceptable due to the exploratory nature of the study and the need to first understand the efficacy of the key pre-distribution schemes from a mathematical perspective before a deeper investigation can be done. A more exhaustive investigation is planned in a future study.

Further limitations are noted with the establishment of a set of assumptions for the communication protocol and the memory utilization requirements of the sensor nodes within a wireless sensor network. Packet size and structure was assumed to follow the TinySec protocol (Karloff, et al., 2004). Use of a different packet type may impact the energy and memory needs of a key distribution scheme, especially if the maximum size of the packet is different from the one selected in this study. While the conclusions regarding energy and memory usage between the key pre-distribution schemes evaluated in this study should remain unchanged (assuming the selected packet structure was applied equally to all key pre-distribution schemes), this statement needs to be validated upon the selection of a different packet structure.

This study assumed a random deployment of sensor nodes within a wireless sensor network. Changing from a random to a pre-determined placement of nodes may change the network connectivity probability and thereby change the study conclusions. Random deployments are typically assumed when discussing WSNs (Du, Ding, et al., 2003; Eschenauer & Gligor, 2002). The assumed network for this study was a 5000 node deployment over a region A of area $|A| = 0.5km^2$ with each node assigned 100 random keys from a large key pool. Each node had an assumed omni-directional radio with a transmission range of r = 40m and formed a 2-connected network with probability 0.999. Changes of any network parameter would change the mathematical results discovered but changes applied equally to all schemes evaluated in this study should produce the same conclusions with respect to the study hypotheses. This statement should remain true for all large-scale WSN deployments (e.g., N > 1000). For small-scale deployments, this statement would need to be validated.

This study assumed that all sensor nodes were of the same product type (i.e., same operating characteristics and features). In a real-world wireless sensor network, different node-types may be use, which may change the outcomes found in this study if the selected nodes differed in available memory or transmission power capability. Lastly, this study assumed a link establishment protocol that followed the PKC algorithm. Changes to the structure of the protocol may affect the number of bytes needed to be transmitted and received. This would affect the energy used by each node in following the protocol to establish one or more secure communication links. Provided that these assumptions, and all assumptions listed in this chapter, were applied equally to each key distribution scheme being evaluated, internal validity should be maintained and the conclusions reached in this research should remain unchanged.

CHAPTER 4 – ASSESSMENT OF THE PRICE, KOSAKA, AND CHATTERJEE KEY PRE-DISTRIBUTION ALGORITHM

4.1 Introduction

The PKC algorithm was analyzed against three dominant key pre-distribution schemes used today to establish a secure wireless sensor network. Referred to in this study as the 3-P schemes, they include the Eschenauer and Gligor random key pre-distribution scheme (Eschenauer & Gligor, 2002), the q-composite scheme of Chan et al. (2003), and the random polynomial-pool key pre-distribution scheme of Liu et al. (2005).

Network Analysis of the Key Pre-Distribution Schemes

Using the mathematical models developed by Tague and Poovendran (2007) and discussed in Chapter 3, each key pre-distribution scheme was evaluated to determine its network probability formation (i.e., network connectivity) and its link compromise resiliency (i.e., the possible threat of an adversary obtaining the secret key information from a set of captured sensor nodes). Knowledge of one or more keys may allow an adversary to decrypt communication traffic or encrypt and inject false messages into a network. Both represent network security threats that must be minimized to ensure the viability of a secure wireless sensor network (Walters et al., 2007). Evaluation of both network connectivity and link compromise resiliency was done to determine the sufficiency of the 3-P schemes against the PKC algorithm and to answer the hypothesis set in this study.

4.2 Wireless Sensor Network Model and Parameters

Analysis of each key pre-distribution scheme was done mathematically using the network example below. This pseudo wireless sensor network was posited by Tague and Poovendran (2007) and used to analyze the 3-P schemes in comparison to the PKC algorithm. Their analysis and evaluated results provided a needed baseline to maximize the internal validity of the study's evaluation and to support an understanding of the viability of the PKC algorithm and the premises set in this study.

Network Example used for Evaluation

A WSN of $N = 5,000$ nodes is deployed over a region A of area $|A| = 0.5km^2$ with each node assigned 100 random keys K from a pool P. Each node has an omni-directional radio with a transmission range of $r = 40m$ and forms a network that is 2-connected with probability 0.999. It is assumed that nodes sharing at least one key can establish a secure link vis-à-vis a link-key. Lastly, link compromise is possible as soon as a key is captured.

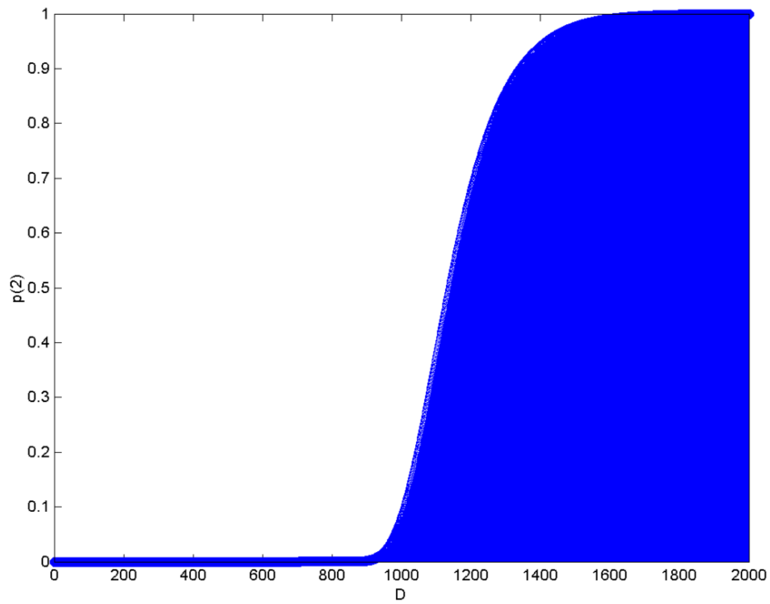
4.3 Mathematical Analysis and Results

Network connectivity and link compromise resiliency was determined mathematically through a sequence of steps: 1) The average expected node degree D of a graph based on the probability that a network is k-connected was first determined; 2) using the discovered expected node degree value, the average mean of the binomial distribution that bounds the distribution of keys assigned to the nodes of the network was investigated; 3) using the discovered average mean of the binomial distribution value, the key pool size needed to meet the *k*-connected requirements of the network was calculated; and, 4) using the values obtained in steps 1-3, the probability of link compromise under the assumption that an adversary captures *m* nodes from *x* nodes and extracts the shared keys from the captured nodes was evaluated for each key pre-distribution scheme.

Network connectivity for all evaluated key pre-distribution schemes was modeled using a probability function of the minimum number of vertices k that leaves a disconnected graph when removed, the average expected node degree *D* of a graph, the total number of nodes *N* in a deployment area *A* with a node density calculated by $\rho = \frac{N}{A}$, and an assumption that communication range of a node was limited by a circular transmission radius *r* (Tague and Poovendran (2007). This probability function is written mathematically as $P_G(k) = \left(1 - e^{-\rho\frac{D+1}{N}\pi r^2} \sum_{i=0}^{k-1} \frac{(\rho\frac{D+1}{N}\pi r^2)^i}{i!}\right)^N$ and labeled as Equation 2.

Using Equation 2, and evaluated with Matlab (Mathworks, 2010), a wireless sensor network matching the given network example is 2-connected using only secure single-hop links with probability of at least 0.999 if and only if the average vertex degree *D* in the graph satisfies $D \geq 1829$.

Figure 8 reports the graphical and numerical results of D versus k-connectivity at k = 2.



D	$P_G(2)$
1827	0.9989
1828	0.9989
1829	0.9990
1830	0.9990
1831	0.9990
1832	0.9990
1833	0.9990
1834	0.9990
1835	0.9990
1836	0.9990
1837	0.9990
1838	0.9990
1839	0.9991

Figure 8: *D* vs. *k-Connectivity*

Setting D = 1829, the mean μ of the binomial distribution $\beta\left(N, \frac{K}{P}\right)$ that bounds each key pre-distribution scheme was determined using Equation 3, or $D = (N-1)\left(1-\left(\frac{N-\mu}{N-1}\right)^K\right)$, for all schemes except the q-composite scheme of Chan et al. (2003). For this key pre-distribution scheme, a modified equation for D that was developed by Tague and Poovendran (2007) was used. Since the q-composite scheme requires a pair of nodes to share at least q keys for some q > 1 to establish a secure link, this study assumed a q value of two (i.e., q = 2). This assumption was selected to match a comparison of results from Chan et al. (2003) and was used for all calculations that involved the q-composite scheme.

Table 4 reports the relationship between D and μ for each evaluated key pre-distribution scheme.

Table 4: Expected Node Degree (D) Equations

Key Distribution Scheme	K and D	Expected Node Degree Equation
Eschenauer and Gligor Random Distribution	K = 100 keys, D = 1829	$D = (N-1)\left(1 - \left(\frac{N-\mu}{N-1}\right)^{K}\right)$
Chan et al. q-Composite (q = 2)	K = 100 keys, D = 1829	$D = (N-1)\left(1 - \sum_{i=0}^{q-1} \binom{K}{i} \left(\frac{\mu-1}{N-1}\right)^{i} \left(\frac{N-\mu}{N-1}\right)^{K-i}\right)$
Liu et al. Polynomial-Pool	K = 20 key polynomials of degree = 5, D = 1829	$D = (N-1)\left(1 - \left(\frac{N-\mu}{N-1}\right)^{K}\right)$
PKC Algorithm	K = 100 keys, D = 1829	$D = (N-1)\left(1 - \left(\frac{N-\mu}{N-1}\right)^{K}\right)$

Using the equations from Table 4, the expected node degree D of each key pre-distribution scheme was evaluated as a function of μ (i.e., a plot of D vs. μ). Each equation was evaluated using the appropriate variables of the given network example and included N = 5000 and K = 100 for all schemes except the polynomial-pool key pre-distribution scheme of Liu et al. (2005). For this scheme, Tague and Poovendran's (2007) finding of K = 20 key polynomials of degree five was verified and adopted.

Figure 9 graphically reports the results of D vs. μ and Table 5 reports the numeric values of μ that were obtained at D = 1829 for each evaluated key pre-distribution scheme.

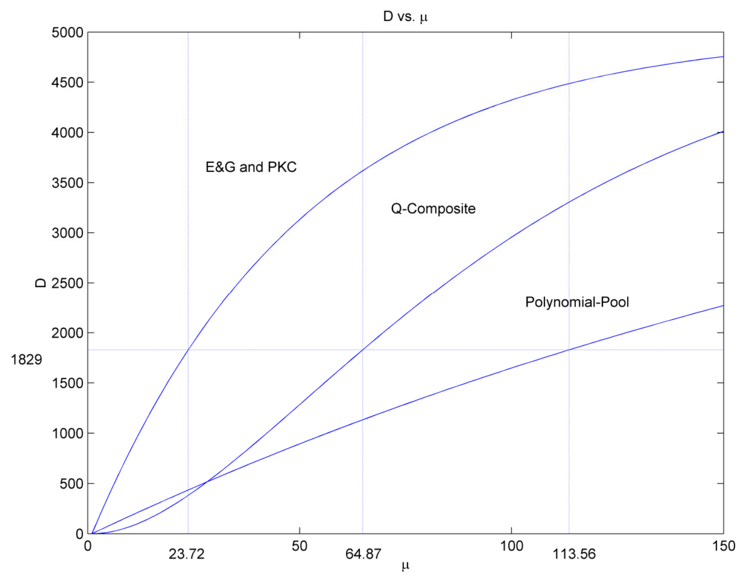


Figure 9: *D* vs. *μ*

Table 5: *D* vs. *μ* Results of Analyzed Key Pre-Distribution Schemes

E&G and PKC		q-Composite (q = 2)		Polynomial-Pool	
μ	D	μ	D	μ	D
22.00	1717.60	63.00	1761.67	112.00	1808.60
23.00	1782.87	64.00	1797.74	113.00	1821.63
23.72	1829.00	64.87	1829.00	113.56	1829.00
24.00	1846.85	65.00	1833.67	114.00	1834.61
25.00	1909.57	66.00	1869.44	115.00	1847.54

Using the μ values of each key pre-distribution scheme at D = 1829, the key pool size P needed to ensure that the network was 2-connected with a probability of at least 0.999 was calculated from $P = \frac{N \cdot K}{\mu}$. This equation was adopted and used by other studies to determine the required key pool size needed for a network to connect based on the probability that two or more sensor nodes share one or more keys (Chan, et al., 2003; Eschenauer & Gligor, 2002; Tague & Poovendran, 2007).

Table 6 reports the calculated results of P for each evaluated key pre-distribution scheme.

Table 6: Pool Size (P) vs. μ Results of Analyzed Key Pre-Distribution Schemes

Key Distribution Scheme	μ	Pool Size, P
Eschenauer and Gligor Random Distribution	23.72	21,079 keys
Chan et al. q-Composite (q = 2)	64.87	7708 keys
Liu et al. Polynomial-Pool	113.56	881 polynomials of degree = 5
PKC Algorithm	23.72	21,079 keys

Since all key pre-distribution schemes evaluated in this study could be modeled as a Bernoulli random variable (Devore, 2004), and the probability distribution of each scheme followed a binomial distribution $\beta(N, \frac{K}{P})$ (Tague & Poovendran, 2007), Equation 5, or $H(\lambda) = P\binom{N}{\lambda}\left(\frac{K}{P}\right)^{\lambda}\left(1-\frac{K}{P}\right)^{N-\lambda}$, was used to determine the average number of nodes λ (i.e., the expected histogram λ) that share a key. Using Matlab (Mathworks, 2010) to evaluate $H(\lambda)$ as a function of λ, Figure 10 graphically reports the results that were obtained for each key pre-distribution scheme. Since μ for the Eschenauer and Gligor (E&G) key pre-distribution scheme (Eschenauer & Gligor, 2002) and the PKC algorithm were equal, their results are shown on the same graph.

Histograms of the Key Pre-Distribution Schemes

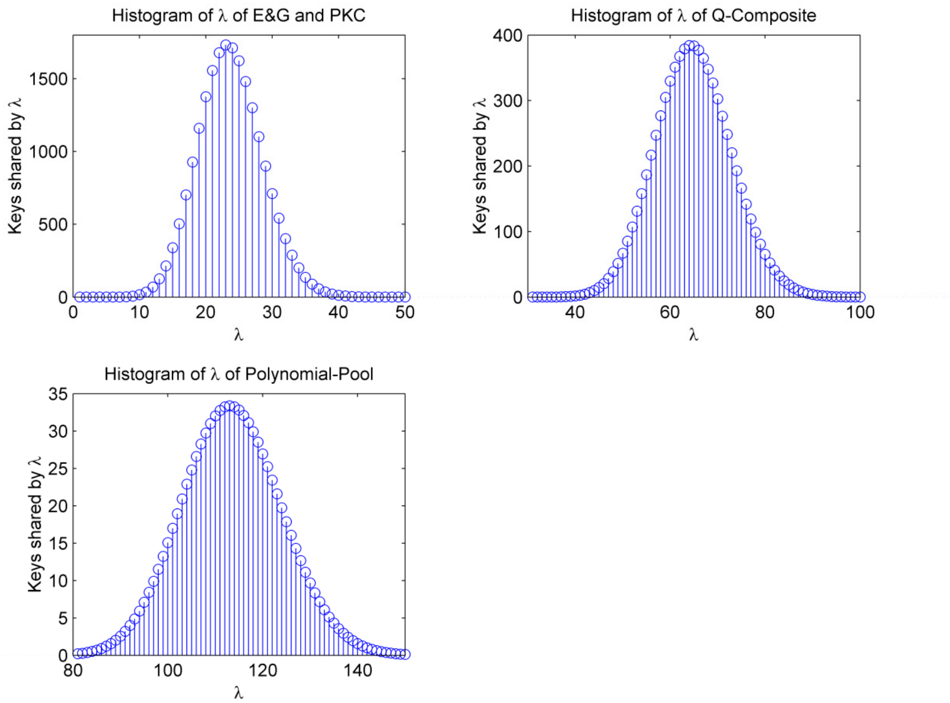


Figure 10: Histogram λ of Key Pre-Distribution Schemes

Resiliency to Link Compromise

The probability of the number of links that can be compromised if an adversary captures m nodes from x nodes and extracts the shared keys from the captured nodes was approximated by Equation 6, or $p(m,x) \approx \binom{x}{m}\left(\frac{\mu-2}{N-2}\right)^{m}\left(\frac{N-\mu}{N-2}\right)^{x-m}$, and modeled by the equations in Table 7. Each equation was established by Tague and Poovendran (2007) and evaluated using Matlab (Mathworks, 2010) to determine the average probability of link compromise for each key pre-distribution scheme.

Table 7: Resiliency to Link Compromise Equations

Key Distribution Scheme	*K* and *D*	Resiliency to Link Compromise Equation
Eschenauer and Gligor Random Distribution	K = 100 keys, D = 1829	$f(x) = \big(1 - p(0,x)\big)$
Chan et al. q-Composite (q = 2)	K = 100 keys, D = 1829	$f(x) = \sum_{i=q}^{K}(1 - p(0,x))^{i}\,\frac{p_s(i)}{p_s(j \geq q)'}$
Liu et al. Polynomial-Pool	K = 20 key polynomials of degree = 5	$f(x) = 1 - \sum_{m=0}^{t-1} p(m,x)$
PKC Algorithm	K = 100 keys, D = 1829	$f(x) = \big(1 - p(0,x)\big)\frac{1}{2^n}$

Figure 11 graphically reports the results that were obtained for the Eschenauer and Gligor random key pre-distribution scheme (Eschenauer & Gligor, 2002), the q-composite scheme of Chan et al. (2003), and the random polynomial-pool key pre-distribution scheme of Liu et al. (2005).

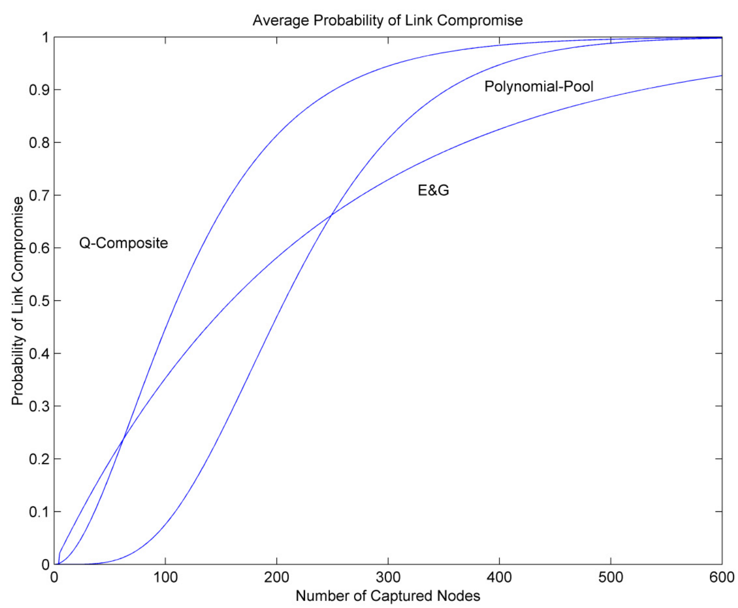


Figure 11: Average Probability of Link Compromise (3-P Schemes)

The security performance results of the 3-P schemes as indicated in Figure 11 reinforces previous findings that Liu et al.'s polynomial-pool scheme (2005) provides greater link compromise resiliency over the schemes of Eschenauer and Gligor (2002) and Chan et al. (2003) when an adversary initiates a small-scale network attack (i.e., a small number of nodes up to a critical number of links are compromised). From the results, this critical point was identified as 208 links. Therefore, the polynomial-pool scheme remains superior among the 3-P schemes up to this point. When the number of compromised links exceeds 208, the Eschenauer and Gligor key pre-distribution scheme (2002) will have fewer compromised links. Nevertheless, under such circumstances, none of the 3-P schemes provide sufficient security due to the large fraction of compromised links that could occur when this critical point is exceeded (Liu, et al., 2005).

Since the PKC algorithm is based upon the key pre-distribution scheme of Eschenauer and Gligor (2003), the average probability of the number of links that could be compromised should be similar between both schemes with the results from Eschenauer and Gligor representing the worst case results for the PKC algorithm. Both schemes assume that two nodes must share a key to establish a secure communication link. However, unlike the scheme based on Eschenauer and Gligor (2002) that uses a shared encryption/decryption key (i.e., a shared 64-bit key) as a whole key, the PKC algorithm uses a shared key as only one-half of a final key needed to encrypt or decrypt a secret message (i.e., a 32-bit key). This final encryption/decryption key is created by the concatenation of the shared key between two sensor nodes and a randomly generated prime number by one of the nodes that follow the steps of the PKC algorithm. Its key length is 64-bits long.

For an adversary to break a link in the PKC algorithm the shared key between two nodes must be obtained and the randomly generated prime number (i.e., the second key-half) deduced. Assuming that the randomly generated prime number is 32 bits (or four bytes), an adversary has one in 2^{32} chances of guessing the right number. Since the probability of obtaining a shared key and deducing the randomly generated prime number is independent, the probability that an adversary can break a secure communication link under the PKC algorithm can be written as the probability of obtaining a shared key times the probability of guessing the correct randomly generated key-half (i.e., $P(A \cap B) = P(A) \times P(B)$). Therefore, using the results from Eschenauer and Gligor's key pre-distribution scheme (2003), and multiplying the results by $\frac{1}{2^{32}}$, the average probability of link compromise for the PKC algorithm is graphically reported in Figure 12.

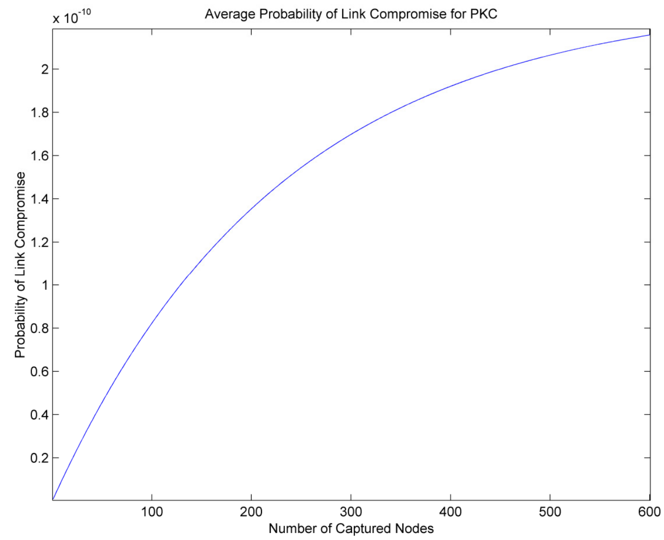


Figure 12: Average Probability of Link Compromise (PKC Algorithm)

Assuming that the probability of the number of links that can be compromised if an adversary captures *m* nodes from *x* nodes and extracts the shared keys from the captured nodes is greater than 0.5, and assuming the critical number of links that can be compromised with the polynomial-pool scheme equaled 208 (selected since it has greater network security among the 3-P schemes up to a critical point), the evaluated results for *m* for each scheme is reported in Table 8.

Table 8: Average Probability of Link Compromise Results

E&G		q-Composite		Polynomial-Pool		PKC	
x	*p*	x	*p*	x	*p*	x	*p*
158	0.498	109	0.494	206	0.495	206	1.38E-10
159	0.499	110	0.498	207	0.499	207	1.38E-10
160	0.502	111	0.503	208	0.504	208	1.39E-10
161	0.504	112	0.508	209	0.508	209	1.39E-10
162	0.506	113	0.513	210	0.512	210	1.40E-10

The results from Table 8 indicate that the PKC algorithm shows better resiliency to link compromise than the 3-P key pre-distribution schemes. Up to the critical point of 208 links, the polynomial-pool scheme of Liu et al. (2007) remains superior among the 3-P schemes but is far less secure than the PKC algorithm with a probability of link compromise evaluated to equal 1.39E-10 at this point. Above this critical point, the PKC algorithm remains more resilient with the average probability of link compromise remaining much smaller than the 3-P schemes (i.e., a probability less than 1E-10). Therefore, the following conclusion was made with respect to the study hypothesis associated with the resiliency to link compromise:

Null Hypothesis (H0): *The PKC algorithm <u>has equal or lower</u> resiliency to link compromise than the 3-P schemes.* **Reject**

Alternate Hypothesis (H1): *The PKC algorithm <u>has greater</u> resiliency to link compromise than the 3-P schemes.* **Accept**

Energy Analysis of the Key Pre-Distribution Schemes

Due to the typical power source of most sensor nodes being battery driven, energy is a critical factor that must be managed to maximize the operating life of a node and the overall network. Once energy has been depleted in a sensor node, it ceases to function and it drops out from operation. The loss of one node may not affect the overall network but the collective loss of multiple nodes may impact its ability to remain connected, reduce its ability to capture and route important information, and increase its vulnerability to attacks since an adversary has fewer links to target. Since the energy consumed by a sensor node is heavily affected by its transmission energy, reducing this energy can increase the operating life of a node.

Setting up a secure wireless sensor network involves the transmission and reception of information needed by a key distribution protocol. While the authors of the 3-P schemes specified a link establishment protocol specific to their algorithm, they could not be used since the differences between them prevented a comparable analysis. Therefore, one based on the PKC algorithm was adopted and used to assess their energy needs. This decision was made to ensure an equal comparison between the 3-P schemes and the PKC algorithm could be made.

Under the PKC algorithm, all sensor nodes when deployed in an operating environment will first broadcast their node ID and key identifiers. Each sensor node will expend transmission and reception energy to learn these identifiers, and for nodes that share a key, they will use one or more identifiers to establish a set of secure communication links. Therefore, while all nodes expend transmission and reception energy to distribute node and key identifier information, only a subset of nodes that share a key (or two keys in the q-composite scheme) will expend additional energy needed by the PKC algorithm in setting up one or more secure communication links. Energy consumed by a sensor node therefore becomes a function of the energy needed to transmit and receive all node and key identifiers and the energy consumed by a subset of key-sharing nodes that proceed in following the link establishment protocol (i.e., the PKC algorithm).

Fundamentally, transmission and reception energy is a function of the number of bits in a packet of data (Heinzelman, et al., 2000; Wander, et al., 2009). Using a packet structure based on the TinySec protocol (Karloff, et al., 2004), the maximum payload of each 41 byte packet is 29 bytes. Since each key ID was assumed to equal two bytes, seven packets are thus required to send all key ID's associated with 100 keys stored in each node (or 20 polynomial keys of degree five with the polynomial-pool scheme of Liu et al. (2005)). Using Equation 8, where $e_{xmit\ one\ byte}$ denotes the transmission energy of one byte of information (i.e., 59.2μJ/byte), B_{packet} denotes the maximum number of bytes in a packet (i.e., 41 bytes), and $N_{packets}$ denotes the total number of packets needed to send all key and node ID's, the total energy expended by a sensor node to transmit seven packets that contain its node ID and all key ID's was calculated and the results are shown below.

Equation 8: Total Transmission Energy (Key and Node ID's)

$$emit_{TOT(key\ and\ node\ ID's)} = N_{packets}\ x\ B_{packet}\ x\ e_{xmit\ one\ byte} = 17.0\ \text{mJ}$$

All sensor nodes not in a transmission state was assumed to "listen" to the communication channel for the node ID and the associated key ID's of each transmitting node. Upon detection of a transmission, if a receiving node determined that it shared one or more keys with a transmitting node, it would record the node ID and the associated shared-key identifier(s) for later used in the shared-key identification phase. Since each node was assumed to be limited by a maximum communication range (i.e., $r = 40m$), and all nodes were assumed to be randomly deployed in a defined operating environment (i.e., $N = 5, 000$ and $|A| = 0.5km^2$), only a subset of nodes within the wireless sensor network is reachable by one node. Reception energy is therefore a function of the average number of nodes within communication range (i.e., N_{avg} and calculated by $\left(\frac{N}{A}\right)\pi r^2 - 1$ (Tague & Poovendran, 2007)), the number of bytes in one data packet (i.e., B_{packet} or 41 bytes), the total number of packets needed to send all key and node ID's (i.e., $N_{packets}$), and the energy expended to receive one byte of information (i.e., 28.6 μJ/byte). Therefore, the energy expended by a sensor node to receive seven packets that contain the node and key ID's from the average number of nodes within communication range was calculated using Equation 9 and the results are shown below.

Equation 9: Total Reception Energy (Key and Node ID's)

$$ercv_{TOT(key\ and\ node\ ID's)} = Npackets\ \left(\left(\frac{N}{A}\right)\pi r^2 - 1\right) \text{ x } B_{packet}\ x\ e_{rcv\ one\ byte} = 402.2 \text{ mJ}$$

Since additional energy is expended by a sensor node only when it shares a key with one or more neighbors (or two keys in the q-composite scheme) within communication range and also participates in the link establishment protocol, a sensor node's expended energy during the shared-key identification phase is thereby dependent upon the probability that a node shares exactly *i* keys with another node and the average number of probable links that can be established with their use. Using Equation 6, or $p_s(i) = \binom{K}{i}\left(\frac{\mu-1}{N-1}\right)^i\left(\frac{N-\mu}{N-1}\right)^{K-i}$, and the values for μ determined and reported in Table 6, the probability that two nodes share one or more keys was calculated and reported in Table 9. For the Eschenauer and Gligor key pre-distribution scheme (2002), the polynomial-pool scheme of Liu et al. (2005), and the PKC algorithm, i was set to one (i.e., i = 1). For the q-composite scheme of Chan et al. (2003), i was set to two (i.e., i = 2).

Table 9: Probability of Sharing Key(s) Results

Key Distribution Scheme	N	K	μ	$p_s(i)$
Eschenauer and Gligor Random Distribution	5000	K = 100 keys	23.72	0.2895
Chan et al. q-Composite (*q*=*2*)	5000	K = 100 keys	64.87	0.2292
Liu et al. Polynomial-Pool	5000	K = 20 key polynomials of degree = 5	113.56	0.2922
PKC Algorithm	5000	K = 100 keys	23.72	0.2895

Assuming the parameters set by the network example (i.e., N = *5, 000 nodes*, r = *40m,* and $|A|$ = $0.5km^2$), and the average number of sensor nodes reachable by one node is equal to 49 (calculated by $\left(\frac{N}{A}\right)\pi r^2 - 1$), a sensor node has an opportunity to establish a secure communication link with no more than 49 nodes, dependent upon the probability of establishing a secured link associated with a particular key pre-distribution scheme.

This was viewed as a set of 49 "trials" with each trial having a probability of "success" equal to one of the probability values determined and reported in Table 9.

Given a set of *X* independent trials, each with a probability of success of *Y*, a Bernoulli process that follows a Binomial distribution can be used to determine the probable number of secure links that can be established (Devore, 2004). Therefore, letting *X* equal 49 and *Y* equal the determined probability of establishing a secure communication link for each key pre-distribution (as reported in Table 9), the number of successful trials for each scheme was calculated using Matlab (Mathworks, 2010) and reported in Figure 13. Since the probability that two nodes will share one key (i.e., $i = 1$) for the Eschenauer and Gligor (E&G) key pre-distribution scheme (Eschenauer & Gligor, 2002) and the PKC algorithm were equal, their results are shown on the same probability distribution function and cumulative distribution function graphs.

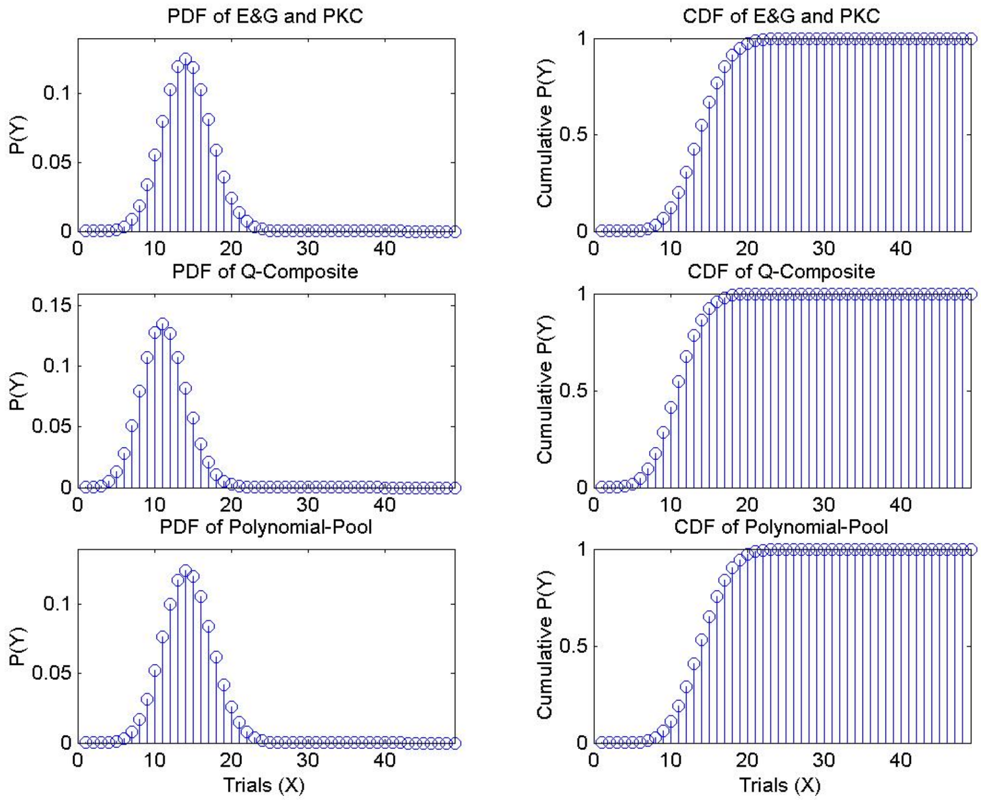


Figure 13: Probability and Cumulative Distribution Functions

Analysis of the results indicates that anywhere between zero and 25 links can be established with a probability of 0.999 by one node. Table 10 reports the number of secure communication links for each key distribution scheme that one node should be able to establish.

Table 10: Number of Secure Link Results (p = 0.999)

Key Distribution Scheme	$p_s(i)$	Number of Links, p = 0.999	Number of Selected Links for Analysis
Eschenauer and Gligor Random Distribution	0.2895	0-24	24
Chan et al. q-Composite (q=2)	0.2292	0-21	21
Liu et al. Polynomial-Pool	0.2922	0-25	25
PKC Algorithm	0.2895	0-24	24

Assuming the protocol steps below, and the total number of bytes transmitted and received at each step, the total energy expended to setup one secure communication link (denoted by elink_{ONE}) was calculated and reported in Table 11.

Table 11: Energy to Setup a Secure Communication Link Results

Scheme	Protocol Steps (From → To)	Bytes Xmit and Rcv	Node A Xmit (μJ)	Node A Rcv (μJ)	Node B Xmit (μJ)	Node B Rcv (μJ)
E&G and Poly	1. A→B: ID_{NA}, ID_{NB}, ID_{KAB}, N_{BX}	8	473.6	0	0	228.8
	2. B→A: ID_{NB}, N_{AX}, $E_{KAB}(ID_{AB}, N_{AB})$	8	0	228.8	473.6	0
	3. A→B: ID_{AB}, $E_{KAB}(N_{AB})$	4	236.8	0	0	114.4
	SubTotal	20	710.4	228.8	473.6	343.2
q-Comp, q = 2	1. A→B: ID_{NA}, ID_{NB}, ID_{KAB1}, ID_{KAB2}, N_{BX}	10	592	0	0	286
	2. B→A: ID_{NB}, N_{AX}, $E_{KAB}(ID_{AB}, N_{AB})$	8	0	228.8	473.6	0
	3. A→B: ID_{AB}, $E_{KAB}(N_{AB})$	4	236.8	0	0	114.4
	SubTotal	22	828.8	228.8	473.6	400.4
PKC	1. A→B: ID_{NA}, ID_{NB}, ID_{KAB}, N_{BX}	8	473.6	0	0	228.8
	2. B→A: ID_{NB}, N_{AX}, $E_{KAB}(ID_{AB}, N_{AB}, S_K)$	12	0	343.2	710.4	0
	3. A→B: ID_{AB}, $E_K(N_{AB})$	4	236.8	0	0	114.4
	SubTotal	24	710.4	343.2	710.4	343.2
elink_{ONE} (E&G and Polynomial-Pool)		20	1.75 mJ			
elink_{ONE} (q-Composition, q = 2)		22	1.93mJ			
elink_{ONE} PKC Algorithm		24	2.11 mJ			

Assuming a worst case scenario, the total energy expended by a sensor node to transmit and receive all node and key identifiers and to establish an assumed number of secure communication links was calculated using Equation 10. The results for each key pre-distribution scheme are reported in Table 12.

Equation 10: Total Sensor Node Energy (Transmission, Reception, and Link)

$$Total\ Node\ Energy$$
$$= \sum \left(emit_{TOT(key\ and\ node\ ID's)}, ercv_{TOT(key\ and\ node\ ID's)}, N_{Links}\ x\ elink_{ONE}\right)$$

Table 12: Total Energy Consumption Results

WSN Scheme	emit $_{TOT}$ (mJ)	ercv $_{TOT}$ (mJ)	N Secure Links	elink$_{ONE}$ (mJ)	Total Node Energy (mJ)
Eschenauer and Gligor Random Distribution	17.0	402.2	24	1.75	461.2
Chan et al. q-composite (*q=2*)	17.0	402.2	21	1.93	459.7
Liu et al. Polynomial-Pool	17.0	402.2	25	1.75	463.0
PKC Algorithm	17.0	402.2	24	2.11	469.8

The results of the energy consumption by a set of sensor nodes to establish an assumed number of secure communication links indicate that the q-composite scheme of Chan et al. (2003) is the lowest consumer of energy. This was expected since the probable number of links that could be established with this key pre-distribution scheme was smaller (i.e., 21) than the other schemes (i.e., 24 or 25). Therefore, the total number of bytes needed to be transmitted and received to setup a secure network was lower and thus resulted in less energy used. Since the key pre-distribution schemes of Eschenauer and Gligor (2002) and the polynomial-pool scheme of Liu et al. (2005) required equal bytes to be transmitted and received, but a different number of secure links that could be established (i.e., 24 vs. 25), the total energy consumed in those key pre-distribution schemes indicate that both schemes requires 0.33% and 0.72% more energy than the q-composite scheme of Chan et al. (2003).

Analysis of the energy consumption in establishing 24 links by the PKC algorithm indicates that it requires more energy than the 3-P schemes. In comparison to the q-composite scheme of Chan et al. (2003), the PKC algorithm requires 2.18% more energy. In comparison to the Eschenauer and Gligor (2002) key pre-distribution scheme and the polynomial-pool scheme of Liu et al. (2005), the PKC algorithm requires 1.84% and 1.45% more energy, respectfully. While the energy consumption for each key pre-distribution scheme was analyzed based on an assumed link establishment protocol (i.e., one based on the PKC algorithm), and noting that changing the protocol may change the energy used by the 3-P schemes in establishing a set of secure links, the total energy consumed by the PKC algorithm is expected to be remain higher since it requires the transmission and reception of a higher number of bytes of information. This is due in part to the need to transmit and receive a randomly generated 32-bit prime number that is used as the second-half of the permanent 64-bit security key. Therefore, the following conclusion was made with respect to the study hypothesis associated with the energy consumption by a pair of sensor nodes that participates in the PKC algorithm protocol:

Null Hypothesis (H0): *The PKC algorithm has equal or higher energy usage requirements than the 3-P schemes.*	**Accept**
Alternate Hypothesis (H1): *The PKC algorithm has lower energy usage requirements than the 3-P schemes.*	**Reject**

Memory Analysis of the Key Pre-Distribution Schemes

Memory needed by a sensor node in supporting a given key pre-distribution scheme was assumed to be function of the total bytes per key (i.e., $Tot_{Bytes/key}$), the number of randomly assigned keys (i.e., K) to each sensor node, the total bytes needed for each key ID (i.e., I_{DKX}), the total bytes needed for each node identifier (i.e., I_{DNX}), and any ancillary information (i.e., X) that may be required by an algorithm (e.g., the discrete matrix elements generated by the Blom symmetric key generation method (1985) and needed by the PKC algorithm only).

For the 3-P schemes, each key ID and node ID was assumed to equal two bytes and each key was assumed to require eight bytes of memory. Therefore, the total memory needed in the 3-P schemes with the assumption that each node receives 100 randomly selected keys (or 20 polynomial keys of degree five with the polynomial-pool scheme of Liu et al.

(2005)) from a larger key pool was determined by Equation 11 and reported below with the ancillary node information X set to zero since no Blom matrix elements were stored in those schemes.

Equation 11: Total Sensor Node Memory Utilization

Total storage $= (Tot_{Bytes/key} + ID_{KX}) \times K + ID_{NX} + X = 1002$ *bytes*

For the PKC algorithm, each key ID was assumed to equal two bytes, each key equaled four bytes, and each node used the primary key ID as a node ID, which eliminated the need to store a separate node ID in the PKC algorithm. Since the PKC algorithm needs to store one row from matrix A and assuming $\lambda + 1 = 50$, with each matrix element assumed to equal one byte, the total row memory $(\lambda + 1) \times N$ matrix was calculated to equal 50 bytes. Lastly, the PKC algorithm needs to also store a seed element s that is used to calculate the column elements from matrix G of a particular node. It was assumed that the seed element equaled eight bytes. Therefore, the ancillary information needed for storage in the PKC algorithm was calculated to equal 58 bytes and the total memory utilization to store 100 keys was calculated by Equation 11 and reported below.

Equation 11: Total Sensor Node Memory Utilization

Total storage $= (Tot_{Bytes/key} + ID_{KX}) \times K + ID_{NX} + X = 658$ *bytes*

Table 13 reports the total memory requirements of each evaluated key pre-distribution scheme.

Table 13: Total Memory Utilization Results

WSN Scheme	**Total Memory Utilization (bytes)**
Eschenauer and Gligor Random Distribution	1002
Chan et al. q-Composite (*q=2*)	1002
Liu et al. Polynomial-Pool	1002
PKC Algorithm	658

The results of the memory analysis indicate that the PKC algorithm shows a 53.9% lower memory utilization when compared to the 3-P schemes. Therefore, the following conclusion was made with respect to the memory utilization by a sensor node that participates in the PKC algorithm:

Null Hypothesis (H0): *The PKC algorithm <u>has equal or higher</u> memory utilization requirements than the 3-P schemes.* **Reject**

Alternate Hypothesis (H1): *The PKC algorithm <u>has lower</u> memory utilization requirements than the 3-P schemes.* **Accept**

4.4 Conclusion

This research looked at a novel key pre-distribution algorithm in comparison to three popular methods used today to distribute keys within a wireless sensor network. The comparison of the PKC algorithm was made against the Eschenauer and Gligor random key pre-distribution scheme (Eschenauer & Gligor, 2002), the q-composite scheme of Chan et al. (Chan, et al., 2003), and the random polynomial-pool key pre-distribution scheme of Liu et al. (Liu, et al., 2005). Collectively, they were referred to in this study as the 3-P schemes.

Each key pre-distribution scheme was evaluated based on its ability to support network connectivity, resiliency to the threat of link compromise, energy consumed in instantiating a key pre-distribution scheme, and the memory required by a sensor node to store a pre-defined number of keys needed to establish one or more secure communication links. Since a typical sensor node is limited in its computational, power, and storage capabilities, managing each limitation is critical to the overall viability and potential use of a key pre-distribution scheme in a practical wireless sensor network.

The results indicate that the PKC algorithm provides greater network resiliency to link compromise, better memory utilization, but higher energy consumption in comparison to the 3-P schemes. Memory utilization of the PKC algorithm was found to be 53.9% less than the other pre key-distribution schemes and the probability of the number of links that could be compromised if an adversary captures *m* nodes from *x* nodes containing a key was $\frac{1}{2^{32}}$ times lower than the probability of link compromise in the 3-P schemes. This improvement in memory utilization and link compromise resiliency came at the expense of higher energy consumption. For the PKC algorithm, it was found that approximately two percent more energy was needed to instantiate the protocol in comparison to the 3-P schemes. With a sensor node typically being battery powered, this increased energy need may reduce the overall operating life of a wireless sensor network and thus create a tradeoff factor (i.e., a tradeoff between memory, power, and security) that must be considered by a network designer in selecting a key pre-distribution scheme. Results indicate that you may not be able to maximize all three factors in the selection of a single key pre-distribution scheme but further research is needed to validate this statement.

This study looked at a network example that assumed a large-scale and randomly deployed wireless sensor network with the number of assumed nodes to be in the thousands (e.g., $N = 5000$) versus one in the hundreds or less. The operating environment was also assumed to be large (e.g., an area of $|A| = 0.5km^2$) versus a much smaller deployment area that would be found if the network was used in a home or office environment. Each sensor node also assumed a small communication range compared to the maximum distance that could be covered with a standard radio available and used today in most commercially available sensor nodes (e.g., 40 meters versus 300 meters). Based on these assumptions, two question emerged at the end of the study: 1) How would network connectivity behave if the operating parameters (i.e., the network example) changed to one that represented a typical home environment where total square feet and the number of needed nodes to measure all events of interest were lower? And, 2) what impact does random versus non-random node placement have on the overall outcomes of the mathematical models used in this study? This study followed prior studies that assumed a random deployment of sensor nodes versus an expected non-random deployment that would occur if a wireless sensor network was placed in a home or other small-scale location (Chan, et al., 2003; Eschenauer & Gligor, 2002; Liu, et al., 2005). Since this research was exploratory, with a driver to first understand the viability of the PKC algorithm, the answers to these questions, while important, are recommended for future studies.

The results of this study were obtained from a mathematical analysis that was conducted against a set of assumptions that supported an equal comparison between all key pre-distribution schemes of interest. The assumptions were based on logical reasoning or ones that followed other studies (Chan, et al., 2003; Eschenauer & Gligor, 2002; Liu, et al., 2005; Tague & Poovendran, 2007; Wander, et al., 2009). For example, this study assumed that the energy consumed by a sensor nodes microprocessor and used to calculate information needed by a key pre-distribution scheme was small when compared to the energy that is expended to transmit and receive one byte of information (Wander, et al., 2009). Therefore, computational energy was not considered in any energy calculation but assessment under other evaluation methods (e.g., network simulation or test bed implementation) is recommended to further validate this assumption.

Analysis in this study was also limited to a network that formed single hops and did not consider the impact or need of intermediary nodes to help distribute keys in the establishment of one or more secure links. Including intermediaries changes the probability of network connectivity and thus changes the size of the required key pool used to feed a subset of keys to each node. Changing the key pool size would change the number of needed keys that must be assigned to each sensor node to ensure a probabilistic network formation. Reducing or increasing the key assignment size affects the memory requirements of the adopted key pre-distribution scheme. Provided that any change in the assumption of the presence of intermediaries or changes in key pool size was apply equally to the key pre-distribution schemes discussed, the conclusions reached in this study should remained unchanged but further research is required to validate this statement.

This study assumed a packet structure based on the TinySec protocol (Karloff, et al., 2004) that has a maximum packet and payload size of 41 and 29 bytes, respectively. Changing the packet size or packet structure affects the number of bytes that can be transmitted and received and thus affects the overall energy used to distribute key information in a given key pre-distribution scheme. Since the selected packet structure should affect each key pre-distribution scheme equally, the conclusions posited in this study should remain unchanged. Nevertheless, packet structure is a factor that must be considered when designing a wireless sensor network, as it can affect the overall energy used by a sensor node in transmitting and receiving information, whether the information is related to key distribution or information traffic once a secure network has formed.

The affect of lost packets or erroneous packets was not considered in this study. This was done to eliminate the uncertainty of packet retransmission that often occurs when a packet is corrupt or fails to reach its destination point. Under such conditions, the transmitting node will rebroadcast the packet. This results in additional energy being consumed by a transmitting and receiving node. Since this study was first interested in understanding the viability of the PKC algorithm, this type of network problem was considered a factor that could be considered in future studies and one that would not affect the general and exploratory evaluation of the PKC algorithm.

One factor that was not considered in this study was the time needed by a key pre-distribution scheme to calculate a key or key component. In the key pre-distribution scheme of Du et al. (2003), they found that up to 25 seconds was needed to calculate a 64-bit key. This time represents a weakness that can be exploited by an adversary, provided that they have sufficient resources available to capture one or more nodes and can extract the secret key information before a set of secure communication links form within the network. Increasing the key size, while supporting greater network security, incurs greater transmission energy, higher memory utilization, and potentially higher calculation times needed to generate or use a key (Schneir, 1996). For the evaluated key pre-distribution schemes, a 64-bit key was assumed and followed the assumptions made by the 3-P scheme authors (Chan, et al., 2003; Eschenauer & Gligor, 2002; Liu, et al., 2005). The question of key size on network formation, energy consumption, or memory utilization is recommended for consideration in future studies of any key pre-distribution scheme.

The results from this study support the use of the PKC algorithm in establishing a secure wireless sensor network through the effective distribution of keys. The question of *"How to establish secure communication links within a wireless sensor network through the distribution of keys?"* formed the first part of this research. The intent of this research was to first validate the PKC algorithm for expected use in future studies that build off a second part of the research with a goal to explore and understand *"How can technology be used to persuade behavior change in the promotion of physical activity?"* and *"What impact and/or level of effectiveness does persuasive computing technology play in promoting behavior change?"* Combined, these questions supported an attempt to understand the security of a wireless sensor network and their use to support persuasive computing technology applications intended on changing human behavior. The findings of both parts were considered mutually supportive in expanding new knowledge of two areas that are connected yet remain open to research.

CHAPTER 5 – DEVELOPMENT AND RESEARCH METHODOLOGY FOR A BEHAVIOR MODIFICATION SENSOR SYSTEM

5.1 Introduction

Within the last decade, wireless sensor networks are making it possible to capture aggregate information about a person and their interaction within their microenvironment (e.g., work, home, or other closed living space) that was previously unavailable with older technologies. The challenge now is less how to capture this information but more how to find meaning from it. What is missing is once a person's "living pattern" has been obtained; can it be used to provide stronger persuasive messages over a simple message construction that often fails to account for behavior context over behavior outcome?

Humans typically follow a 24-hour living pattern or *circadian activity rhythm* with routines including sleep times, personal hygiene activities, recreational activities (e.g., watching television (TV), reading, or listening to a radio), and other repeated engagements that occur in 24-hour cycle (Virone, et al., 2008). Understanding a person's living pattern was posited to support a greater understanding of a person's habits and to provide greater context regarding the why, when, or where a person engages in a behavior. It may also provide information that can be used to identify changes in behavior that may foreworn of an impending health problem or may enable the effective alignment of a persuasive message needed to aid the movement of a person towards an advocated position or goal. For example, in the case of physical activity, understanding when and why a person is least active may create opportunities to deliver a persuasive message that is closer to the low activity state (i.e., an event) and with greater context of why engagement is low. Research shows that when a persuasive message is triggered and delivered closer to context, greater effect on behavior change is possible (Fogg, 2009; Intille, 2004).

This study put forth a prototype Behavior Modification Sensor System that explored the capturing of human living patterns and used the captured information to create "information rich" persuasive messages intended to impact physical activity behavior. The presentation of information through an effective human-computer interaction channel is critical, especially when users are technologically challenged (Sambath, 2005). This study tested the efficacy of information feedback by using a digital newspaper format (i.e., a flat screen liquid crystal display or LCD with a message presented and structured in a standard newspaper form) as opposed to other methods like simple short message service (SMS) texting on a cellular telephone. The instantiation of the information system included micro-environmental and body-wearable sensors with data that was fused together to generate a meaningful feedback of a human's pattern of living including their physical activity outcome.

5.2 Research Question and Hypothesis

To understand and answer the fundamental question of *"What impact do persuasive messages have on daily physical activity*?" a hypothesis and its null was established.

Hypothesis: *Event-driven persuasive messages formed from the combining of physiological and microenvironment* data *will* *increase physical activity levels of a user of a Behavior Modification Sensor System or BMSS.*

Null Hypothesis: *Event-driven persuasive messages formed from the combining of physiological and microenvironment* data *will not* *increase physical activity levels of a user of the BMSS.*

5.3 Framework for the Development of a Behavior Modification Sensor System

To help instantiate the development of a persuasive information system (referred to as the Behavior Modification Sensor System or BMSS) for the collection, analysis, and presentation of disparate health and home-living pattern data by means of different computing-based technologies, the Behavior Modification Sensor System Framework as shown in Figure 14 was created.

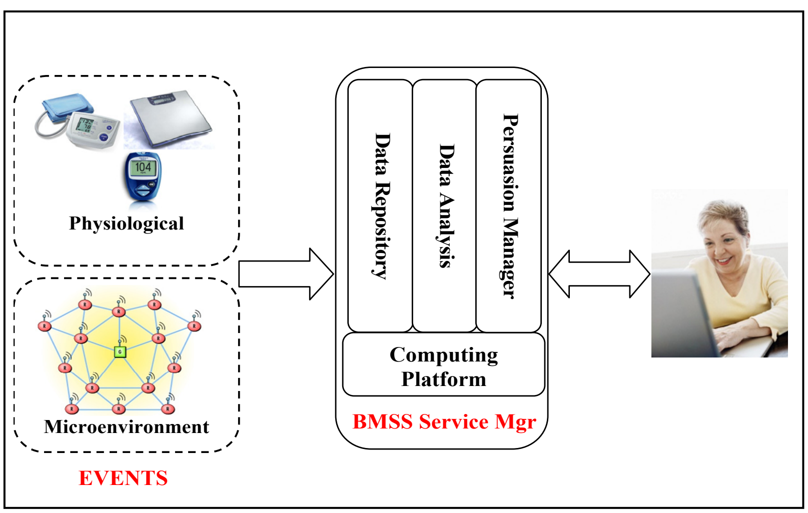


Figure 14: Behavior Modification Sensor System

The intent of the BMSS was to identify human behaviors and actions for the purpose of providing actionable data to a user and to offer a system and service that supports persuasive computing ideologies. This framework was adapted from existing frameworks using logical reasoning in establishing the system's interaction between the constructs of interest and the user of the system (Alwan, et al., 2006; Demiris, Parker-Oliver, Dickey, Skubic, & Rantz, 2008; Korhonen, Parkka, & Van Gils, 2003). Construct validity associated with physiological health states and living pattern determinants referenced in the Events group of the BMSS has been documented in recent literature (Chen, et al., 2007; Walker, et al., 2006) and the abstraction of data storage, processing, and presentation of user information referenced in the BMSS Service Manager segment is a common form of information system design (Denning & Martell, 2007; Jorgensen, 2010; Whitten & Bentley, 2005).

Figure 14 is divided into three parts: (1) Events of medical and lifestyle interest that are captured and sent to a (2) Behavior Modification Sensor System Service Manager that processes and exchanges information with a (3) User of the system.

Events—Physiological/Psychological and Microenvironment

Within the Events domain, various physiological constructs exist that can be used to gauge general health. They include blood pressure, blood glucose, body weight, cardiac health, cognition, and physical activity. This study monitored and considered blood pressure and body weight as indirect health outcomes but focused only on daily physical activity as a direct and testable parameter that could be impacted by persuasive messaging.

Physical activity is broadly defined in academic literature as “any force exerted by skeletal muscles that results in energy expended above rest” (Edwards & Tsouros, 2006, p. 3). Measuring physical activity is a trade-off between precision and ease of assessment. While direct and indirect calorimetry and the doubly-labeled water technique represent the most common and highly precise approaches to quantifying the energy generated by a body during rest and non-rest states, they are difficult to use without intrusive and bulky test equipment (Ekelund, 2009). Self reporting information by the test subject of all physical activities completed during a measurement period is the easiest mode of assessment but, due to the risks of incomplete data recording, it represents the least precise method of determining physical activity (Ekelund, 2009).

This study measured physical activity based on the well established principles of accelerometry, which is a direct measure that provides medium precision with ease of assessment (Sahn, Lockwood, & Scrimshaw, 1985). Commercially available devices based on this principle typically fall under the category of pedometers. For this study, physical activity was defined by the total walking steps that a person takes in a 24-hour day. Secondary constructs derived from total walking steps include aerobic steps and time (e.g., 10 minutes or more of continuous walking), calories burned, and total distance traversed in a day. Each of these variables was used to gain further insight(s) into the physical activity of a person.

Microenvironment Domain

For this research, the microenvironment is the residence or living space of a home's inhabitant. Within the microenvironment, various objects including kitchen appliances (e.g., stove, microwave, and refrigerator), bed, TV, and sitting objects (such as a couch or chair) can be monitored and used to induct the activity of a resident as they effectuate a daily living rhythm from wake through sleep (Chen, et al., 2007; Intille, 2004). By monitoring the usage of these objects, physical activity states can be determined. For example, sitting on a couch and watching TV for long periods of time represents a physical activity reducer. Understanding what reducers exist and how a person utilizes their microenvironment over time can aid in developing or reinforcing the type of persuasive message that is communicated to the message receiver (Intelle 2004).

Figure 15 shows the rooms and associated objects that were monitored in this study.

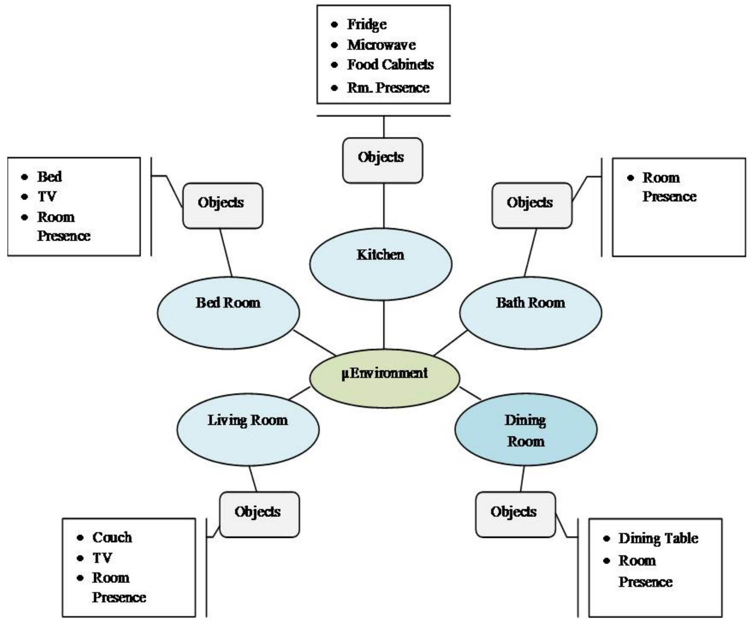


Figure 15: Microenvironment Rooms and Objects

Within the living room, the couch and the TV represent high interest objects since they indicate when a person sits and engages in a low physical activity. Within the dining room, the dining table represents time spent sitting and engaging in food consumption or in ancillary activities (e.g., sitting and talking to guest, paying bills, engaging in a hobby that requires a table, etc.). Within the kitchen, objects such as the refrigerator and microwave represent objects that can be monitored for food preparation activities. Lastly, within the bedroom, monitoring bed presence and TV usage (in cases where a TV is located in a bedroom) represent times of sleep and/or periods of rest including low physical activity states.

This research focused on the primary rooms found in a typical home (e.g., the living room, bedroom, bathroom, dining room, and kitchen) and the associated objects within each room. While knowing the operating times of all kitchen appliances, for example, may help in understanding a person's complete kitchen history, it does not necessarily provide extra knowledge of interest. For this study, it was more important to know that a person was moving within their kitchen environment versus a question of what did occur within the kitchen.

Behavior Modification Sensor System Service Manager

The BMSS Service Manager is "the system" to the user. Through the BMSS Service Manager, the user receives all persuasive messages built from the analysis of physical activity and living pattern information. The BMSS Service Manager links collected Event data to a health information database that stores recorded data for the purpose of analysis and information presentation regarding a user's health and living domain states by the system using theoretical foundations of persuasive computing and behavior change ideology. The health records component for this study was limited to a simple database and the researcher did not consider health information standards like HL 7, ISO/TC 215, or HIPAA (HIPAA, 2010; NHII, 2010). The Elaboration Likelihood Model grounds the study's premise that if a person is able and properly motivated, they will elaborate, or systematically analyze, persuasive messages and thus will engage in a desired behavior (Petty & Cacioppo, 1986).

5.4 Research Methodology

The research in this dissertation was classified as exploratory. The nature of the study was to understand how a humans' living pattern could be captured, to discover what information it could provide, and to determine whether its use in persuasive messages could change human behavior. Because the BMSS design was a prototype—and the usage of enriched persuasive messages formed from the collation of living patterns with physical activity states—is not well understood in current research, it therefore did not fit the standard Popperian view of experimental design. The Popperian design is based on the belief that "scientists should experiment only *after* theories have been constructed *and* pointed predictions made" (Franklin, 2005, p. 889).

This study tested an expanded form of the basic hypothesis that simple persuasive messages can have a positive effect on changing human behavior as a means to demonstrate the existence of significant effects from these messages. As this basic hypothesis has already been studied and reported in research literature (Kroeze, et al., 2006), a field experiment was used to study an expanded hypothesis. This hypothesis posits that information rich persuasive messages formed from the combining of living pattern and physiological data will have a positive impact on encouraging the physical activity of a user of the Behavior Modification Sensor System.

Design Science was used to guide the research (Hevner & Chatterjee, 2010; Hevner, et al., 2004). Since this study encompasses various fields that included psychology, persuasive and ubiquitous computing, and the impact of information systems on the human experience, it required the selection of a research methodology that could combine and integrate systematically each field's best aspect. Where ubiquitous computing applications typically use a mixed selection of methodologies, each selecting measures appropriate for their particular application (Scholtz & Consolvo, 2004), research associated with behavior change, persuasive and ubiquitous computing, and information system impact commonly use field evaluations, laboratory studies, or traditional social research design approaches. A survey of research methods revealed that all these methodologies fall within Design Science where endorsed methods can include observational (case and field), analytical, experimental (controlled and simulation), testing, and descriptive studies (Hassan, 2008).

The information technology (I.T.) artifact as described by Hevner et al. (2004) in this study is the BMSS. While this study did not use the BMSS in an automated way—where persuasive messages are generated and delivered automatically to a user upon a trigger from an anomaly in a determined living pattern or event—the findings in this research can support future artifact development that will meet this goal. Table 14 reports the guidelines set by Hevner et al. (2004) in conducting Design Science research and how this study met each guideline.

Table 14: Design Science Research Guidelines (BMSS)

Guideline	Description	BMSS Artifact
Guideline 1: Design as an Artifact	Design Science research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation.	The BMSS artifact was manifested in one instantiation of a persuasive information system that collates health event and microenvironment information for the purpose of changing physical activity behavior of a user of the system. Currently, the artifact relies on manual data analysis to generate a persuasive message but future expansion of the system may leverage data mining algorithms to automate the message creation and delivery through any communication channel.
Guideline 2: Problem Relevance	The objective of Design Science research is to develop technology-based solutions to important and relevant business problems.	The BMSS artifact solves the initial question of the feasibility of capturing a persons living pattern. Understanding a persons living pattern is posited to provide important information that may forewarn of impeding health problems or to be used to create stronger persuasive messages that have been shown to impact behavior change (Baranowski, et al., 2003; Kroeze, et al., 2006). Physical inactivity has been identified as a major risk factor that compounds health and healthcare (USDHHS, 2003). Solutions that promote physical activity are not only an active business problem but a social problem.
Guideline 3: Design Evaluation	The utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation methods.	The BMSS artifact was designed and evaluated in accordance to standard information system design principles (Shelly, Cashman, & Rosenblatt, 2005). Needs and requirements of the system design were established to solve a real-world problem that was supported by published research literature (the reader is referred to Chapter 2 for a discussion of the publications). Analysis of efficacy, quality, and utility and its associated results were evaluated using standard statistical methods (Devore, 2004).
Guideline 4: Research Contributions	Effective Design Science research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies.	The usage of the BMSS artifact provides evidence that living pattern information can support more effective persuasive messages and adds to the knowledge base within information system and persuasive computing research as a practical system for use in future research that intends to build upon this study's findings.
Guideline 5: Research Rigor	Design Science research relies upon the application of rigorous methods in both the construction and the evaluation of the design artifact.	The BMSS artifact design was based on standard information system design principles (Whitten & Bentley, 2005) and evaluation of its usage was supported by the statistical analysis of its outcomes (Devore, 2004). Research rigor was followed using deductive thinking and proper research methods to ensure validity, reliability, and sound conclusions were maximized (Trochim, 2001).

Guideline	Description	BMSS Artifact
Guideline 6: Design as a Search Process	The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.	The BMSS artifact was designed iteratively with the needs and requirements pre-determined to ensure effective design and outcomes that met a defined problem statement. The problem definition was clearly established prior to the building of the system and was set by identifying weaknesses in the current research literature (Chen, et al., 2007; Hassan, 2008).
Guideline 7: Communication of the Research	Design Science research must be presented effectively to both technology and management-oriented audiences.	Preliminary results of this study and the BMSS artifact have been presented at research-oriented conferences and published in associated papers for the purpose of obtaining feedback of the efficacy and utility of the artifact and to validate the goals of this study (Price & Chatterjee, 2010a, 2010b).

Study Participant

The study participant is a 64 year old single Hispanic female diagnosed with pre-diabetes and told by her physician to improve her physical activity as prevention to a worsening state. The overall health of the study participant was considered good and within standard measures (e.g., blood pressure, weight, glucose levels, etc.). Selection of the study participant was based on a convenience sample; she is the mother of a former work colleague to the researcher and no relationship between the study participant and the researcher existed before the study. While low external validity and sample bias resulting from a small population is noted, the usage of a single sample allowed the researcher to test the basic premises set forth in this exploratory study. Refinements to the research application, its frameworks, and the BMSS design are planned for use in future studies that will use a larger sample size.

The study participant lives in a one bedroom apartment that is located in a senior living complex in Southern California. This senior living complex is an adult community specially designed for seniors 55 and over that can live independently and without intervention. The complex allows its residents to “create their own lifestyle through the activities and events that are offered from a vast array of pursuits and entertainment such as a fully-equipped fitness center and social clubs” and supported by the “many daily and weekly activities offered by the complex to promote social interaction, spiritual renewal, and physical activity” (Beacon Property Management, 2009, ¶2).

5.5 Artifact Development

Needs Analysis

Designing any information system requires an understanding of the system users from the perspective of what their goals, their technological literacy, and their expected needs are from the system. For this study, users were defined as the researcher and the study participant that directly interfaced with the BMSS. Each user had a different set of needs.

Based on a pre-study interview, the study participant required a system that was easy to use, was unobtrusive, and one that required minimal operating commitment. The study participant did not own a cellular telephone, has never used a computer, and expressed anxiety when confronted with simple technological task like setting the clock on a microwave. When presented with the details of the study, the study participant requested that all technology placed in her home be invisible to view and require minimal usage responsibility. Transparent technology and ease of use with minimal user responsibility were also required by the researcher in addition to a system that was reliable, capable of 24/7 remote monitoring and management, could operate on non-battery and redundant power, and could support visible message delivery that maximized message exposure to the study participant.

Table 15 summarizes the approach taken to meet the user needs in this study.

Table 15: Summary of Needs Analysis

User	Need	Approach to Needs Solution
Study Participant and Researcher	Transparent or Invisible Technology	All technology including sensors to determine living patterns within the microenvironment must be small and placed in minimally visible locations within the home.
Study Participant	Ease of System Use	All technology used by the study participant must require minimal usage commitment up to plugging in simple devices or clicking a mouse button no more than twice if user-computer interaction was required.
Researcher	24/7 Remote Monitoring and System Management	An Internet enabled computer must be placed in the study participant's home and remote management software installed to provide control and monitoring by the researcher.
Researcher	Non-battery and Redundant Power	All system electronics must run off of utility power; an uninterruptable power supply (UPS) must be available to provide backup power to the main computer in the event of a power disturbance.
Researcher	Message Delivery and Visibility	A large liquid crystal display (LCD) must be placed in a highly visible location within the study participant's home. Message exposure must be maximized during all waking hours.

Requirements Analysis

The requirements analyses in information system design are those needs required to meet the goals and development of a new artifact. Critical to the success of a project, the system must be documented, actionable, measureable, testable, and defined to a level of detail that is sufficient for system design. Requirements can be both functional and non-functional (Shelly, et al., 2005). The requirements for the BMSS were set and summarized by the researcher in Table 16.

Table 16: Summary of Requirements Analysis

BMSS Element	Need
Event—Physical Activity	• Small, discrete commercially available technology that can be worn on the arm or hip and collect daily walking steps. • Operate continually on battery power for a minimum of one month before requiring battery replacement. • Support wired or wireless communication, required for data extraction by the BMSS. • Limited software development with standard API support for inclusion in the BMSS. • Simple features to support minimal operating commitment by the user.
Event—Blood Pressure	• Commercially available technology that measures systolic and diastolic blood pressure. • Operate periodically on battery power for a minimum of one month before requiring battery replacement or on utility power for the duration of the study. • Support wired or wireless data communication, required for data extraction by the BMSS. • Limited software development with standard API support for inclusion in the BMSS. • Simple features to support minimal operating commitment by the user.
Event—Weight	• Commercially available technology that measures body weight in pounds. • Operate periodically on battery power for a minimum of one month before requiring battery replacement or on utility power for the duration of the study. • Support wired or wireless data communication, required for data extraction by the BMSS. • Limited software development with standard API support for inclusion in the BMSS. • Simple features to support minimal operating commitment by the user.

BMSS Element	Need
Microenvironment—Room Presence, TV, Couch, Bed, Microwave, Refrigerator, and Food Cabinet Usage	• Commercially available electronics and/or sensors that require minimal circuit design to function; reliable operation is required. • All technology must be designed in accordance to standard U.S. electrical guidelines and compliant with user safety requirements/standards. • Operate continually on utility or redundant backup power. • Support wired or wireless communication, required for data extraction by the BMSS. • No or limited software development required for operation. • Small package footprint to minimize setup, placement, and visible presence within the microenvironment; placement of sensors must be discrete and free from study participant interaction; design must minimize sensor displacement problems in the event that the study participant touches a sensor. • No study participant involvement with the technology.
BMSS Service Mgr—Computing Platform	• Commercially available personal computer (PC) with sufficient memory, hard drive space, and microprocessor speed to support system software and BMSS operating functions. One PC will be placed in the home of the study participant and used as the computing platform of the BMSS Service Manager and a second PC will be used by the researcher for remote-management of the BMSS.
BMSS Service Mgr—Data Repository	• Standard and commercially available relational database with sufficient storage size to support BMSS operating functions.
BMSS Service Mgr—Data Analysis	• Standard and commercially available software tools to support analysis of all data sets associated with the study.
BMSS Service Mgr—Persuasion Manager	• Research validated theories and models to support effective and manual persuasive message generation.

Based on the needs and requirements analysis of the study, a working prototype of the BMSS was developed. Research of available technology for physical activity measurement identified two products that could meet the goals and requirements of the study: the Garmin Forerunner 310XT sports watch (Garmin Ltd., 2009) and the Omron HJ-720ITC Pocket Pedometer (Omron Healthcare, 2010). The Garmin watch tracks a user's position with GPS satellite technology and records movement distance that can be sent wirelessly to a host computer within communication range of the watch (Garmin Ltd., 2009). With an additional foot pod accessory, the Garmin 310XT sports watch can capture user walking distances' for both inside and outside a residence space. Physical activity data is available as a downloadable data set from the company's secure web server. The Omron HJ-720ITC Pocket Pedometer (Omron Healthcare, 2010) is simpler technology that can be worn on the hip and measures walking steps, aerobic steps, distance walked, and calories burned over a 24-hour cycle. The software provided with the product supports data extraction, storage, and analysis using a simple universal serial bus (USB) connection between the pedometer and a standard Windows-based computer.

Both devices were purchased and evaluated for compliance against the needs and requirements of the BMSS. The Omron HJ-720ITC Pocket Pedometer (Omron Healthcare, 2010), hereby referred to as the "study pedometer" or "pedometer", was selected for inclusion in the study. The pedometer was selected for its ease of use, established reliability, and unrestricted need of a foot pod that required attachment to a shoe before physical activity data can be captured (i.e., as seen with the Gamin product). A product that required a foot pod was deemed too restrictive to the study participant and provided lost opportunity potential for non-physical activity determination if it was not worn. While the Garmin product does provide wireless communication, and the Omron HJ-720ITC Pocket Pedometer requires that the user interface the device with a computer to extract data, the benefits of wireless communication did not outweigh the risk of burdening the study participant with intrusive technology nor the risk of losing data if the Garmin product was not used to operating specifications.

To augment physical activity data collection, the Wireless Complete Health Monitoring System (A & D Medical, 2010) was selected and used in the study. The Wireless Complete Health Monitoring System provides a complete wellness tracking system that includes a Wireless Automatic Blood Pressure Monitor (UA-851THW), a Wireless Precision Weight Scale (UC-324THW), and a Wireless Activity Monitor (XL-20) that uses an ActiLink™ USB Transceiver to support physical activity tracking. Each device provides one-button operation with automatic wireless connectivity for data uploading to a provided Wellness Connected software application that automatically receives all measurements for quick analysis through a user-friendly interface. Since the ActiLink™ USB Transceiver requires a foot pod to operate, it was excluded from use.

Device reliability and measurement validity of the Wireless Complete Health Monitoring System was based upon the producing company's reputation as a leader in health monitoring technology. Products from A & D Medical, Inc. support home and professional use and exceed accuracy standards set by the Association for the Advancement of Medical Instrumentation (AAMI, 2010). It is noted that blood pressure and weight determination, secondary physiological constructs of interest, were collected less-frequently than physical activity (e.g., weekly instead of in real-time) and both were used to reinforce the type of message that the study participant received. For example, *"Your weight is three pounds lower this month than last month. See how walking more can improve your health?"*

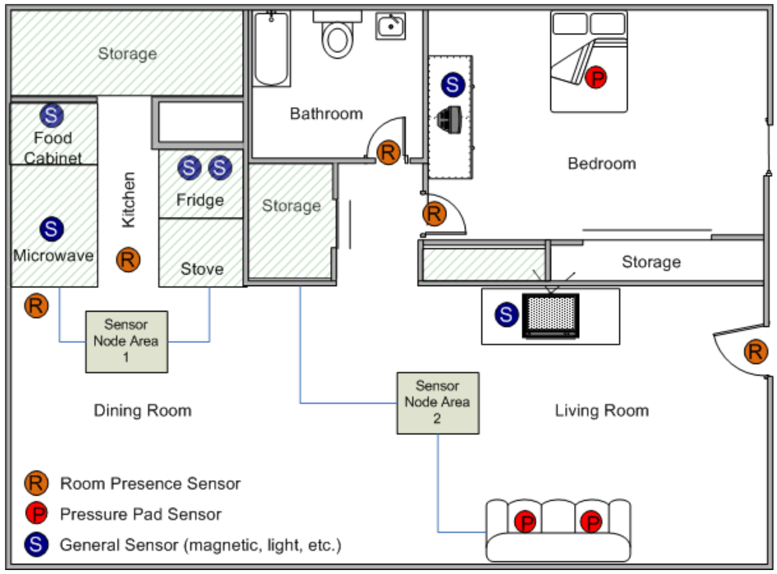


Figure 16: Study Participant's Microenvironment

Figure 16 shows the microenvironment of the study participant's home. It is a 611 square foot apartment with one main entry door, one bathroom, one bedroom with a small television (TV), one small dining area and kitchen, and one small living room with a TV placed in front of a couch.

A wireless sensor network consisting of two IRIS sensor nodes or motes from Crossbow Technology, Inc., (Crossbow Technology, 2008) was used to capture room presence (e.g., movement within each room) and object usage information (e.g., TV operation, refrigerator activity, sleep patterns, etc.) of the study participant. Crossbow Technology, Inc. was selected as they are "the leading supplier of end-to-end solutions in wireless sensor networks and the largest manufacturer of wireless sensor networks" (Crossbow

Technology, 2005, p. 1). Their products are based on the Berkeley-style MICA motes and the TinyOS operating system. Both are commonly used by researchers working with wireless sensor networks (Fogarty, et al., 2005; Shnayder, et al., 2005; Walker, et al., 2006).

Each mote was interfaced to a MDA300 data acquisition board developed at UCLA's Center for Embedded Network Sensing (MEMSIC Corporation, 2010). Both devices combined formed the hardware of the wireless sensor network and the backbone of the BMSS. Each node was interfaced to a set of selected sensors and used to capture living pattern or activity of interest within the study participant's microenvironment.

Room presence was monitored using a simple passive infrared (PIR) sensor and circuit (Parallax, 2010) that was built and placed above the doorway or in the movement path of each room. Time spent in each room was determined by subtracting the time of entering a room minus the time of exiting a room, as determined by the associated room presence sensor. Sleep patterns and couch usage were measured using commercially available pressure pad sensors (Colonial Medical Assisted Devices, 2010) that were placed under the study participant's mattress and sofa cushions. To measure kitchen activities (e.g., refrigerator, microwave, or food cabinet usage) standard normally-open-normally-closed magnetic switches were used (Jameco Electronics, 2010). One switch was placed in the main food cabinet, one switch was placed on the microwave door, and two switches were placed on the refrigerator to monitor freezer and main door activity. Lastly, television viewing was determined using an infrared light sensor (Radio Shack Corporation, 2010). Its circuit was built and discreetly placed in front of each TV screen using a specially designed mounting bracket. Light changes indicated when a TV was operating (e.g., the presence of light represented when a TV was on and no light represented when a TV was off). All sensors were hardwired to a wireless sensor node using standard 22 gauge wire that was discreetly placed along the door frames or baseboards within the study participant's home.

It is noted that no electronics were placed in areas near water. While the electricity associated with the wireless sensor network was direct current, and no human harm from an engineering perspective existed, consideration for receiving Institutional Research Board (IRB) approval deemed that anything that might pose a health hazard to the study participant be excluded from the study (Claremont Graduate University, 2010). Therefore, bathroom activities and kitchen sink usage were not considered. Due to the exploratory nature of this study, this limitation did not impact the validity of the research.

The design of the BMSS was iterative with changes to the hardware and software done during a system test that ran continually for two weeks before the start of a baseline period (i.e., a period that was set to capture the normal living pattern and physical activity of the study participant before the administration of a treatment from a persuasive message). During the system test phase, the original pressure pads (Harbor Freight Tools, 2010) were identified as problematic with false sensor readings noted and required a change to a pressure pad that was designed for healthcare applications (Colonial Medical Assisted Devices, 2010). With this exception, all hardware and software designed for the study operated according to specifications and without error or problem.

Behavior Modification Sensor System Service Manager

The development of the BMSS Service Manager was done using commonly available Windows XP-based software applications that were loaded onto a computer and placed in the study participant's home (referred to as the "BMSS computer" from this point forward). MoteWorks™ — a software platform from Crossbow Technology—was used to instantiate the primary software layers and database functions of the wireless sensor network (Crossbow Technology, 2010). Software code needed to manage sensor node data acquisition, transmission, and network functions was developed using modified base routines provided with the MoteWorks™ software (Crossbow Technology, 2010). Data from physical activity, blood pressure and weight was handled by software that came with each associated device (e.g., The Advanced Omron Health Management Software that came with the pedometer handled all database functions associated with physical activity and software from A&D Medical, Inc. supported the extraction of blood pressure and weight data from the Wireless Complete Home Monitoring System).

Data extraction from the BMSS Service Manager to a Windows XP-based computer managed by the researcher and located offsite to the study participant's home was done through a provided Internet connection using remote monitoring and management software (Teamviewer GmbH, 2010). Daily logins to the BMSS by the researcher allowed all raw data associated with the Events and Microenvironment groups of the BMSS to be extracted, analyzed, and used to create unique persuasive messages that were manually uploaded to the BMSS computer during the experiment phase of the study.

All system functions associated with the BMSS Service Manager were invisible to the study participant. The study participant interfaced with the BMSS Service Manager through the viewing of each persuasive message on a large 23” liquid crystal display (LCD) that was located in a high traffic area within the study participant’s home. A JPEG converted PowerPoint slide contained the intended persuasive message and was setup to run as a screen saver using the “My Picture Slideshow” setting in Microsoft XP (Microsoft Corporation, 2010). All persuasive messages were changed and uploaded to the BMSS computer by the researcher daily. A post-study interview validated the reading of all daily messages by the study participant.

5.6 Study Procedures, Methods, and Analysis

Message Generator

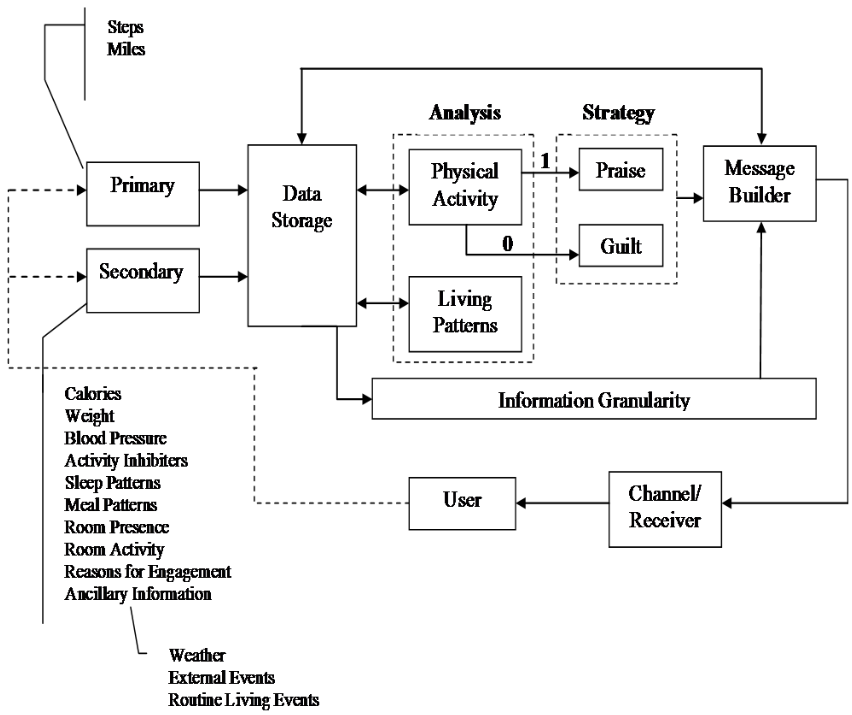


Figure 17: Message Generator Framework

The message generator framework shown in Figure 17 was developed by the researcher to guide the building of a persuasive message. The message building process began with the daily collection of primary and secondary data captured by the BMSS and ancillary information sources. Primary data included physical activity associated with walking steps and miles walked per day, as calculated by the pedometer. The primary data was used to determine the study participant's daily physical activity and goal attainment results. Supporting the primary data, secondary data was used to deduce the study participant's daily living pattern and to provide information granularity needed to build information rich persuasive messages. The secondary data included daily calories burned from walking, blood pressure, weight, physical activity inhibiters such as TV watching, changes in sleep and meal patterns, room presence and activity, reasons for physical activity engagement, and ancillary information such as weather and social events occurring in the study participant's senior living community. Table 17 summarizes the secondary data elements and their support in message building.

Table 17: Secondary Data Elements

Data Element	Driver for Message Inclusion
Calories	Increased physical activity incurs higher calorie output.
Blood Pressure	Physical activity supports blood pressure management and provides a general health parameter for secondary monitoring.
Weight	Physical activity supports weight management and reinforcement of physical activity engagement.
Physical Activity Inhibiters	Identification supports targeted persuasive messages to encourage higher physical activity (e.g., TV viewing can be a physical activity reducer).
Sleeping Patterns	Reduced or interrupted sleep patterns may create physical activity inhibitors (e.g., the study participant may be too tired to engage in physical activity).
Meal Patterns	Changes in meal consumption patterns may create physical activity inhibitors (e.g., the study participant may not have the energy needed from eating to engage in physical activity).
Room Presence	Changes in room presence may indicate changes in activity.
Room Activity	Reinforcement of physical activity. Higher room activity implies higher walking rates.
Reasons for Engagement	Scientific information on the reasons why physical activity is good for health. Reinforces physical activity engagement.
Weather	Possible physical activity inhibitor (e.g., bad weather may impact ability to engage in outdoor activities).
Social Events	Reinforce social involvement activities offered by the adult living community with intent to encourage greater physical activity.

While a daily message always included each prior days total walking steps and total miles walked, selected secondary elements were changed daily to reinforce the persuasive message strategy and to provide motivation for physical activity encouragement.

Analysis of each preceding day's physical activity results was completed against an established walking goal to determine the impact of the associated persuasive message. A weekly goal was set by averaging the three highest walking days of the previous week and multiplying the average by a gain factor that typically represented a three to six percent goal improvement from week-to-week. A daily goal was set by using a linear function (e.g., $y = x$) to ensure that each new day would be progressively higher than a previous day and to support the study participant in meeting the weekly goal at the end of a seven-day period. To guide the creation of a persuasive message, two types of motivation strategies were selected. A persuasive strategy of praise was used when the study participant met or exceeded a daily walking goal and conversely, a guilt strategy was adopted when not.

Figure 18 and 19 shows an example of a praise and guilt-driven persuasive message that was used in this study. In each example is a summary of the previous day's physical activity and secondary information that provided information richness to the message. Ancillary information was also added to provide an impetuous for message reading. For example, the study participant stated in a post-study interview that she would check each day's message for the daily weather forecast and, in the process, would read the intended persuasive message. Each message was based on a newspaper structure that was identified in a pre-study interview as the most appropriate delivery method for presenting information to the study participant.

ANA MARIA TIMES

no.203.078 | Walking Towards Better Health | - Monday, December 28, 2009

ANOTHER GREAT WEEK…!

You kept moving…

You walked an average of **6053** steps or **3.2** miles for each of the three highest days that you walked. **Great Job!**

Your weekly goal is to continue with 6000 daily steps. With efforts like last week, you can do it.

Curious of when you were most active yesterday? The following chart shows that you walked the most between 1 and 2 PM.

Yesterday's activities allowed you burned an extra 128 calories. See how walking can help you to lower your weight?

Keep up the fantastic efforts and make today "**Another Great Day!**"

Remember When?

Let's take a walk down memory lane. Do you remember when…

A gallon of gas was 35 cents?

24 oranges were 88 cents?

The Fugitive was a popular TV show?

Be My Baby was a popular song.

In the Heat of the Night won five Oscars.

Did you figure it out? **All happened in the 1960's.**

Today's Weather

Today: Cloudy skies. High near 70F.

Tonight: Low 41F.

Today's Events

Bible Study—12:30 & 6 PM

Thought for the Day

"It's amazing to see all the wonderfully amazing things that can happen in a day in which you participate."

Steve Maraboli

Keep walking towards better health.

Figure 18: Praise-Driven Persuasive Message

ANA MARIA TIMES

no.203.078 | Walking Towards Better Health | - Tuesday, January 05, 2010

UNDER THE WEEKLY GOAL

Yesterday…

You walked **5208** steps or **2.79** miles and you burned off an extra **152** calories. This was better than the day before but under the week's goal of 5600 steps.

TV Time

Yesterday, you watched almost four hours of television. You need time to relax but don't let too much TV time keep you from moving. Walk outside or in your apartment to remain active.

Blood Pressure & Weight (Last Reading)

Blood Pressure: **138/74**
Weight: **146.2 lbs**

Today's Weather

Today: Sunny. High 79F.

Tonight: A few clouds. Low 44F.

This week's weather is sunny and warm. **Great opportunity for walking**

Quote for the Day

"Everyone is entitled to be stupid, but some abuse the privilege." **Author Unknown**

"I missed my goal"

Figure 19: Guilt-Driven Persuasive Message

Baseline Establishment

Prior to starting the study, the subject was given a physical by a licensed physician to ensure that she could participate in the study and to determine her baseline physiological states (e.g., weight, blood pressure, glucose levels, etc.). Baseline establishment of physical activity and living pattern was done for a period of one month and immediately followed by a two month experiment period. Based on the nature of the study, three months was considered appropriate.

Baseline information was captured by the BMSS and its values represented pre-treatment data, as the study participant did not receive persuasive messages during this period. Since a persuasive message was defined as a daily treatment, physical activity and living pattern information captured during the experiment period represented post-treatment data. It was used to assess the impact of the treatment on changing physical activity behavior.

Physical activity was captured by the study pedometer. The study participant wore the pedometer during all waking hours with the exception of personal hygiene times—e.g., taking a shower or a bath, and was instructed to plug the pedometer into the BMSS computer prior to bedtime using a provided USB cable. Upon each new day's waking, the study participant was instructed to unplug the pedometer and to wear it on her hip. The pedometer automatically self-reset itself at midnight (i.e., a time of typical non-pedometer usage) to prevent data integrity problems between day-to-day readings. Daily analysis of collected physical activity data and a post-study interview validated the correct use of the pedometer by the study participant. Augmenting the capture of living patterns by the BMSS, the study participant was given a log book and asked to record her daily activities (during the baseline period only). The log book was used to calibrate the results obtained by the BMSS during the experiment period.

Ex-ante to the baseline and ex-post to the experiment periods, the study participant completed a 63 question survey that was used to determine her motivation to engage in physical activity and barriers that could prevent her from elaborating on all persuasive messages. Changes in pre and post-study survey data were posited as a validation of behavior change associated with persuasive messages on physical activity.

The survey was created from five instruments with exercise and physical activity defined as walking versus a sports-based endeavor. No changes were made to the instrument questions to ensure that the validity and reliability of the instruments were maintained.

Behavioral Regulation in Exercise (BREQ). The BREQ is a 15-item questionnaire that measures intrinsic and extrinsic motivation to exercise associated with the levels of self-determination of physical activity (Mullan & Markland, 1997; Mullan, Markland, & Ingledew, 1997). Scored on a five-point Likert scale, BREQ measures regulation along the self-determination continuum and it includes questions that measure introjected regulation ("I feel guilty when I do not exercise"), identified regulation ("I value the benefits of exercise"), external regulation ("I exercise because other people say I should"), and intrinsic regulation ("I exercise because it is fun"). Previous research has established the validity and reliability of the BREQ instrument (Mullan & Markland, 1997; Wilson & Rodgers, 2002).

Motives for Physical Activity Measure—Revised (MPAM-R). The MPAM-R is a 30-item questionnaire that measures five motives for participating in exercise. It includes competence ("Because I like engaging in activities that physically challenge me"), appearance ("Because I want to reduce or maintain weight so that I look better"), interest/enjoyment ("Because it is fun"), fitness ("Because I want to be physically fit"), and social ("Because I want to be with my friends"). The MPAM-R is a validated survey instrument that is assessed on a seven-point Likert scale (Ryan, Fredrick-Recascino, Lepes, Rubio, & Sheldon, 1997).

Physical Exercise Self-Efficacy Scale (PESES). PESES has been used in recent studies to assess self-efficacy associated with exercise (Brown, 2005; Schwarzer & Renner, 2004). Measured on a four-point Likert scale, PESES is setup with a question that ask "How certain are you that you could overcome the following barriers? The opening question is followed by a set of statements: "I can manage to carry out my exercise intentions…even when I am tired…even when I am tense…even when I feel depressed …and even when I am busy." Brown (2005) found that PESES has excellent reliability and moderate correlation validity with exercise intention.

The Decisional Balance Scale (DBS). DBS uses a five-point Likert scale to assess attitude, both pro and con, towards exercise. A decisional balance score is calculated by subtracting the total responses to pro questions from the total responses to con questions (Marcus, Rakowski, & Rossi, 1992). Plotnikoff et al. (2002) established reliability and validity of the decisional balance instrument in their longitudinal study across populations.

Physical Activity Stages of Change (PASCO). PASCO assesses the Transtheoretical Model's five stages of change in relationship to current exercise behavior (Brown, 2005; Marcus & Simkin, 1993; Schwarzer & Renner, 2004). A scoring algorithm is used to determine a respondent's particular stage at the time of completing the questionnaire. Reliability and validity have been shown to be stable over a two-week period from the time of questionnaire completion (Marcus & Forsyth, 2003). Questions included "I intend to become more physically active within the next six months", "I am currently physically active", "I currently engage in regular physical activity", and "I have been regularly physically active for the past six months."

Data Analysis

Data collection associated with persuasive messages and physical activity encouragement was handled by the BMSS. The data collected during the baseline period represented pre-treatment data, as the study participant did not receive any persuasive messages during this time. Treatment from a persuasive message was delivered daily during the experiment period only. Therefore, a statistical analysis between both data sets supported the investigation of the hypothesis posited in this study.

Data from both periods was used to understand the impact of persuasive messages on changing physical activity and living pattern behavior of one user of the BMSS. Analysis of physical activity change was done quantitatively since it represented a testable variable for detecting effects in the study. Analysis of living pattern change, while supported by a statistical foundation, was evaluated qualitatively since it relied on qualitative methods to understand how it could be captured, what meaning could be extracted from it, and whether it supported the use of stronger persuasive messages in changing physical activity behavior. Lastly, the use of established behavioral models needed to assess pre and post-behavior change were also evaluated qualitatively since only one sample (i.e., one study participant) was used. While low external validity from one sample limits the generalization of the study conclusions, the results from the use of the behavior change instruments facilitated a deeper understanding of the study's overall findings.

To strengthen the internal validity of the study data, the sample size needed for analysis between pre and post-treatment data was matched even though the data available in the experiment period was greater. For determining the affect/effect of persuasive messages on physical activity, a sample size of 19 days (N=19) was used. To understand the impact of persuasive messages on living pattern, a sample size of 14 days (N=14) was selected. This difference between sample sizes was dependent upon the time spent by the study participant in her home and the type of component of interest (e.g., physical activity or living pattern) being evaluated. The days selected for analyzing living patterns was limited to days where the study participant spent 100% in residence (i.e., days that she did not spend living with her family). Days selected to analyze changes in physical activity behavior was set for days where she spent 80% or more of her time at home *and* could be impacted by a treatment.

All persuasive messages built and used in this study were driven from the capture, analysis, and presentation of the study participant's physical activity and living pattern information. Both types of data were obtained and managed differently. Physical activity was captured using a pedometer and reported quantitatively. Living pattern was captured quantitatively using the BMSS but its results were evaluated qualitatively.

Living pattern data was collected daily and in its raw form was given as a series of discrete sensor readings (e.g., binary values and voltage readings between zero and three volts). The BMSS was designed such that when a sensor was triggered, a value of zero volts was recorded. Twelve sensors were placed throughout the study participant's home and divided equally between two wireless sensor nodes (i.e., each sensor node received input from six sensors). Each sensor node sampled their sensor set approximately once every 1.8 seconds, thereby providing approximately 48,000 raw samples of sensor activity in a 24-hour period. All data collected by the sensor nodes was transmitted to the BMSS computer and extracted daily by the researcher using remote monitoring and management software (i.e., the researcher remained offsite and interacted with the BMSS remotely). No data was lost during the transfer between the BMSS computer and the computer used by the researcher.

Data extraction of a prior day's physiological outcomes (e.g., physical activity, blood pressure, or weight readings) and living pattern information was done daily at 5:00 a.m. and followed by two hours of manual data analysis and persuasive message building to ensure that the study participant received a new persuasive message by the time that she woke up or before she started any planned activities.

The message building process began with the remote extraction of three different data sets: (1) the study participant's physical activity captured by the pedometer and uploaded to the software provided with the device (Omron Healthcare, 2010), (2) the weight and blood pressure readings captured by the Complete Wellness System and stored in its own software (A & D Medical, 2010), and (3) the raw living pattern information captured by the wireless sensor network and stored using the MoteWorks™ software (Crossbow Technology, 2010). Since the data provided by the pedometer and the Complete Wellness System software was already in a usable form (i.e., physical activity, blood pressure, and weight readings represented actual values), no pre-scrubbing or cleansing of the data was needed for analysis. This could not be said for the living pattern data.

The data from the wireless sensor network required scrubbing and manual interpretation before the study participant's living pattern could be used for analysis. This process began with the raw sensor data being imported into Microsoft Excel. Using a pre-designed worksheet, the raw data was organized such that each sensor reading would be placed in a column that represented its monitoring domain or activity type (e.g., dining room, microwave, bed, living room TV, etc.), with each row associated with the time that a sensor reading occurred. This created a worksheet of approximately 50,000 rows by 12 columns of data for each day analyzed. Each data element under each column field reported different values, dependent upon the type of input being recorded by a sensor node. Six of the column fields represented analog inputs that listed a voltage reading of between zero and approximately three volts and six columns represented digital inputs that listed a binary value of zero or one. All analog input values were re-formatted to a value of either a two, which represented that a sensor was in an off state, or a zero that represented the triggering or activation of a sensor. This changed the sensor data associated with the analog fields to a binary function, as all sensors and their associated electronics were designed to function as either on or off when used. Since the BMSS circuitry was designed to operate as active low, a zero represented when a sensor was activated or triggered and the data cleansing process began by identifying all zeros for each sensor throughout a day.

Depending upon the sensor type, values between the beginning and ending zero values that indicated when a sensor had triggered and therefore represented movement or activity in the home would often show a non-zero value and thus required the manual changing of those values to zero in the data set. For example, in the case of a TV sensor, which used light changes to represent when it was operating, a series of ones and zeros would be seen in the raw data set. The first zero represented when a TV was first turned on and the last zero represented when it was turned off. All the values in between were changed to zero to represent that a TV was operating between its starting and ending points. This process was also done to the data associated with the room presence sensors. When the study participant walked into a room, an associated room sensor triggered and showed a value change from approximately two to zero volts. The sensor reset itself after approximately two seconds to a non-zero value (i.e., two) and became ready to re-trigger upon the exiting of the room by the study participant. With the time recorded of when the study participant entered and exited a room, zeroing out the data between these two points represented the study participant's total time in a room.

Data scrubbing was not needed for the sensors associated with the normally-open-normally-closed magnetic switches that were used to determine microwave, food cabinet, refrigerator, couch, or bed activity. Those sensors when triggered provided a continuous stream of zeros, which denoted the occurrence of an activity or usage of an object. Analysis of each sensor's data set relied upon the evaluation of the beginning and ending times to conclude the overall activity time by the study participant.

The data provided by a single sensor provided little value in building one day's living pattern but the aggregated of all sensor data allowed the researcher to form a pattern that provided an understand of how the study participant moved about her home and of the general activities like meal preparation and relaxation times that appeared to be cyclical from day-to-day. The complete and scrubbed data provided from 12 sensors showed when the study participant moved out of her bed, often nightly to use the bathroom, how she often went straight to the kitchen upon waking and opened the refrigerator (learned later in a post-study interview for a drink of water to take her medicine), when she engaged in hygiene activities, when she sat on the couch and watched TV, and when and for how long she spent outside her home. Each day's living pattern was averaged together to form a representative picture of the study participant's behavior over time and supported the reinforcement of the persuasive message and its goal to change physical activity behavior.

5.7 Study Limitations

While the cleansing or scrubbing of the raw sensor data needed to extract a daily living pattern of the study participant relied upon the interpretation of the sensor values, and study limitations are noted in that established living patterns were not available to validate the interpretations, the obtained results supported the progression of the study and the analysis needed to assess the study hypothesis.

Further study limitations include low external validity from one sample (i.e., one study participant) and the seasonal variation and limitations that may occur outside the study period. This study occurred during the winter months of November through January. Therefore, the study results cannot be generalized to other seasons were physical activity opportunity may increase or decrease due to warmer weather.

This study looked at one component of healthy living (i.e., physical activity) and did not consider the impact of nutrition on behavior nor the impact of life satisfaction that often supports a person's mental outlook to engage in healthy living. Research has shown that emotional states including mood and feelings of subjective well-being can be impacted by poor diet (Rogers, 2001). This in turn can create barriers to any behavior change program that relies on a subject's affective support. While a formal personality and mental assessment test were not done, the study participant appeared emotionally stable and mentally well-balanced. Furthermore, a post-study interview supported a position that her diet was appropriate and within normal standards for her age, weight, and height. However, validation would be needed by a licensed health professional to nullify the diet component as a mitigating factor on behavior.

While this study and the associated design of the Behavior Modification Sensor System minimized the usage responsibility by the study participant to wearing a pedometer and reading a daily persuasive message, validity of the study data is reliant upon the correct use of the technology and the participation by the study participant to read, but not necessarily internalize, any persuasive message. This problem may be reduced or eliminated by providing clear instructions on the study expectations and responsibilities from the study participant as was done for this research but limitations in the study conclusions are noted if these responsibilities are not met in future research.

This study looked at the daily living pattern of a person within their home environment. No attempt was made to determine activities outside the home, which may provide a better understanding of overall physical activity engaged in a typical day. Living pattern determination was limited to a single person with the BMSS unable to differentiate the study participant from a guest that might enter her home. This problem was further compounded with the presence of a cat that lives with the study participant. Knowing which living pattern belongs to the study participant and which belongs to the cat or guest resides with the interpretation of the collected data of home movement and activity. While this problem was managed in this study, it did create variances in interpreting the data that must be accounted for in a study's methodology.

This research looked at persuasive messages on encouraging physical activity using a digital newspaper format that was delivered once per day. Other types of persuasive message structures such as audio or text-based messages were not considered. Therefore, conclusions of message-type and its persuasive impact on behavior cannot be made from this study. Non-real time message delivery also limits conclusions to the impact of a persuasive message on overall daily physical activity and not its impact on changing physical activity associated with behavior at the time of context.

This study assumed that a baseline of physical and living pattern activity could be deduced in one month. Due to the small sample size, limitations in the data are again noted. Furthermore, established data sets of living patterns were not available to serve as a baseline in the deduction of living pattern context from living pattern activity. To mediate this problem, simple activities like sitting on a couch while the TV was on or non-movement between rooms within the home were assumed to represent periods of low physical activity states.

Lastly, this study limited its assessment of behavior change to the theories based on the models previous discussed eliminating other conclusions to behavior change theories that could have been used. Due to the exploratory nature of this study, one that included the feasibility of living pattern determination and behavior change limited to physical activity, all these limitations were considered manageable and acceptable.

CHAPTER 6 – ASSESSMENT OF THE BEHAVIOR MODIFICATION SENSOR SYSTEM

6.1 Introduction

The Behavior Modification Sensor System (BMSS) used in this study melds together advances happening in two fields, namely wireless sensor networks and persuasive computing technology. Its purpose was to understand the usage of a person's living pattern to support the richer persuasive message creation intended to change behavior associated with physical activity. Research has shown that simple persuasive computing technology can impact behavior change provided that the persuasive message(s) is aligned to a specific change goal (Fogg, 2009). Prior studies have applied simple messages built from limited information of a subject's behavior outcome to drive a behavior change strategy (Kroeze, et al., 2006). This study expands new knowledge in persuasive computing research by exploring the feasibility of capturing a person's living pattern and leveraging the findings to better understand the fundamental research question of "*How can we effectively use technology to improve health and long-term healthy living?*" To answer this question and the hypothesis set in this study a field experiment was conducted that included the establishment of the baseline of physical activity and living pattern of one study participant.

6.2 Physical Activity Analysis and Results

Baseline physical activity and living pattern data (referred to as pre-treatment data) was collected for 25 days (24 hours per day) and included 19 days where the study participant resided at her home and six days that she spent visiting family (i.e., the study participant typically spent one or two days per week in residence with her daughter). Comparable data associated with an experiment period was collected immediately after the baseline period for 49 days. It included data collected for 33 days of residence and 16 days of non-resident times. Daily treatment from a persuasive message was delivered to the study participant during the experiment period on resident days only. The reader is referred to Appendix G for a schedule of the baseline and experiment periods including which days were used for both data selection and analysis.

While physical activity was collected for a total of 74 days ($N_{Baseline}$: 25, $N_{Experiment}$: 49), it was evaluated on the observed difference between pre and post-treatment means on a sample size of 19 days (N = 19). This equates to all 19 days captured during the baseline period and the first 19 days of the experiment period where the study participant could be impacted by a persuasive message. The sample population was selected to include all days where the study participant resided 80% or more time in residence.

To ensure that the first 19 days of physical activity captured in the experiment period represented a valid sample (versus a random sample of 19 days out of the total population of available data), a null hypothesis was posited that equal average means of *total daily walking steps*—the primary variable used in this study to represent physical activity—would exist between this data set and a random sample of 19 data points out of a total of 33 resident days in the experiment period. Rejection of the null hypothesis would indicate that the first 19 days of physical activity could not be used as a valid sample for further hypothesis testing that was associated with determining the impact of persuasive messages on physical activity and acceptance of the null would validate its use. Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 18 (IBM, 2010).

A normality test was first done on both data sets (i.e., the first 19 days versus a random sample of 19 days) using the Shapiro-Wilk's statistical method (Shapiro & Wilk, 1965). This method was selected for its utility with small sample sizes. The results from the Shapiro-Wilk's test as listed in Table 18 indicate that the observed significance levels are sufficient (variable 1 = 0.627; variable 2 = 0.515) and that normality is not an unreasonable assumption. However, to support this assumption, the Q-Q plots of each variable and its distribution curve on the histograms were evaluated as shown in Figure 20.

Table 18: Walking Step Normality Test Results (First 19 days vs. Random Sample)

	Random Sample (Variable 1)	1st 19 Day Samples (Variable 2)
Mean	4955.3684	5000.4210
SD	1025.1054	1336.1890
Test Statistic	0.963	0.957
df	19	19
Significance	0.627	0.515

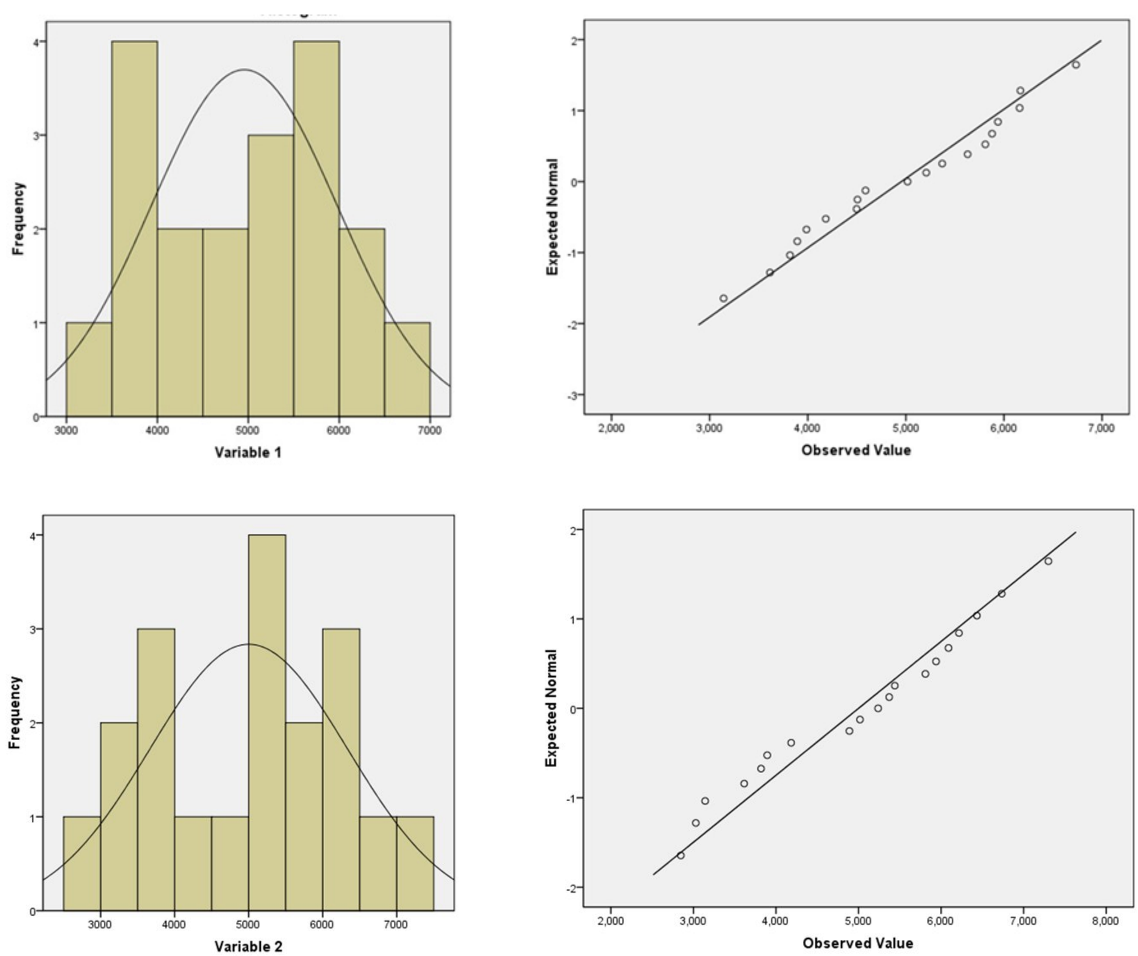


Figure 20: Histogram and Normal Q-Q Plots of Variable 1 and 2

Since both data sets were assumed normally distributed, and the measurements of the same variable occurred over two different time periods, a paired t-test at a 95% confidence level was conducted between both samples. The results shown in Table 19 indicate the acceptance of the null hypothesis (e.g., Sig. 2-tail value > α). Based on this result, the first 19 days of physical activity data from the experiment period was sufficient for use in testing the study hypothesis.

Table 19: Paired t-Test Results (Random vs. First 19 Days of Physical Activity)

		Correlation			Paired Differences					Test Results		
								95% Confidence Interval of the Difference				
		N	Results	Sig.	Mean	Std. Dev.	Std. Error Mean	Lower	Upper	t	df	Sig. 2-tailed
Pair 1	Random - First 19 Days	19	-.298	.216	-45.05	1910.94	438.40	-966.09	875.99	-.10	18	.91

Having demonstrated the fitness of use of the physical activity sample populations, descriptive statistics were run on samples from both the baseline and experiment periods to provide a greater understanding of the differences between pre and post-treatment outcomes. The primary variable of interest was the *total daily walking steps* taken by the study participant in a day. Secondary variables of interest included *total daily calories* burned from physical activity and *total daily distance* walked plus a tertiary variable of *total daily aerobic activity* (i.e., 10 minutes of more of continuous walking time and steps)—each being a dimension of the total number of walking steps completed in a day—was used to further understand physical activity change only.

Table 20 reports the descriptive statistics results of the pre and post-treatment data.

Table 20: Descriptive Statistics Results

		Baseline Steps	Exp. Steps	Baseline Calories	Exp. Calories	Baseline Distance, Miles	Exp. Distance, Miles
		Pre-Treatment	**Post-Treatment**	**Pre-Treatment**	**Post-Treatment**	**Pre-Treatment**	**Post-Treatment**
N	**Valid**	19	19	19	19	19	19
	Missing	0	0	0	0	0	0
Mean		3103.05	5000.42	90.71	137.68	1.6605	2.6774
Std. Deviation		979.806	1336.189	34.24	48.224	.52566	.71774

		Baseline Steps	Exp. Steps	Baseline Calories	Exp. Calories	Baseline Distance, Miles	Exp. Distance, Miles
		Pre-Treatment	Post-Treatment	Pre-Treatment	Post-Treatment	Pre-Treatment	Post-Treatment
N	**Valid**	19	19	19	19	19	19
	Missing	0	0	0	0	0	0
Skewness		1.469	-.139	1.615	.237	1.459	-.142
Std. Error of Skewness		.524	.524	.524	.524	.524	.524
Kurtosis		4.049	-1.085	4.128	-.835	4.009	-1.089
Std. Error of Kurtosis		1.014	1.014	1.014	1.014	1.014	1.014
Range		4439	4453	146	165	2.38	2.39
Minimum		1669	2847	34	68	.89	1.52
Maximum		6108	7300	180	233	3.27	3.91
Sum		58958	95008	1410	2616	31.55	50.87

Based on the total daily walking step means, results indicate that the study participant was able to change and increase her total daily physical activity by 61% (i.e., 5000 post-study average daily steps versus 3103 pre-treatment average daily steps). While not formally evaluated due to insufficient data availability, assessment of total daily aerobic activity noted changes between both periods. In the baseline period, the study participant walked for more than 10 continuous minutes one day out of 19 days and for a total of 14 days out of 19 days during the experiment period. Furthermore, analysis of both periods shows the range, or the difference between maximum and minimum values, of total daily steps (4439 vs. 4453) and total daily distance walked per day (2.38 vs. 2.39 miles) to be approximately equal. Kurtosis values indicate greater peaks around the baseline means versus a flatter spread in the experiment period for the same variables. This indicates that the study participant had a relatively fixed baseline walking pattern over a greater variance in the experiment period. However, due to the small sample size of and between both data sets (N=19), a formal conclusion associated with skewness and kurtosis cannot be made.

Results from the Pearson coefficient (denoted by *r*) as reported in Table 21 indicate that correlation existed between the primary and secondary variables within the same group (e.g., Baseline and Experiment). This conclusion is reasonable since total daily walking steps impacts calories burned and distance walked per day. For example, as a person increases their total daily walking steps, their walking distance covered will also increase. Since each step requires energy, an increase in steps will incur greater energy usage and therefore higher calorie requirements. Lastly, if walking is continuous for more than 10 minutes, increases in aerobic steps and time will also be seen.

Table 21: Correlation Statistics Results

		Baseline Total Steps (Pre-Treatment)	Exp. Total Steps (Post-Treatment)	Baseline Calories (Pre-Treatment)	Exp. Calories (Post-Treatment)	Baseline Distance (Pre-Treatment)	Exp. Distance (Post-Treatment)
Baseline Total Steps (Pre-Treatment)	**r**	1	-.312	.979*	-.342	1.000*	-.312
	Sig. (2-tailed)		.193	.000	.152	.000	.194
	N	19	19	19	19	19	19
Exp. Total steps (Post-Treatment)	**r**	-.312	1	-.289	.975*	-.312	1.000*
	Sig. (2-tailed)	.193		.231	.000	.193	.000
	N	19	19	19	19	19	19
Baseline Calories (Pre-Treatment)	**r**	.979*	-.289	1	-.303	.979*	-.288
	Sig. (2-tailed)	.000	.231		.208	.000	.232
	N	19	19	19	19	19	19
Exp. Calories (Post-Treatment)	**r**	-.342	.975*	-.303	1	-.342	.975*
	Sig. (2-tailed)	.152	.000	.208		.151	.000
	N	19	19	19	19	19	19
Baseline Distance (Pre-Treatment)	**r**	1.000*	-.312	.979*	-.342	1	-.312
	Sig. (2-tailed)	.000	.193	.000	.151		.193
	N	19	19	19	19	19	19
Exp. Distance (Post-Treatment)	**r**	-.312	1.000*	-.288	.975*	-.312	1
	Sig. (2-tailed)	.194	.000	.232	.000	.193	
	N	19	19	19	19	19	19

* Correlation is significant at the 0.01 level (2-tailed).

Since a single test subject was used in this study, and the measurements of the same variable occurred over two different time periods, a paired statistical test was warranted to assess the magnitude of changes seen in physical activity between pre and post-treatment variables and to test the study hypothesis. Selection of the appropriate paired statistical test is dependent upon the assumptions that only matched pairs can be used to perform a paired sample t-test, normal distribution exist within each variable, variance is equivalent between the two samples, and that independence of observation exist.

Since the data collection between the baseline and experiment periods were mutually exclusive, independent observations were assured. Correlation between variable-pairs was determined and the results from Table 22 illustrate that effective pairing is shown to exist between the appropriate pre and post-treatment variables.

Table 22: Paired Samples Statistics Results

		N	Correlation	Sig.
Pair 1	**Baseline Total Steps & Exp. Total Steps**	19	-.312	.193
Pair 2	**Baseline Calories & Exp. Calories**	19	-.303	.208
Pair 3	**Baseline Distance & Exp. Distance**	19	-.312	.193

To test the normalicy of each variable, a normality test at a significance level of 0.05 was done using the Shapiro-Wilk's statistical method (Shapiro & Wilk, 1965). The results from the test as shown in Table 23 indicate that a minimum threshold for normalcy exist for each variable in the experiment period (i.e., significance > 0.5) but normalicy fails for the baseline variables.

Table 23: Test of Normalicy Results

Treatment	Variable	Statistic	df	Significance
Pre	Baseline Total Steps	.890	19	.033
	Baseline Calories	.869	19	.014
	Baseline Distance (Miles)	.891	19	.034
Post	Exp. Total Steps	.957	19	.515
	Exp. Calories	.958	19	.530
	Exp. Distance (Miles)	.957	19	.507

While all observations between pre and post-treatment variables were independent, and correlations between pairs of data are indicated, the failing of normalicy within the baseline variables precluded the selection of a paired t-test. Since this study was exploratory with a small sample size (N=19), it is noted that when normalicy was tested at a less stringent level consistent with initial exploratory studies (e.g., a significance between 10-20%), normality was indicated within all variables. As such, a paired t-test could have been used to assess the indications of persuasive message impact on physical activity. However, the researcher opted to take a conservative approach with the data analysis and selected a test that could account for both small sample sizes and normality violations. This supported a greater opportunity to discover the differences between the pre and post-treatment variables. Therefore, the Related Samples Sign Test and the Related Samples Wilcoxon Signed-Rank Test were used (Devore, 2004).

Table 24 reports the results from these tests at a 95% confidence level with respect to an indicated null hypothesis between sample-pair variables.

Table 24: Related Samples Sign and Wilcoxon Signed-Rank Test Results

Pair	Null Hypothesis	Test	Test Results		Decision
1	Median of differences between Exp. and Baseline Total Walking Steps equals zero.	Related Samples Sign Test	**Total N:**	19	Reject the null hypothesis
			Test Statistic:	15.000	
			Standard Error:	2.179	
			Standardized Test Statistic:	2.294	
			Asymptotic Sig. (2-sided test):	.022	
			Exact Sig. (2-sided test)	.019	
		Related Samples Wilcoxon Signed-Rank Test	**Total N:**	19	Reject the null hypothesis
			Test Statistic:	174.000	
			Standard Error:	24.850	
			Standardized Test Statistic:	3.179	
			Asymptotic Sig. (2-sided test):	.001	
2	Median of differences between Exp. and Baseline Calories equals zero.	Related Samples Sign Test	**Total N:**	19	Reject the null hypothesis
			Test Statistic:	15.000	
			Standard Error:	2.179	
			Standardized Test Statistic:	2.294	
			Asymptotic Sig. (2-sided test):	.022	
			Exact Sig. (2-sided test)	.019	
		Related Samples Wilcoxon Signed-Rank Test	**Total N:**	19	Reject the null hypothesis
			Test Statistic:	173.000	
			Standard Error:	24.845	
			Standardized Test Statistic:	3.140	
			Asymptotic Sig. (2-sided test):	.002	
3	Median of differences between Exp. and Baseline Distance (miles) equals zero.	Related Samples Sign Test	**Total N:**	19	Reject the null hypothesis
			Test Statistic:	15.000	
			Standard Error:	2.179	
			Standardized Test Statistic:	2.294	
			Asymptotic Sig. (2-sided test):	.022	
			Exact Sig. (2-sided test)	.019	
		Related Samples Wilcoxon Signed-Rank Test	**Total N:**	19	Reject the null hypothesis
			Test Statistic:	174.000	
			Standard Error:	24.850	
			Standardized Test Statistic:	3.179	
			Asymptotic Sig. (2-sided test):	.001	
			Test Statistic:	104.000	
			Standard Error:	15.835	
			Standardized Test Statistic:	3.252	
			Asymptotic Sig. (2-sided test):	.001	

The results from Table 24 indicate that the treatment (i.e., persuasive messages formed from the combining of physiological and microenvironment data) positively impacted physical activity behavior with each variable-pair's null hypothesis indicating rejection for each test used. Therefore, the following was concluded for the overall study hypothesis:

Null Hypothesis (H0): *Event-driven persuasive messages formed from the combining of* physiological and microenvironment data *will not increase physical activity levels of a user of the BMSS.*	**Reject**
Alternate Hypothesis (H1): *Event-driven persuasive messages formed from the combining of* physiological and microenvironment data *will increase physical activity levels of a user of the BMSS.*	**Accept**

6.3 Living Pattern Change Analysis and Results

While a formal hypothesis was not set regarding the impact of persuasive messages on living pattern change, differences between pre and post-treatment periods were expected since changes in physical activity were believed to impact the daily living routines of a person.

The daily living pattern of the study participant was collected using the BMSS in both baseline and experiment periods. Both periods were evaluated on the differences between means based on a sample size of 14 days (N=14). This sample size was selected to include all 14 days in the baseline period and the first 14 days in the experiment period where the study participant did not spend partial or whole days away from her home. Therefore, all hours in a 24-hour cycle were evaluated. To understand the impact of persuasive messages on living pattern change, a null hypothesis was posited that living pattern means between baseline and experiment periods were equal (this co-established an alternative hypothesis that means were not equal). Since the direction of living pattern change (e.g., changes in room presence, movement between rooms, time sitting on the couch and watching TV, meal preparation activities, sleep times including interrupted sleep patterns, etc.) was unknown, a two-tailed test on the null hypothesis was selected. The results are shown in Table 25 and indicate that the null hypothesis cannot be rejected with a two-tail critical value of 2.160 for all rooms with the exception of the kitchen and bathroom. It is noted that the two-tail critical value was selected from a standard t-critical values distributions table (Devore, 2004) using a degree of freedom (df) equal to 13. A test statistic value greater than 2.160 supports the rejection of the null hypothesis and a value less than the two-tail critical value supports its acceptance. Furthermore, all variables evaluated in the t-test met normalicy, as reported in Appendix J.

Table 25: Living Pattern Results (Room Presence and Activity in Hours)
(Baseline vs. Experiment Periods)

	Dining Room		Kitchen		Bedroom		Bed		Bath Room		Living Room		Outside Home		Couch-TV	
Day	**B**	**E**	**B**	**E**	**B**	**E**	**B**	**E**	**B**	**E**	**B**	**E**	**B**	**E**	**B**	**E**
1	1.15	2.02	1.73	1.37	10.62	8.53	10.03	7.52	1.27	1.63	5.07	8.48	4.12	1.92	4.13	5.17
2	0.55	1.63	1.87	1.03	9.45	10.71	8.88	9.63	1.50	1.17	6.38	8.91	4.20	0.48	3.23	3.03
3	2.37	1.88	1.60	1.10	10.33	9.58	9.50	8.98	1.55	0.80	8.02	9.03	0.08	1.55	6.93	5.95
4	2.87	1.87	1.43	1.13	10.43	10.85	9.57	9.95	1.30	0.98	4.60	5.40	3.32	3.72	3.72	4.30
5	2.63	3.47	0.80	0.92	10.70	8.88	9.80	7.95	1.68	1.30	5.40	5.62	2.72	3.77	4.80	4.20
6	2.08	2.90	1.92	1.42	8.20	9.47	7.58	8.78	1.67	1.47	8.58	3.98	1.50	4.72	7.67	2.77
7	2.08	1.55	1.10	1.05	10.02	10.07	9.18	9.72	1.08	1.28	4.58	6.68	5.07	3.32	4.18	5.03
8	3.28	3.67	1.68	1.47	8.55	8.40	7.92	8.15	1.33	1.22	7.17	8.87	1.93	0.32	5.57	7.83
9	1.00	2.07	2.27	1.02	9.12	9.12	8.05	8.58	1.43	0.98	5.70	5.97	4.42	4.80	4.68	5.32
10	0.88	2.42	1.75	1.23	10.30	9.90	9.78	9.10	1.75	1.42	7.53	4.23	1.73	4.77	6.32	3.37
11	1.68	2.33	1.30	0.73	11.38	8.88	10.53	8.17	1.18	1.07	5.52	5.95	2.87	4.98	4.67	5.42
12	1.90	1.50	1.22	1.77	7.88	8.42	7.25	7.63	1.45	1.13	6.68	4.72	4.82	6.42	5.42	3.35
13	2.00	2.87	1.97	1.73	9.52	9.28	8.85	7.95	1.18	1.43	4.87	6.50	4.43	2.13	3.87	5.83
14	4.45	2.38	1.82	1.32	7.73	11.10	7.17	8.23	1.32	1.28	8.57	7.87	0.07	0.00	7.67	5.00
AVG	**2.07**	**2.33**	**1.60**	**1.23**	**9.59**	**9.51**	**8.86**	**8.60**	**1.41**	**1.23**	**6.33**	**6.59**	**2.95**	**3.06**	**5.20**	**4.75**
SD	**1.04**	**0.68**	**0.39**	**0.30**	**1.15**	**0.90**	**1.09**	**0.79**	**0.20**	**0.22**	**1.44**	**1.77**	**1.68**	**2.01**	**1.45**	**1.37**
df	**13**		**13**		**13**		**13**		**13**		**13**		**13**		**13**	
t Stat	**0.962**		**3.259**		**0.1835**		**1.667**		**2.245**		**0.421**		**0.201**		**0.201**	
Null Hypo.	**Accept**		**Reject**		**Accept**		**Accept**		**Reject**		**Accept**		**Accept**		**Accept**	

While the indicators in each variable do not validate changes in living pattern when assessed as an average of time per day, observational assessment does indicate that changes did occur when selected variables between both baseline and experiment periods are evaluated as an average of presence or activity per hour.

Figure 21 reports the graphical representation of the study participant's living pattern as an average by hour for the bedroom, dining room, kitchen, and bathroom.

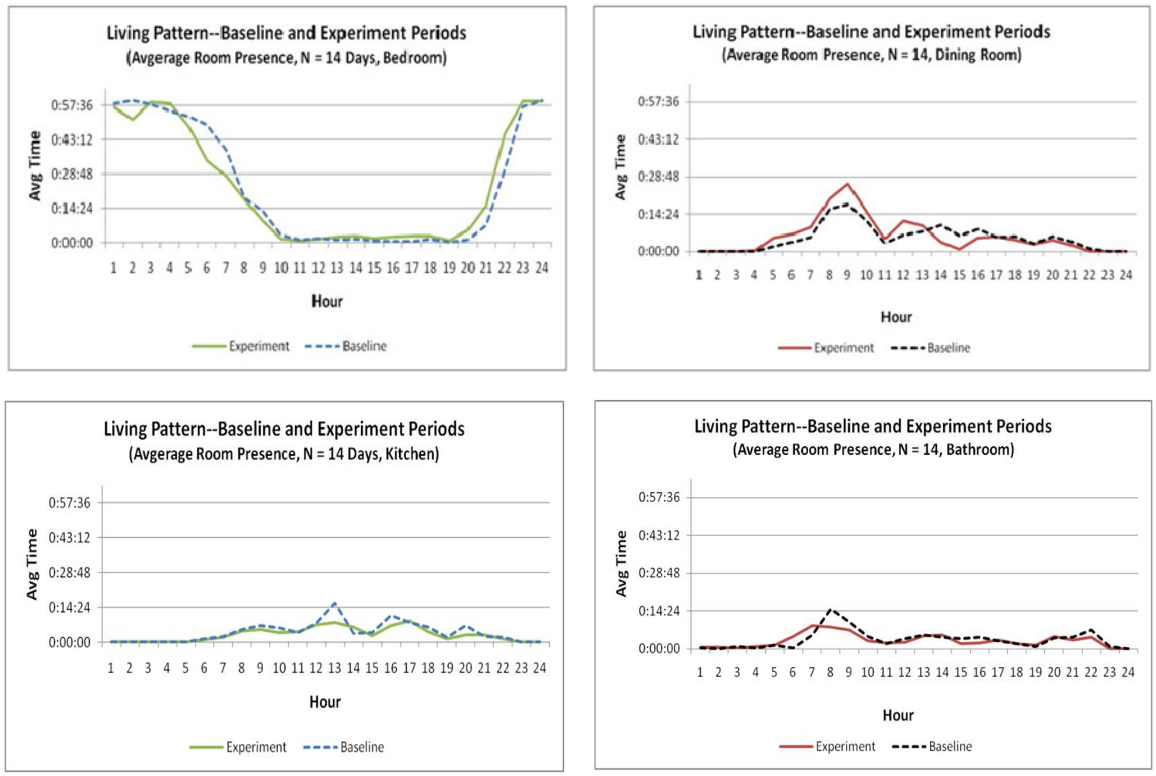


Figure 21: Living Pattern Results by Hour (All rooms except Living Room)

Observational analysis of these four rooms indicates minimal change in activity (i.e., similar patterns and peak differences less than 10 minutes) with the exception of room presence in the dining room. The results for this room suggest that change did occur throughout the day with the greatest indication of change occurring between the hours of 7:00 to 9:30 a.m. In a post-study interview, the study participant stated that through renewed participation in various hobby clubs offered in her community, she would often sit at her dining table and work on her hobby crafts. The post-study interview identified that the engagement driver in these hobby clubs was the daily persuasive messages that listed those activities that occurred within her senior living community. The study participant stated that knowing which activities were occurring on a particular day encouraged her to get out of her home and to become more engaged in social and hobby activities. This finding supports the belief that information rich persuasive messages can have an impact on changing human behavior.

Additional support that living pattern changes have taken place between pre and post-treatment periods are further seen in the data associated with the living room and outside the home times. Figure 22 reports the graphical representation of the study participant's living pattern as an average by hour for these constructs.

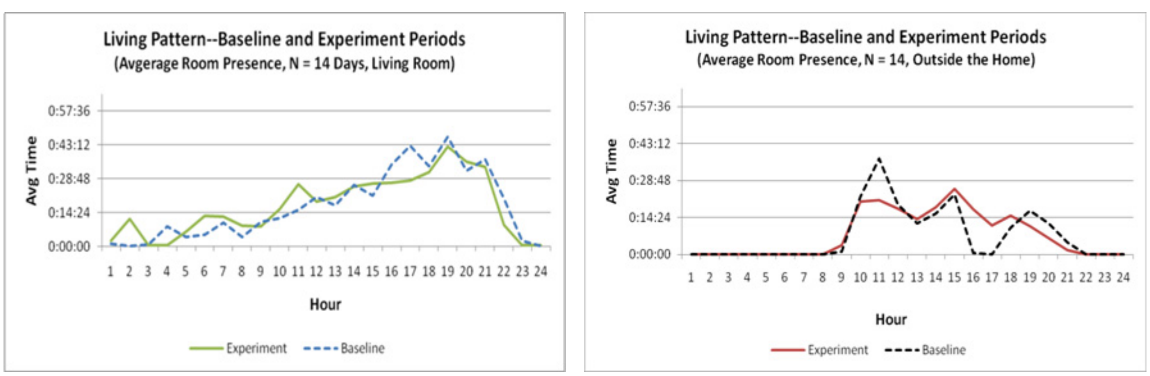


Figure 22: Living Pattern Results by Hour (Living Room and Outside Home)

While the general graph patterns are similar between both periods, observational analysis indicates a greater pattern variance between the pre and post-treatment variables during the approximate hours of 9:00 to 11:00 and 14:30 to 17:00. In the case of the living room construct, this variance may occur from changes in the movement within the room (i.e., room presence) or from the engagement of sitting on the couch and watching TV for extended periods of time (i.e., room activities). Observational analysis of Figure 22 indicates that the living room variable changed in relationship to the time spent outside the home during these hours. To understand if the change in the living room construct was presence or activity driven, the couch-TV and outside the home patterns were plotted as an average by hour and reported in Figure 23.

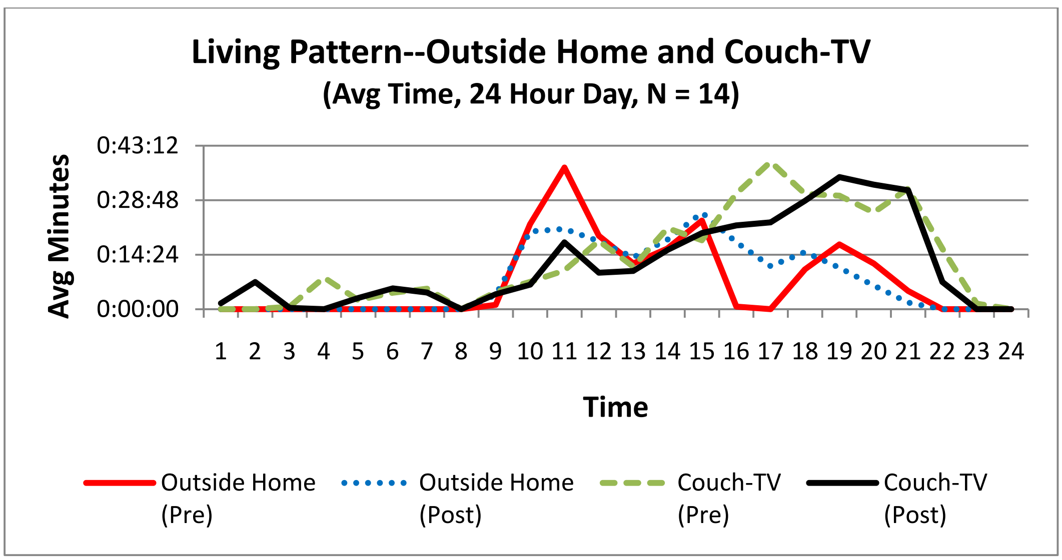


Figure 23: Living Pattern Results by Hour (Outside Home and Couch-TV Times)

Observational analysis of the time between 9:00 and 11:00 indicates that the study participant spent more time outside the home in the baseline period while the average time spent sitting on the couch and watching TV were approximately equal between both periods. This finding does not provide indications as to whether the change(s) in living room pattern was presence or activity driven. To understand what occurred during this time period, a post-study interview was conducted. The study participant stated that she shifted her morning attendance in various church events to the evening hours in the experiment period to free up her time to work on her new hobbies. While this knowledge was not known during the experiment period, having this information may have facilitated its use in reinforcing the persuasive messages that were delivered during this period.

Observational analysis of the graphs for the approximate hours of 14:30 and 17:00 yields indicators that show the study participant decreased her time spent seating on the couch and watching TV while increasing her time spent outside the home. Analysis of total daily walking steps during this time period indicated a higher engagement and therefore suggests that the change in the living room pattern was *activity* versus *presence* driven during this time period. This finding supports the beliefs and observations that persuasive messages can impact a change in living pattern. However, further study with a larger sample size is needed to strengthen this conclusion.

6.4 Behavior Change Analysis and Results

With a better understanding from a qualitative perspective of how persuasive messages may impact behavior change, results from a pre and post-treatment survey were used to determine the direction and amount of change in physical activity behavior associated with study's selected behavior change theories: (1) stage of changes, (2) self-efficacy, (3) motives of physical activities, and (4) self-determination (the reader is referred back to Chapter 2 for a discussion of these behavior change models). Formal statistical analysis methods were not used due to a sample size of one. Analysis was limited to the calculation of the percent difference between pre and post-treatment questions associated with each behavioral component of interest.

Table 26 summarizes the results from all instruments used to identify changes in pre and post-study behavior change. The reader is referred back to Chapter 5 for an explanation of the instruments used in the table.

Table 26: Behavior Change Results

						Pre	**Post**
Instrument	**Component**	**Question**	**Pre**	**Post**	**Precontemplation**		
PASCO	Stages of Change	1	N	Y	**Contemplation**	Y	
		2	Y		**Preparation**		
		3	N	Y	**Action**		Y
		4	N	N	**Maintenance**		

Instrument	Component	Question	Pre	Post	% Change
Decisional Balance (DBS)	Pro's	5	3	4	33.33%
		7	2	4	100.00%
		9	2	5	150.00%
		11	3	4	33.33%
		13	3	4	33.33%
	Con's	6	3	1	-66.67%
		8	3	1	-66.67%
		10	4	2	-50.00%
		12	2	1	-50.00%
PESES	Self-Efficacy	14	2	3	50.00%
		15	1	3	200.00%
		16	2	4	100.00%
		17	1	3	200.00%
		18	2	3	50.00%
MPAM-R (Motivation Type)	Interest/ Enjoyment	20	3	7	133.33%
		25	3	6	100.00%
		29	3	8	166.67%
		36	4	7	75.00%
		40	2	8	300.00%
		44	2	7	250.00%
		47	4	7	75.00%
	Competence	21	3	5	66.67%
		22	3	4	33.33%
		26	4	6	50.00%
		27	2	4	100.00%
		30	3	6	100.00%
		32	2	6	200.00%
		43	3	7	133.33%
	Appearance	23	7	7	0.00%
		28	7	8	14.29%
		35	7	8	14.29%
		38	7	7	0.00%
		42	7	7	0.00%
		45	4	7	75.00%

Instrument	Component	Question	Pre	Post	% Change
MPAM-R (Motivation Type)	Fitness	19	6	8	33.33%
		31	4	7	75.00%
		34	3	6	100.00%
		37	8	9	12.50%
		41	8	8	0.00%
	Social	24	4	5	25.00%
		33	2	6	200.00%
		39	4	6	50.00%
		46	6	6	0.00%
		48	3	7	133.33%
BREQ (Regulation State)	External	49	4	2	-50.00%
		53	3	2	-33.33%
		57	3	2	-33.33%
		61	4	2	-50.00%
	Introjected	50	2	4	100.00%
		54	1	3	200.00%
		58	2	3	50.00%
	Identified	51	3	4	33.33%
		55	2	4	100.00%
		59	2	4	100.00%
		62	1	5	400.00%
	Intrinsic	52	2	3	50.00%
		56	3	4	33.33%
		60	2	4	100.00%
		63	2	4	100.00%

Differences between pre and post-treatment results—as measured by questions based on the PASCO survey instrument—indicate that the study participant moved from a *contemplation* stage of change where physical activity engagement was intended but not acted upon to an *action* stage of change where physical activity engagement dominated the new behavior. Research indicates that stages of change are cyclic over time with progression and/or regression through the stages occurring before a behavior change is achieved or sustained (DiClemente, 1993; Mullan & Markland, 1997). Due to a limited experiment period of two months, conclusions on sustainability or cyclically patterns of change cannot be drawn.

Progression through the stages of change has been shown to be supported by the decisional balance, or internal decision process, of an individual as they weigh the pros and cons of activity engagement (Marcus, et al., 1992; Velicer, et al., 1985). Results from the DBS-based questions appear to support this finding with the indications that the pros increased while the cons decreased, as the study participant moved through the stages of change.

Results from the PESES-based questions (Brown, 2005; Schwarzer & Renner, 2004) indicate a positive change in the study participant's self-efficacy to engage in physical activity. This supports previous research that self-efficacy increases as an individual moves from lower to higher stages of change (Buckworth, et al., 2002; Leenders, et al., 2002). A post-study interview identified that the study participant felt empowered by her physical activity gains and thus reinforced her physical activity engagement and continuation.

To understand the motives of why a person engages in physical activity, the instrument known as the Motives for Physical Activity Measure—Revised (MPAM-R) was used. The MPAM-R survey identifies motives for physical activity against five constructs: *Interest/Enjoyment*—motivated from the activity itself, *Competence*—belief that one is capable in activity engagement, *Appearance* and *Fitness*—benefits from the outcome of an activity, and *Social*—where connections to family and friends are established or expanded (Ryan, et al., 1997).

Results from the questions based on the MPAM-R survey indicate that positive change in all five constructs occurred with the greatest change noted in the Interest/Enjoyment and the Competence constructs. A post-study interview supported these findings with the study participant's statement of her changing beliefs of holding greater confidence to engage in higher physical activity and her shifts in internalization that exercise was enjoyable, as opposed to an activity that was done to gain an appearance or fitness benefit alone. A post-study interview also demonstrated changes in the social construct, as the study participant stated that she would often walk with friends in her community, even though this motive was not identified as a driver for physical activity engagement in the pre-treatment outcomes.

Results from the questions based on the BREQ instrument (Mullan & Markland, 1997; Mullan, et al., 1997) indicate a behavior shift in self-determination between pre and post-treatment data. Pre-treatment results showed that the study participant to be predominately externally regulated and close to amotivation regulation where motivation for physical activity was weak. Post-treatment results displayed a decreased change in external regulation and positive change towards higher extrinsic regulation states. This evidence indicates that the study participant moved to a behavior that supports motivation for physical exercise derived from a perceived benefit received and supports prior research that exercise regulation can differentiate in predicting motivational consequences (Fredrick & Ryan, 1993; Ingledew, Markland, & Medley, 1998).

6.5 Conclusion

This study looked at the impact of persuasive messages on physical activity encouragement with a study conducted in Southern California during the winter season of 2009-10. Temperatures during this period were moderate (e.g., the average day-time temperatures in December and January were 69 and 68 degrees Fahrenheit, respectfully (Weather.com, 2010)). With the exception of six days of rain (out of 49 days tracked) where the study participant was limited in outdoor physical activity opportunities, weather did not appear to be a mitigating factor in limiting physical activity engagement. This conclusion could not be reached if the study had been conducted in a region where weather is more extreme and would have a material impact on the study participant's ability to engage in outdoor physical activity.

An initial concern at the start of the study was the question regarding the length of time needed to establish a baseline of physical activity and living pattern information. A decision was made by the researcher to set the baseline period for one month since prior studies were not available to determine the minimum number of days needed. Analysis of the captured baseline data indicated that a minimum of four days is reasonable to establish the physical activity and living pattern of a person, but further research is needed to verify this conclusion. Given this belief, the baseline established in this study was deemed reasonable as was the use of the test results chosen from the experiment period for understanding the changes in physical activity and living pattern behavior.

The experiment phase was conducted immediately following the baseline period with the study participant receiving a treatment (i.e., a persuasive message formed from the combining of physiological and microenvironment data) during all days that she resided in her home, versus the times that she spent away and living with family where living pattern monitoring and persuasive message delivery was not possible. This equated to 33 days where the study participant received a treatment and 16 days where she did not (total days in the experiment period was 49 days). Results from the first 19 days of treatment, which was selected to equal the total number of resident days from the baseline period, indicate that the study participant was able to change and improve her daily physical activity by 61% (e.g., 5000 post-study average daily steps versus 3103 pre-study average daily steps). Total walking steps for all days where the study participant could be impacted by a persuasive message (i.e., 33 days) averaged 5061 steps verses an average of 3516 total walking steps when the study participant resided outside the home and in residence with her family (i.e., 16 days). This difference in walking steps further strengthens the indication of the positive impact of persuasive messages on changing physical activity behavior.

Changes in physical activity were noticed immediately after the start of the experiment (e.g., the study participant averaged 5394 daily walking steps at the end of week one versus 3103 steps in the pre-treatment period). In a post-study interview, the study participant stated that through the persuasive messages she never knew how little she walked and how by having that information provided her with an incentive to increase her walking activity. She also stated that seeing her day-to-day physical activity improvement provided her with the motivation for physical activity continuation. This finding reinforces the belief that once an individual moves to action, a person's internalization of the cost and benefits of exercise begin to change with the pros outweighing the cons of exercising and thus further supports the individual's movement towards the intended behavior change goal (Plotnikoff, et al., 2001).

While this study used an information system as a tool for encouraging an active lifestyle, it was discovered that it could also be used as an alert of potentially negative health problems. Through daily monitoring of the study participant's physical activity levels, it was noticed by the researcher that her walking activity decreased in the last two days of the experiment (e.g., her total average daily walking steps for the last two days were 800 steps lower than normal). Upon communication of this finding to the study participant, it was identified that she was experiencing knee pains during this period. The researcher immediately stopped the study instead of finishing the last week of the planned experiment schedule and instructed the study participant to forego physical activity and to see a physician if her knee pains did not subside. Since more than 19 days of experimental data had already been collected, early stoppage of the experiment was not viewed as detrimental to the exploration put forth in this study. Furthermore, through regular monitoring of the study participant's blood pressure, it was noticed that her readings were above normal in week four of the experiment (i.e., systolic: 166, diastolic: 76). The immediate reporting of this finding to the study participant prompted her to see a physician, who adjusted her blood pressure medication. Subsequent weeks showed that normal blood pressure readings (i.e., 120/80) were reached.

In this study, physical activity was targeted as the primary change variable. Both the study participant's physical activity and her living pattern were determined with the use of a Behavior Modification Sensor System (BMSS). Physical activity measurement was done using a pedometer that the study participant wore during all waking hours (i.e., she would remove the pedometer before bedtime and would re-engage its use upon waking). Since the study participant did not wear the pedometer during all hours in a 24-hour period, daily physical activity between the approximate hours of 11 p.m. and 5 a.m. was not captured. Analysis of the study participant's daily living pattern often showed that she would wake up in the middle of the night to use the bathroom. Since physical activity during these hours was minimal, the impact on overall physical activity assessment in a day was ignored. However, it does represent a limitation on total physical activity determination as reported in this study.

Changes in physical activity were also reinforced by change indicators in living pattern. As the study participant increased her walking activities, changes in room presence (i.e., time spent in her home environment) and selected living activities (e.g., watching TV) were observed in the data. As the study participant changed her behavior from a limited mobility state to one that incorporated more walking, the results showed that time spent outside the home increased by approximately 15 minutes each day, while the time spent sitting and watching TV decreased by approximately the same amount of time. This change typically occurred on most days between 2:30 to 5:00 p.m. A post-study interview identified that this time was typically used for dedicated walking exercise and supports the belief that the study participant moved to an *action* stage of change where an individual is engaged in a change program (Glanz, et al., 1994).

The BMSS was designed to capture living routines of a single user that lives alone. However, limitations in the system design did exist. The BMSS could not automatically differentiate between the interaction of the study participant and any guest that might have entered the study participant's home. Any guest that entered the study participant's home created false sensor readings and therefore skewed the intended living pattern of the study participant. This system limitation required that any day a guest visited, its data had to be scrubbed and removed before the associated day's living pattern of the study participant could be analyzed. Since 14 days of living pattern were selected for analysis, and those days selected did not include guest visitation, this factor did not impact the results or conclusions of the study. This cannot be said for the impact of the presence of a cat that lives with the study participant.

While the conclusions associated with the living patterns captured in this study were for the study participant only, it is noted that assumptions were made as to which triggered sensor reading was associated with the study participant and to which was associated with the cat (or any guest that entered the home) during the daily scrubbing of all living pattern data. Since the cat could only trigger a room presence sensor that determined when someone or something entered or exited a room (i.e., the cat could not open the refrigerator, open the food cabinet, open the microwave, or trigger a pressure pad sensor located in the couch or bed), the determination of the study participants living pattern relied upon looking at activity within the home to support the exclusion of the impact of the cat on its results. The use of a log book that was completed by the study participant prior to beginning the experiment period supported the identification of daily activities and aided in building the study participant's daily living pattern. Since the analysis of the data looked at averages of room presence and room activity over time, the validity of the living patterns of the study participant reported in this study is reasonable even if small errors were made in extracting out the impact of the cat on the final results.

Living pattern information was used to understand the behavior change of the study participant and to reinforce the persuasive messages that targeted daily or weekly walking goal improvement. Weekly physical activity goals were established by the researcher without input from the study participant. A weekly goal was initially set that equaled a three to six percent improvement week-over-week with a daily goal set to support the weekly goal being met. Goal establishment proved difficult with some weeks showing that the study participant far exceeded a weekly goal and other weeks showing far less (e.g., the goal for week one was 3450 daily steps and the study participant averaged 5394 steps; the goal for week five was 6000 daily steps and the study participant averaged 5427 steps). As each new week progressed, it appeared that the study participant was reaching a steady state of physical activity of between 4800 to 5500 daily walking steps. Shifts in the goal establishment strategy after the first month of the experiment changed to one that attempted to maintain this progress with a week-to-week increase of one to two percent used as a new goal. This change in goal strategy may have helped to reduce any *learning effects* associated with the original goal strategy by the study participant but further research is needed to eliminate this factor on the study results and its conclusions.

Since the type of persuasive message that was delivered to the study participant (e.g., a guilt-based message was used when the study participant did not meet a daily walking goal and a praise strategy when met) may have impacted physical activity encouragement, setting realistic goals was determined to be important. While this study did not look at the effect of guilt versus praise on physical activity encouragement, future studies may warrant the participant's involvement in the goal establishment process to possibly maximize the effectiveness of a message strategy.

Delivery of all daily persuasive messages were structured in an electronic newspaper format and displayed on a large LCD that was placed in a visible location within the study participant's home. The persuasive message structure proved effective with a post-study interview identifying that the study participant read each day's message. The study participant stated that she would read each day's message to learn about the daily weather forecast and any social events that were occurring in her community. She also stated that she would read each day's message to see her walking progress, as she felt empowered when she met or exceeded a daily walking goal. This finding reinforces the researcher's position that a person's self-efficacy, or confidence to engage in a behavior, can affect their ability to perform an action. This position is based on the belief that if a person feels that they can perform a behavior, engagement in the behavior is often high. Otherwise, engagement in the behavior is often low (Leenders, et al., 2002).

While a daily message often included brief statements of the health benefits of walking and summaries of living pattern activities, their effect on physical activity encouragement could not be clearly delineated. The study participant stated that she already knew about the health benefits of walking. Seeing how many hours that she slept or moved about her home per day was of moderate importance to her. She did acknowledge that knowing the amount of time spent watching TV provided her with an incentive to increase her physical activity, as she was not aware of the amount of time that she spent in this activity prior to beginning the experiment. This may indicate that monitoring activity context is more effective than monitoring activity outcome but further study is needed to validate this claim.

One component of a persuasive message that appeared to be beneficial in encouraging physical activity was the usage of family pictures that were embedded into a message for the purpose of reinforcing the message strategy. Pictures that showed her happy family (individual or as a group) were incorporated into a message when the study participant met a daily walking goal and opposite pictures were used when not. In a post-study interview the study participant stated that she enjoyed seeing them as it made her "feel more connected to her family" when she was alone. The study participant acknowledged that seeing her family happy encouraged her to continue with walking as a way to improve her health. This finding supports the position that *relatedness*, or the connectedness or closeness that an individual feels to others, when combined with the psychological needs of *autonomy* and *competence*, can create the self-determining conditions needed for effective motivation and further supports behavior change associated with physical activity (Ryan & Deci, 2000b).

Regardless of the use of family pictures or not, each daily message was structured with a balance of textual and visual cues and included to reinforce the message theme. These cues included such textual statements as *"Great Job…", "Keep up the good work…",* or *"You did not meet your walking goal today…What happened?"* Visual cues of smiley faces, sad animals, or other visuals that expressed the praise or guilt strategy were added to reinforce the intent of the persuasive message. The strengths of each cue-type on physical activity encouragement were not evaluated. Therefore, conclusions of its impact on the study outcomes cannot be made. Future studies that look at persuasive messages as a method to change human behavior should consider cue-type as a mediating factor.

Findings from this study posit that understanding and using a person's daily living pattern may allow for more information rich and stronger persuasive messages. Building messages that included how much time was lost to TV watching, the daily events offered in the study participant's apartment complex (e.g., art classes, social gatherings, etc.), or messages that reported her recent sleeping patterns, added to the strength of the persuasive message over the reporting of daily walking steps alone. While this study looked at changing physical activity behavior for two months only, the findings indicate that the use of the Behavior Modification Sensor System described in this study can create positive behavior change and further supports work being done in the new field of persuasive computing research.

CHAPTER 7 – CONCLUSION

7.1 Introduction and Key Findings

This research explored a new frontier called *"Persuasive Sensing"* that brings together advances happening in two fields, namely wireless sensor networks and persuasive computing technology. Their combination has wide spread implications and applicability to a growing population suffering from chronic diseases such as cancer, diabetes, and Alzheimer's. Persuasive sensing also has implications and applicability to preventative healthcare programs where changing lifestyle behavior can support healthier living.

Persuasive sensing allows for the collection of information about a person that was previously unavailable with older technology. Today, the challenge is less on how to collect this data and more on how to find meaning from it. Wireless sensor networks often provide the hardware and software foundation for applications designed and used to alter human behavior without deception or coercion. Understanding the infrastructure that makes up a wireless sensor network and the intelligence that can be extracted from it were the goals of this research.

Wireless sensor networks consist of ultra-small and autonomous devices that are developed with limited computational, power, and communication capabilities. Often deployed in an operating environment in high numbers, these devices use sensors to capture various parameters of interest and are required to engage in network formation and data traffic functions without the support from an external aid. Critical to the security of a wireless sensor network is the need to establish secure communication links. This requires the distribution and use of a cryptographic key.

This study posited the Price-Kosaka-Chatterjee Key Pre-Distribution Algorithm (referred to as the PKC Algorithm). Investigation of this novel algorithm yielded results that suggest it provides greater network security and lower memory requirements but slightly higher energy cost over three dominate key pre-distribution schemes used today. How to establish a secure wireless sensor network was part one of a two-part exploration. The second part explored the use of a Behavior Modification Sensor System (a prototype of a persuasive computing system) designed to extract knowledge from its use. The Behavior Modification Sensor System drove a strategy and intent promulgated to change physical activity behavior of one user. Due to a limited understanding from current research of each part, both are pieces of a whole within persuasive sensing that needed to be first studied separately before they can be combined in future investigations.

Human beings have been shown to follow an approximately 24-hour fluctuating living rhythm. This rhythm consists of all the activities that occur when a person transverses their daily lives from wake through sleep. Wireless sensor networks can be used to collect data from environmental and body-wearable sensors that are fused together to understand a person's activity rhythm or living pattern, as referred to in this study. Knowledge culled from this information can support better decision making and healthcare responses by providing the necessary information needed by its stakeholders to make good healthy living choices or treatment prescriptions.

This research explored a question of "*How can we effectively use technology to improve health and long-term healthy living?*" and provided novel ideas of how one persuasive computing system (i.e., a Behavior Modification Sensor System) could be used to support health through physical activity improvement. Physical activity was targeted as it is a major risk factor that compounds healthcare and its associated cost. Findings indicate that information rich persuasive messages built from the integration of a persons living pattern and their physiological states—and captured by the Behavior Modification Sensor System—can affect physical activity behavior. Findings further reinforce a position that motivation to engage in physical activity and barriers that limit its engagement can be changed with the use of the Behavior Modification Sensor System that is put forth in this dissertation.

7.2 Research Implications

The Behavior Modification Sensor System, while limited in this research to studying behavior change associated with physical activity, can be extended to other health domains within disease prevention and health management—e.g., alcoholism, diabetes, hypertension, or other health problems. Its use also has tremendous potential to assist elderly users to live more independent lives by providing technology that can identify anomalies in health, changes in living behavior, or other health impediments that can be used to trigger alerts for faster responses by healthcare providers than without its use. With the increased growth in the aging population, combined with the rise in healthcare costs, improving health and allowing people to age in a place that they call home is an important social goal. A system like the Behavior Modification Sensor System in this dissertation is posited as a vehicle that can be used to meet this goal and to aid in reducing the overall cost on the healthcare system.

While wireless sensor networks and other ad-hoc persuasive computing systems have been previously used in healthcare applications, the work put forth in this research of providing persuasive feedback based on the mining of living pattern data and benchmarking it against "normal" living activity is novel. This research and its findings expand new knowledge and possibilities with broad implications in health and healthcare management:

1. **Network Security**. Wireless sensor network applications that require secure communications on sensor nodes with computational, memory, and power constraints can benefit from the use of the PKC algorithm. Since the PKC algorithm is a symmetric-based cryptographic key distribution method, it does not require a unique key (i.e., a public-private key as in asymmetric cryptographic systems) between two or more nodes to establish a secure link. This reduces the complexity needed to establish a secure network. Due to the indications of its greater security and operational benefits, the PKC algorithm is an optimal choice

to support applications that require secure and confidential wireless sensor network operations. Both are critical when dealing with health information.

2. **Persuasive Computing Technology**. Applications that require information rich activity context driven from an understanding of *"why"* versus *"when"* behavior occurs can benefit from this study. The Behavior Modification Sensor System represents a tool that supports highly granulated information about a person's living pattern to be obtained and used to interpret behavior context needed to build an effective persuasive message response. Prescriptive messages that recommend action of positive behavior change or preventative messages that alert of possible negative health behavior are outputs of the system.

3. **Frameworks.** Models and frameworks developed in this research can guide future persuasive computing applications that require secure technology. At the "infrastructure" and "intelligence" levels, an algorithm to distribute keys needed to establish a secure wireless sensor network, a framework for the development of a persuasive computing system that is grounded by a wireless sensor network, a framework for the generation of persuasive messages that integrates human living pattern and physiological states, and a model for message presentation are put forth in this research. Furthermore, the application of the Behavior Modification Sensor System can support a greater understanding of behavior change context and forewarn of future health problems through detection of anomalous changes

in a persons living pattern that is currently non-existent or limited with today's current technology.

4. **Behavior Change**. The field of psychology is rich with theories and models that define human behavior, its components, and guidelines that can be used to affect/effect its change. This study discussed an application that explored human behavior and its change through support with persuasive computing technology. The findings from this research can be used to support a greater understanding of current behavior change theories or to provide a vehicle to explore new frameworks, models, or ideas posited by researchers working in this broad domain.

5. **Research Methods**. Design Science guided both the development and the analysis of the PKC algorithm and the Behavior Modification Sensor System. The findings in this research further validate the Design Science methodology as an alternative research approach over the traditional behavioral science paradigm that is typically adopted by researchers in the information systems community. The research approach included the design steps taken, the constructs defined, and the frameworks established by the researcher. Each can be used by future researchers to explore new ideas built from the findings in this study, regardless of the research methodology adopted.

7.3 Research Limitations

This research was exploratory with a goal to first understand the efficacy of a novel key pre-distribution scheme and second to understand the design, development, and implementation of a Behavior Modification Sensor System. Both touch upon the field of wireless sensor network research. While many of the limitations were eliminated or minimized in the research design, this research was not limitation free.

The exploratory investigation of the novel key pre-distribution algorithm was limited to a mathematical analysis only. Evaluation by other methods—e.g., network simulation or test bed implantation—was not done. The findings obtained represent what should occur when implementing the algorithm in a fictitious network example and not what will occur in an actual real-world scenario. Due to the exploratory nature of this research, one that needed to first understand the sufficiency of the algorithm, this limitation was acceptable but does warrant future investigation to confirm the findings obtained and discussed.

The use of a wireless sensor network to support a persuasive computing system (i.e., a Behavior Modification Sensor System) needed to investigate the feasibility of capturing human living patterns and for the integration of such patterns with physiological states posited to support the building of information rich persuasive messages that targeted behavior change associated with physical activity is another limitation. Investigation on other healthy living components—e.g., diet and nutrition, emotional/mental wellbeing, or other health conditions including diabetes, smoking cessation, or alcoholism—was not done. This limitation was appropriate and needed to first understand the design and use of the Behavior Modification Sensor System before more extensive research questions can be asked and targeted health applications done.

The Behavior Modification Sensor System was limited to a microenvironment—i.e., a home space, and did not consider the impact of activity in a macroenvironment or outside the home. This limits the study's conclusions to one environmental domain where the combination of both may provide greater information granularity and better determination of the affect/effect of persuasive messages on behavior change.

This research consisted of a study that was structured to deliver a persuasive message once per day. It represented an average of prior-day activity (both living pattern and physiological states) and not activity or physiological outcomes at the moment of activity occurrence. The current design of the Behavior Modification Sensor System does not implement automatic analysis and message generation in real-time and thus could not respond when an event occurred. For example, non physical activity events like sitting on the couch and watching television for extended periods of time was captured by the Behavior Modification Sensor System but the manual cycle to download, analyze, and respond with a persuasive message was limited to an after event occurrence (typically 24 hours after the event) and not a response at the time of occurrence. Prior research has suggested that the delivery of a persuasive message(s) when aligned with context provides a stronger driver for changing behavior (Fogg, 2003; Ulm, 2007). Future research is needed to develop an autonomous system that will support this alignment.

All persuasive messages in this study were structured in an electronic newspaper format and used a mixed-method of visual and textual cues to reinforce the guilt or praise message strategy that was adopted to drive physical activity behavior change. Use of other delivery channels—such as simple SMS messaging on a cellular telephone, or other message cues (e.g., audio, multimedia, or interactive navigation webpage's) was not included. This limits the study conclusions to one delivery-type and opens a question of the optimal message structure and message format to future research.

Behavior change was assessed against a subset of behavior change models available. The models selected were matched to physical activity behavior exploration and limitations are noted in their selection over other behavior change theories that could have been adopted. The behavior change models selected in this research included the Self-Determination Theory for the study of motives associated with behavior change, the Transtheoretical Model that evaluates an individual's readiness to behavior change, and the Elaboration Likelihood Model that focuses on the determinants of message learning and persuasion.

Lastly, this research with its use of a Behavior Modification Sensor System was limited to a single test subject. The study participant is a female Hispanic senior adult that lives alone in a Southern California senior-living community. The study participant is representative of a healthy middle-class person that holds a high school education and lives in the United States with diet, weight, and physical activity typical for her age. While the use of a single sample limits external validity, it allowed the researcher to test the basic premises set forth in this exploratory study. Refinements to the research application, its frameworks, and the BMSS design can support future studies where a larger sample size is available.

7.4 Future Research Directions

Future research possibilities can begin by addressing the questions posed by the limitations of this research and through use of its findings to further explore and/or confirm its conclusions. One challenge faced in the BMSS study involved the large amount of data that was generated by the system each day and the need to manually analyze the data before meaning could be extracted from it. This challenge posits a question of "*What is the most effective method to autonomously mine large data sets?"* This requires the development of evolutionary data mining algorithms. The goal should be to find the needle in the proverbial haystack of human living pattern that may support abnormal behavior detection or patterns that yield the detection of the onset of pathologies or disease.

As the field of persuasive computing advances, a critical concern is how to provide the most effective subject-feedback in order to maximize a behavior change strategy? The presentation of information through an effective human-computer interaction channel is critical, especially when a subject is technologically challenged. Modeling the effect of persuasion on a person's behavior must be grounded on understanding how they react to the feedback. With the complexity of human behavior, this is difficult. One presentation and feedback strategy may be optimal for one person but not another.

As new persuasive computing technologies are developed, new research directions that look at their security, their usage, or their benefits over existing systems can generate new questions previously unanswered or asked. Future persuasive computing designs can begin with the extension of the ideas presented in this research. The time is right. Are the researchers, designers, and users of the technology ready for it?

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APPENDIX A: MATLAB SOFTWARE CODE OF NETWORK CONNECTIVITY AND RESILENCY

k-Connectivity

```
%Function to determine the probability of a network being k-connected (i.e., Pg(k))
function y=kconnected(A,N,r)
  for d=1:2000
      y(d+0)=(1-1/exp(((d+1)*pi*r^2)/A)-1/exp(((d+1)*pi*r^2)/A)-
      (1/exp(((d+1)*pi*r^2)/A)*((d+1)*pi*r^2)/A))^N
      format short e
  end
```

Link Compromise

```
%Function to determine the probability of link compromise of Eschenauer and Gligor
scheme (m = 0)
function y=linkcomp(N,u,x)
  for X=5:x
      y(X+0)=1-((N-u)/(N-2))^X
      format short
  end
```

Histogram of Lambda

```
%Function to determine the expected histogram as a function of lambda (i.e., H(lambda))
function y=wsnbinomial(N,K,P)
%l = lambda, p = keys/pool = K/P
p=K/P;
  for l=1:150
     y(l+0)=P*exp(gammaln(N+1)-(gammaln(l+1)+gammaln(N-l+1)))*p^l*(1-p)^(N-l)
  end
```

u vs. k

```
%Function to determine mean u of the binomial distribution given D and N
function y=u_K(D,N,K)
  for k=1:K
     y(k+0)=N-((1-(D/(N-1)))^(1/k))*(N-1)
     format bank
  end
```

Probability of Sharing i Keys

```
%Function to determine the probability that a node will share i keys
function y=probshare(K,N,u,i)
   y=(factorial(K)/(factorial(i)*factorial(K-i)))*((u-1)/(N-1))^i*((N-u)/(N-1))^(K-i)
   format short
```

Key Pool (P)

```
%Function to determine the key pool size needed to ensure connectivity
function y=P_K(N,u)
 for K=1:200
   y(K+0)=N*K/u
   format bank
 end
```

D vs. k

```
%Function to determine D vs. k-connectivity
function y=D(N,K,x)
 for u=1:x
   y(u+0)=(N-1)*(1-((N-u)/(N-1))^K)
 end
```

Average Link Compromise (q-Composite)

```
%Function to determine the average link compromise of the q-composite scheme
function y=avglinkcomp_Q(q,K,N,u)
 for x=5:600
   A=1-((N-u)/(N-2))^x;
   T=0;
     for j=q:K
        R=factorial(K)/(factorial(j)*factorial(K-j));
        S=(((u-1)/(N-1))^j)*(((N-u)/(N-1))^(K-j));
        T=R*S+T;
     end
   F=0;
     for i=q:K
        B=(factorial(K)/(factorial(i)*factorial(K-i)));
        C=(((u-1)/(N-1))^i)*(((N-u)/(N-1))^(K-i));
        D=B*C;
        F=F+A^i*(D/T);
     end
   y(x+0)=F
 end
```

D vs. k (q-Composite, q = 2)

```
%Function to determine D vs. k-connectivity of the q-composite scheme
function y=D_Q2(N,K,x)
 for u=1:x
   A=((N-u)/(N-1))^K+factorial(K)/factorial(K-1)*((u-1)/(N-1))*((N-u)/(N-1))^(K-1);
   y(u+0)=(N-1)*(1-A)
   format short e
 end
```

Average Link Compromise (Polynomial-Pool)

```
%Function to determine the average link compromise of the polynomial-pool scheme
function y=avglinkcomp_poly(t,N,u)
 for x=5:600
    C=0;
       for m=0:t-1
           A=exp(gammaln(x+1)-(gammaln(m+1)+gammaln(x-m+1)));
           B=(((u-1)/(N-1))^m)*(((N-u)/(N-1))^(x-m));
           C=A*B+C;
      end
   y(x+0)=1-C
 end
```

Average Link Compromise (PKC Algorithm)

```
%Function to determine the average link compromise of the PKC algorithm
function y=linkcomp_pkc(N,u,i,b)
 for x=1:i
   y(x+0)=(1-(((N-u)/(N-2))^x))*1/(2^b)
   format short
 end
```

Probability Distribution Function (PDF)

```
%Function to determine the PDF given n trials with each trial having probability of p
success
function y=binopdf(n,p)
for k=1:49
   y(k+0)=factorial(n)/(factorial(k)*factorial(n-k))*p^k*(1-p)^(n-k)
end
```

Cumulative Probability Distribution Function (CPDF)

```
%Function to determine the CDF given n trials with each trial having probability of p
success
function y=cdfbinopdf(n,p)
for k=1:49
   z(k+0)=factorial(n)/(factorial(k)*factorial(n-k))*p^k*(1-p)^(n-k)
   y(k+0)=sum(z)
end
```

APPENDIX B: NETWORK CONNECTIVITY AND RESILIENCY DATA

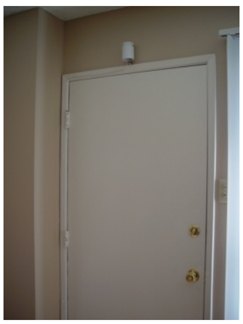
The following reports the probability of one node and its ability to establish a set of secure communication links. This data augments the network connectivity and resiliency data that is embedded into Chapter 6 and shows that between zero and 25 links are possible at a probability of 0.999, dependent upon the specific key pre-distribution scheme of interest.

		Number of trials per experiment: 49			**E&G and PKC**	**q-Composite**	**Polynomial-Pool**
		Probability of "success" in each trial:			0.2895	0.2292	0.2922
		Exact Probability			**Cumulative Probability**		
Number of Successes	**Number of Failures**	**E&G and PKC**	**q-Composite**	**Polynomial-Pool**	**E&G and PKC**	**q-Composite**	**Polynomial-Pool**
0	49	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1	48	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	47	0.00%	0.03%	0.00%	0.00%	0.03%	0.00%
3	46	0.01%	0.14%	0.01%	0.01%	0.17%	0.01%
4	45	0.03%	0.48%	0.03%	0.04%	0.65%	0.03%
5	44	0.11%	1.28%	0.10%	0.15%	1.93%	0.14%
6	43	0.34%	2.79%	0.31%	0.49%	4.72%	0.44%
7	42	0.85%	5.09%	0.78%	1.35%	9.81%	1.22%
8	41	1.83%	7.95%	1.68%	3.17%	17.77%	2.90%
9	40	3.39%	10.77%	3.16%	6.56%	28.54%	6.06%
10	39	5.52%	12.81%	5.23%	12.09%	41.35%	11.29%
11	38	7.98%	13.51%	7.65%	20.07%	54.86%	18.94%
12	37	10.30%	12.72%	10.00%	30.36%	67.58%	28.93%
13	36	11.94%	10.76%	11.75%	42.30%	78.34%	40.68%
14	35	12.51%	8.23%	12.47%	54.81%	86.57%	53.15%
15	34	11.90%	5.71%	12.01%	66.71%	92.28%	65.16%
16	33	10.30%	3.61%	10.54%	77.01%	95.89%	75.70%
17	32	8.15%	2.08%	8.44%	85.15%	97.97%	84.14%
18	31	5.90%	1.10%	6.20%	91.05%	99.07%	90.34%
19	30	3.92%	0.53%	4.17%	94.98%	99.61%	94.52%
20	29	2.40%	0.24%	2.59%	97.38%	99.85%	97.10%
21	28	1.35%	0.10%	1.47%	98.72%	99.94%	98.57%
22	27	0.70%	0.04%	0.77%	99.42%	99.98%	99.35%
23	26	0.34%	0.01%	0.38%	99.76%	99.99%	99.72%
24	25	0.15%	0.00%	0.17%	99.91%	100.00%	99.89%
25	24	0.06%	0.00%	0.07%	99.97%	100.00%	99.96%
26	23	0.02%	0.00%	0.03%	99.99%	100.00%	99.99%
27	22	0.01%	0.00%	0.01%	100.00%	100.00%	100.00%
28	21	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
29	20	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
30	19	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
31	18	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
32	17	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
33	16	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
34	15	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
35	14	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
36	13	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
37	12	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
38	11	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
39	10	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
40	9	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
41	8	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
42	7	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
43	6	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
44	5	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
45	4	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
46	3	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
47	2	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
48	1	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
49	0	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%

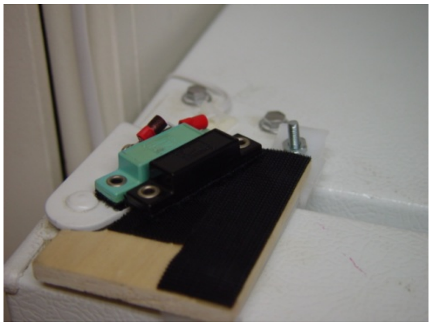
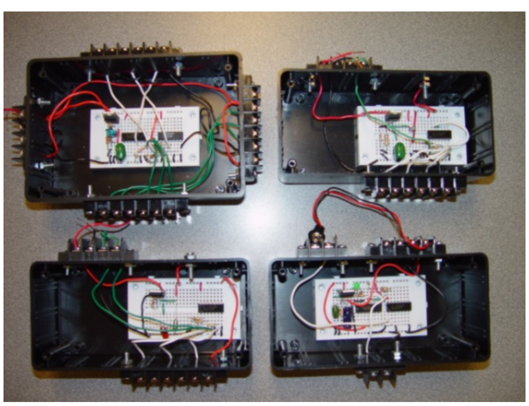
APPENDIX C: BEHAVIOR MODIFICATION SENSOR SYSTEM HARDWARE

	Part	Vendor	Part Number	Qty	Description	Unit Price
1	BMSS Computer	Dell	Dimension 4100	1	Desktop Intel® Pentium® III Processor 933 MHz 512MB RAM	$0
2	Acer 23” LCD Monitor	OfficeMax	22394491	1	Persuasive message display	$210.99
3	Researcher Computer	Dell	Dell Latitude D600	1	Laptop Intel® Pentium® M Processor 1.40GHz 2GB RAM	$0
4	2.4 GHz IRIS OEM Reference Board	Crossbow Technology	XM2110CA	3	Wireless sensor node	$115
5	USB PC Interface Board	Crossbow Technology	MIB520CA	1	Wireless sensor gateway	$115
6	Mote Data Acquisition Board with Temperature and Humidity	Crossbow Technology	MDA300CA	2	Wireless sensor data acquisition board (mounts to sensor node)	$95
7	Omron Pocket Pedometer	Amazon.com	HJ-720ITC	1	Physical activity sensor	$32.99
8	Wireless Complete Health Monitoring System	A&D Medical	CP-1THW	1	Blood pressure and weight sensors	$229.95
9	PIR Sensor Module	Radio Shack	276-033	5	Room presence sensor	$9.99
10	Infrared Phototransistor Detector	Radio Shack	276-142	2	TV sensor	$3.49
11	Switch Reed N.O./N.C.	Jameco Electronics	617545	5	Magnetic switch—food cabinet, microwave, and refrigerator	$6.95
12	Care-For Chair Sensor Pad-9”x16”	Colonial Medical	32069	3	Couch sensor	$45.00
13	Care-For Bed Sensor Pad-14”x24”	Colonial Medical	32068	2	Bed sensor	$54.00
14	Project Enclosure (6”x4”x2”)	Radio Shack	270-1806	3	Electronics housing	$4.99
15	PIR Mounting Cases	Lowes	NA	5	Room presence sensor casing	$3.50
16	TV Sensor Mounts	Custom	NA	2	TV sensor mount	$1.00
17	DC Voltage Regulator	Radio Shack	7805	7	+5V power regulator	$1.59
18	2-Input NOR Gate	Jameco Electronics	74AC02	2	Interface electronics	$0.10

	Part	Vendor	Part Number	Qty	Description	Unit Price
19	LM339 Quad Comparator	Radio Shack	276-1712	2	Interface electronics	$1.99
20	2-Input OR Gate	Jameco Electronics	74AC32	3	Interface electronics	$0.10
21	4-Position Dual-Row Barrier Strips	Radio Shack	274-658	6	Interface electronics	$2.09
22	2-Position Dual-Row Barrier Strips	Radio Shack	274-656	2	Interface electronics	$2.09
23	2-Position Dual-Row Barrier Strips	Radio Shack	274-659	4	Interface electronics	$2.39
24	AC/DC Power Supply Single-Out 9V 0.3A 2.7W	Jameco Electronics	133891	3	Interface electronics	$5.95
25	Breadboard 6.5” x 2.125”	Jameco Electronics	20723	3	Interface electronics	$9.95
26	0.1 uF Capacitor	Various	NA	7	Interface electronics	$0.10
27	0.33uF Capacitor	Various	NA	7	Interface electronics	$0.10
28	10K Resistor	Various	NA	10	Interface electronics	$0.05
29	33K Resistor	Various	NA	2	Interface electronics	$0.05
30	100K Resistor	Various	NA	2	Interface electronics	$0.05
31	200K Potentiometer	Jameco Electronics	855421	2	Interface electronics	$1.19
32	Light Emitting Diode	Various	NA	2	Interface electronics	$0.10
33	Misc. Wire and Connectors	Jameco Electronics	NA	1	Interface electronics	$100
					Estimated Total:	**$1687.35**

Photos	Description
   	Sensors used to detect room presence. Each unit was built using standard infrared (IR) technology and included a specially designed housing case (e.g., modified from standard plastic garden pipes). Each sensor was placed above the door in the following rooms: main entrance, bedroom, bathroom, and in the kitchen. While not seen in the pictures, a printed circuit board and a +5V power supply was designed to run each IR device (e.g., white dome in the first picture).

Photos	**Description**
	Sensors used to detect when a person sits on the couch (i.e., room activity). Each pressure pad was wired to an interface box that was connected to a wireless sensor node. The sensors were designed to activate when one or more of the pressure pads were triggered. This picture shows the seat cousins removed to highlight the pressure pads.
 	Sensor used to detect when the TV was on/off (i.e., room activity). The sensor measured light and was connected to an interface box that was located at the back of the TV. An interface box was connected to a wireless sensor node. It is noted that a special mount had to be constructed for the sensor. The mount was made from clear Plexiglas and was attached to the TV using Velcro.

Photos	Description
 	Sensor used to detect when the freezer or main refrigerator door was opened (i.e., room activity). It is noted that a special mount had to be constructed for the sensor.
	Sensor used to detect when the food cabinet was opened (i.e., room activity).
	Picture of interface boxes. Each box was designed to provide power and to function as a connection point for the various sensors used in the study. The boxes were connected to a wireless sensor node to relay the captured sensor information to a computer that ran the MoteWorks™ software (Crossbow Technology, 2010). Note: Four interface boxes were designed but only three were used. The fourth box was used as a backup in case one of the other boxes became non-functional.

IRIS

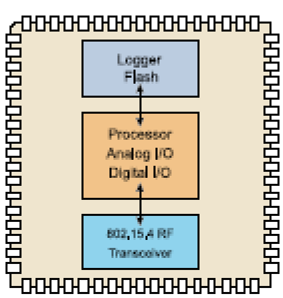
WIRELESS MEASUREMENT SYSTEM

- 2.4 GHz IEEE 802.15.4, Tiny Wireless Measurement System
- Designed Specifically for Deeply Embedded Sensor Networks
- 250 kbps, High Data Rate Radio
- Wireless Communications with Every Node as Router Capability
- Expansion Connector for Light, Temperature, RH, Barometric Pressure, Acceleration/Seismic, Acoustic, Magnetic and other Crossbow Sensor Boards

Applications

- Indoor Building Monitoring and Security
- Acoustic, Video, Vibration and Other High Speed Sensor Data
- Large Scale Sensor Networks (1000+ Points)

ZigBee™ Alliance



XM2110CA Block Diagram

Document Part Number: 6020-0124-01 Rev A

IRIS

The IRIS is a 2.4 GHz Mote module used for enabling low-power, wireless sensor networks. The IRIS Mote features several new capabilities that enhance the overall functionality of Crossbow's wireless sensor networking products.

Product features Include:

- Up to three times improved radio range and twice the program memory over previous MICA Motes
- Outdoor line-of-sight tests have yeilded ranges as far as 500 meters between nodes without amplification
- IEEE 802.15.4 compliant RF transceiver
- 2.4 to 2.48 GHz, a globally compatible ISM band
- Direct sequence spread spectrum radio which is resistant to RF interference and provides inherent data security
- 250 kbps data rate
- Supported by MoteWorks™ wireless sensor network platform for reliable, ad-hoc mesh networking
- Plug and play with Crossbow's sensor boards, data acquisition boards, gateways, and software

MoteWorks™ enables the development of custom sensor applications and is specifically optimized for low-power, battery-operated networks. MoteWorks is based on the open-source TinyOS operating system and provides reliable, ad-hoc mesh networking, over-the-air-programming capabilities, cross development tools, server middleware for enterprise network integration and client user interface for analysis and configuration.

Processor & Radio Platform

The XM2110CA is based on the Atmel ATmega1281. The ATmega1281 is a low-power microcontroller which runs MoteWorks from its internal flash memory. A single processor board (XM2110) can be configured to run your sensor application/processing and the network/radio communications stack simultaneously. The IRIS 51-pin expansion connector supports Analog Inputs, Digital I/O, I2C, SPI and UART interfaces. These interfaces make it easy to connect to a wide variety of external peripherals.

Sensor Boards

Crossbow offers a variety of sensor and data acquisition boards for the IRIS Mote. All of these boards connect to the IRIS via the standard 51-pin expansion connector. Custom sensor and data acquisition boards are also available. Please contact Crossbow for additional information.

Processor/Radio Board	XM2110CA	Remarks
Processor Performance		
Program Flash Memory	128K bytes	
Measurement (Serial) Flash	512K bytes	> 100,000 Measurements
RAM	8K bytes	
Configuration EEPROM	4K bytes	
Serial Communications	UART	0-3V transmission levels
Analog to Digital Converter	10 bit ADC	8 channel, 0-3V input
Other Interfaces	Digital I/O,I2C,SPI	
Current Draw	8 mA	Active mode
	8 µA	Sleep mode (total)
RF Transceiver		
Frequency band[1]	2405 MHz to 2480 MHz	ISM band, programmable in 1 MHz steps
Transmit (TX) data rate	250 kbps	
RF power	3 dBm (typ)	
Receive Sensitivity	-101 dBm (typ)	
Adjacent channel rejection	36 dB	+ 5 MHz channel spacing
	34 dB	- 5 MHz channel spacing
Outdoor Range	> 300 m	1/4 wave dipole antenna, LOS
Indoor Range	> 50 m	1/4 wave dipole antenna, LOS
Current Draw	16 mA	Receive mode
	10 mA	TX, -17 dBm
	13 mA	TX, -3 dBm
	17 mA	TX, 3 dBm
Electromechanical		
Battery	2X AA batteries	Attached pack
External Power	2.7 V - 3.3 V	Molex connector provided
User Interface	3 LEDs	Red, green and yellow
Size (in)	2.25 x 1.25 x 0.25	Excluding battery pack
(mm)	58 x 32 x 7	Excluding battery pack
Weight (oz)	0.7	Excluding batteries
(grams)	18	Excluding batteries
Expansion Connector	51-pin	All major I/O signals

Notes

[1]5 MHz steps for compliance with IEEE 802.15.4/D18-2003.
Specifications subject to change without notice

IRIS Mote (bottom view)

MIB520CA Mote Interface Board

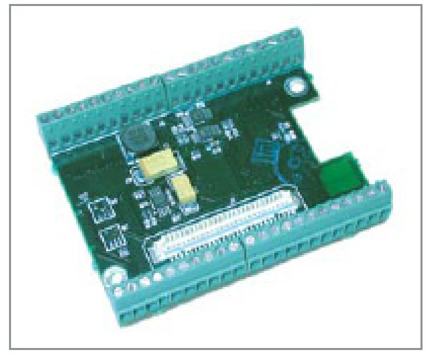
Base Stations

A base station allows the aggregation of sensor network data onto a PC or other computer platform. Any IRIS Mote can function as a base station when it is connected to a standard PC interface or gateway board. The MIB510 or MIB520 provides a serial/USB interface for both programming and data communications. Crossbow also offers a stand-alone gateway solution, the MIB600 for TCP/IP-based Ethernet networks.

Ordering Information

MDA300

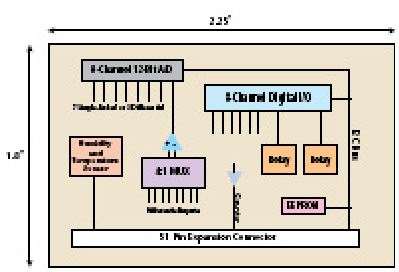
DATA ACQUISITION BOARD



- Multi-Function Data Acquisition Board with Temp, Humidity Sensor
- Compatible with MoteView Driver Support
- Up to 11 Channels of 12-bit Analog Input
- Onboard Sensor Excitation and High-Speed Counter
- Convenient Micro-Terminal Screw Connections

Applications

- Environmental Data Collection
- Agricultural and Habitat Monitoring
- Viticulture and Nursery Management
- HVAC Instrumentation and Control
- General Data Collection and Logging



MDA300C Block Diagram

MDA300

Developed at UCLA's Center for Embedded Network Sensing (CENS), the MDA300 is an extremely versatile data acquisition board that also includes an onboard temperature/humidity sensor. With its multi-function direct user interface, the MDA300 offers a convenient and flexible solution to those sensor modalities commonly found in areas such as environmental and habitat monitoring as well as many other custom sensing applications.

As part of a standard mesh network of Motes, the MDA300's easy access micro-terminals also make it an economical solution for a variety of applications and a key component in the next generation of low-cost wireless weather stations. Data logging and display is supported via Crossbow's MoteView user interface.

Crossbow's MoteView software is designed to be the primary interface between a user and a deployed network of wireless sensors. MoteView provides an intuitive user interface to database management along with sensor data visualization and analysis tools. Sensor data can be logged to a database residing on a host PC, or to a database running autonomously on a Stargate gateway.

Communication and Control Features Including:

- 7 single-ended or 3 differential ADC channels
- 4 precise differential ADC channels
- 6 digital I/O channels with event detection interrupt
- 2.5, 3.3, 5V sensor excitation and low-power mode
- 64K EEPROM for onboard sensor calibration data
- 2 relay channels, one normally open and one normally closed
- 200 Hz counter channel for wind speed, pulse frequencies
- External I2C interface

Drivers for the MDA300 board are included in Crossbow's MoteWorks™ software platform. MoteWorks enables the development of custom sensor applications and is specifically optimized for low-power, battery-operated networks. MoteWorks is based on the open-source TinyOS operating system and provides reliable, ad-hoc mesh networking, over-the-air-programming capabilities, cross development tools, server middleware for enterprise network integration and client user interface for analysis and configuration.

Ordering Information

Model	Description
MDA300CA	Mote Data Acqustion Board with Temperature and Humidity

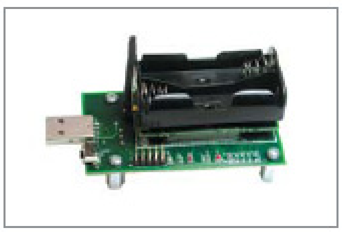
MIB520

USB INTERFACE BOARD

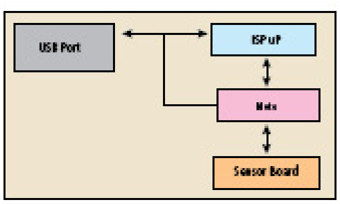
- Base Station for Wireless Sensor Networks
- USB Port Programming for IRIS/MICAz/MICA2 Hardware Platforms
- Supports JTAG code debugging
- USB Bus Power

Applications

- USB Interface
- Testbed Deployments
- In-System Programming



MIB520CB with attached Mote



MIB520CB Block Diagram

MIB520CB

The MIB520CB provides USB connectivity to the IRIS and MICA family of Motes for communication and in-system programming. Any IRIS/MICAz/MICA2 node can function as a base station when mated to the MIB520CB USB interface board. In addition to data transfer, the MIB520CB also provides a USB programming interface.

The MIB520CB offers two separate ports: one dedicated to in-system Mote programming and a second for data communication over USB.The MIB520CB has an on-board processor that programs Mote Processor Radio Boards. USB Bus power eliminates the need for an external power source.

Specifications

USB Interface
- Baud Rate: 57.6 K
- Male to Female USB cable (included with unit)

Mote Interface
- Connectors:
  - 51-pin
- Indicators:
  - Mote LED's: Red Green, Yellow

Programming Interface
- Indicators:
  - LEDs - Power Ok (Green), Programming in Progress (Red)
- Switch to reset the programming processor and Mote.

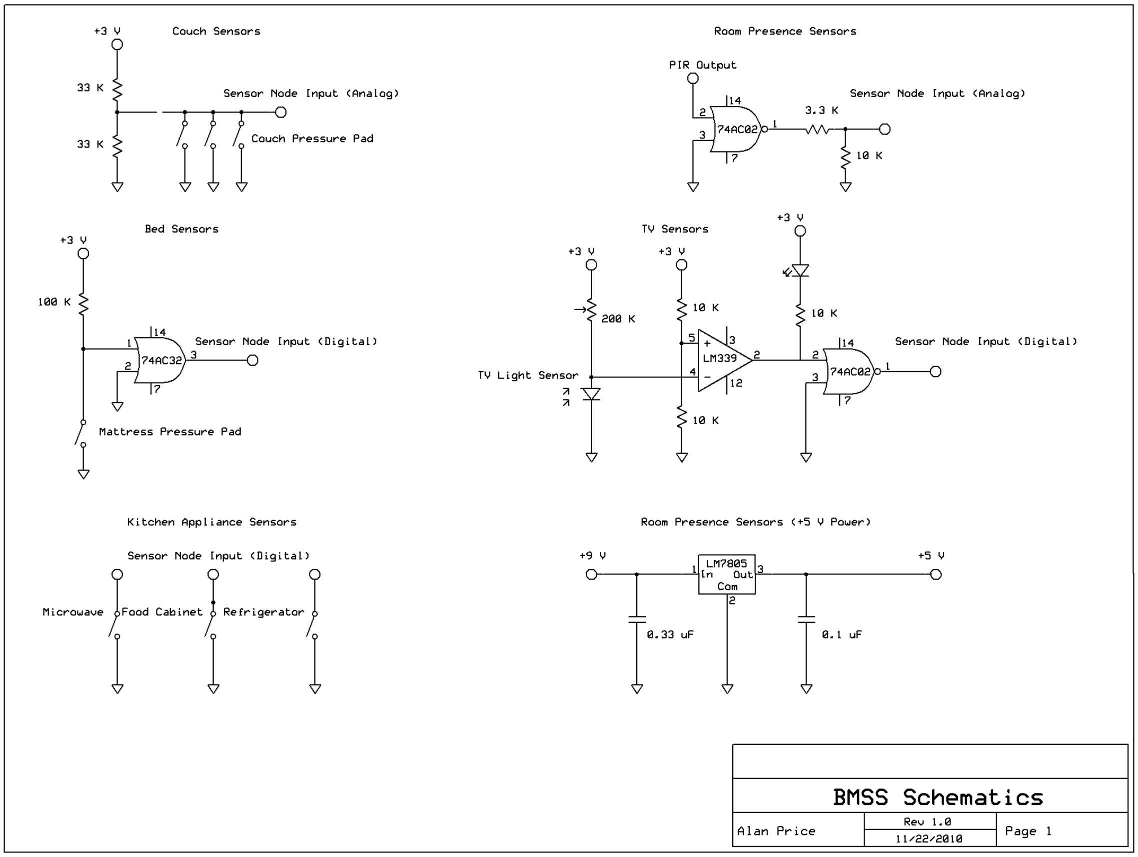
Jtag Interface
- Connector: 10-pin male header

POWER
- USB Bus powered

Ordering Information

Model	Description
MIB520CB	USB PC Interface Board

APPENDIX D: SCHEMATICS OF ELECTRONIC CIRCUITS



Notes:

1. All electronic circuits were designed to function as active-low. When a sensor was triggered or activated, it would fall to a zero-voltage state. Non-zero values represented a ready-to-trigger state and typically equaled approximately three volts. All circuits were designed to ensure the maximum voltage placed on an input of a wireless sensor node never exceeded three volts. This was done to protect the node and to ensure that its operating specifications were met.
2. Digital inputs were typically wired to a simple switch that drove the input to ground when activated. No external voltage was placed on a digital input. The sensor node's own power serviced this type of input.
3. The room presence sensors (i.e., PIR sensor) produced an output of three volts. A five volt regulator circuit was designed to power each PIR sensor and all circuits in the design. Each five volt regulator received its power from a nine volt power transformer.

APPENDIX E: BMSS SOFTWARE PACKAGES

MOTEWORKS™

SOFTWARE PLATFORM

MoteWorks™ 2.0 provides a complete software development environment for wireless sensor network applications. Included is a collection of flexible software packages that enables both quick-and-easy out-of-the-box deployment of sensor systems for monitoring and alerting, to powerful tools to empower custom development of pervasive sensory networks.

Key Features

- Supports all Crossbow MICA and IRIS series Mote hardware and sensor boards:
    - Motes: IRIS, MICAz, MICA2, MICA2DOT
    - Sensors: MDA100/300/320, MTS300/310/400/410/420, MEP410/510
- Simple one-click installation and upgrade
- Based on TinyOS 1.1, a popular Open Source embedded operating system
- Source level access for modification and custom development
- MoteView: Rich interface for visualization and analysis of sensor data streams
- MoteConfig: Simple graphical interface to program flash and configure firmware images
- XMesh: Reliable mesh networking stack
- XOtap: Over-the-air firmware reprogramming
- XRadio: Low power radio protocol for battery powered devices
- XServe: Powerful utilities for data logging, parsing, conversions, and alerts
- XSniffer: Displays radio communication for protocol debugging
- XSensor: Complete set of example sensor applications
- Cygwin: Command line shell and development environment
- Programmers Notepad: Rich text editor and compilation front-end
- nesC: Pre-compiler language for generating ultra-efficient embedded software
- gcc: Industry standard C language cross-compiler
- TortoiseCVS: File Manager integrated revision control interface
- WinMerge: Graphical source revision differencing tool

Overview

A wireless network deployment is composed of the three distinct software tiers:

1. The Mote Tier, where XMesh resides, is the software that runs on the cloud of sensor nodes forming a mesh network. The XMesh software provides the networking algorithms required to form a reliable communication backbone that connects all the nodes within the mesh cloud to the server.
2. The Server Tier is an always-on facility that handles translation and buffering of data coming from the wireless network and provides the bridge between the wireless Motes and the internet clients. XServe is the primary server tier application, and can run on a PC or Gateway.
3. The Client Tier provides the user visualization software and graphical interface for managing the network. Crossbow provides an analysis and monitoring package called MoteView for the client tier, but XMesh can be interfaced to custom 3rd party client software as well.

Wellness Connected Software
Manufacture: A&D Medical, Inc.

Included with the Wireless Complete Medical Monitoring System (CP-1THW); downloaded at http://www.LifeSourceOnline.com/getstarted on October 2009

Used to measure and monitor blood pressure and weight

Omron Health Management Software
Manufacture: Omron Healthcare

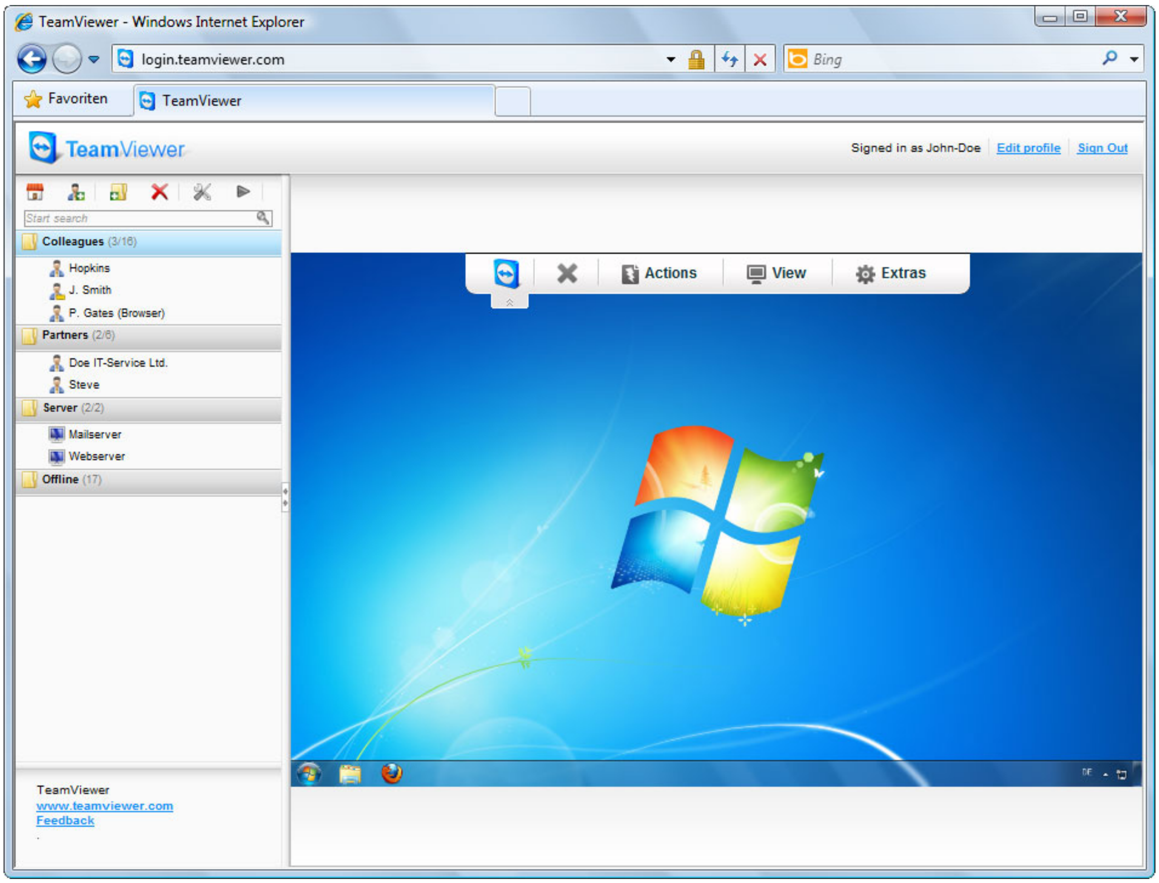
Included with the HJ-720ITC Pocket Pedometer

Used to monitor the daily walking activity of the study participant

TeamViewer Software
Manufacture: TeamViewer GmbH

Downloaded at http://www.teamviewer.com/download/index.aspx on October 2009

Used to remotely monitor and manage the Behavior Modification Sensor System



APPENDIX F: SENSOR NODE SOFTWARE CODE

XDMA300

```
/* Program that includes the local hardware definitions for the MDA300 data acquisition
   board.  This module does not provide any interface functions.
 * Copyright (c) 2004-2007 Crossbow Technology, Inc.
 * All rights reserved.
 * See license.txt file included with the distribution.
 * $Id: XMDA300.nc,v 1.3.4.3 2007/04/26 20:07:13 njain Exp $
 * XMesh multi-hop application for MDA300 sensorboard.
 *
 * @author Martin Turon, Alan Broad, Hu Siquan, Pi Peng
 */

#include "appFeatures.h"
includes sensorboardApp;
configuration XMDA300 {
}

implementation {

components Main,  GenericCommPromiscuous as Comm, MULTIHOPROUTER,
XMDA300M, QueuedSend, LEDS_COMPONENT XCommandC, Bcast, SamplerC,
TimerC;

   Main.StdControl -> XMDA300M.StdControl;
   Main.StdControl -> QueuedSend.StdControl;
   Main.StdControl -> MULTIHOPROUTER.StdControl;
   Main.StdControl -> Comm.Control;
   Main.StdControl -> TimerC.StdControl;

   LEDS_WIRING(XMDA300M)
   XMDA300M.Timer -> TimerC.Timer[unique("Timer")];

   //Sampler Communication
   XMDA300M.SamplerControl -> SamplerC.SamplerControl;
   XMDA300M.Sample -> SamplerC.Sample;

   //support for plug and play.
   XMDA300M.PlugPlay -> SamplerC.PlugPlay;

   // Wiring for broadcast commands.
   XMDA300M.XCommand -> XCommandC;
   XMDA300M.XEEControl -> XCommandC;
```

```
   // Wiring for RF mesh networking.
   XMDA300M.RouteControl -> MULTIHOPROUTER;
   XMDA300M.Send -> MULTIHOPROUTER.MhopSend[AM_XMULTIHOP_MSG];
   MULTIHOPROUTER.ReceiveMsg[AM_XMULTIHOP_MSG] ->
    Comm.ReceiveMsg[AM_XMULTIHOP_MSG];
   XMDA300M.HealthMsgGet -> MULTIHOPROUTER.HealthMsgGet;
   XMDA300M.health_packet -> MULTIHOPROUTER.health_packet;
}
```

XMDA_300

```
/* Copyright (c) 2004-2007 Crossbow Technology, Inc.
 * All rights reserved.
 * See license.txt file included with the distribution.
 *
 * $Id: XMDA300M.nc,v 1.5.4.7 2007/04/26 20:07:21 njain Exp $
 *
 * XMesh multi-hop application for MDA300 sensorboard.
 *
 *    - Tests the MDA300 general prototyping card
 *       (see Crossbow MTS Series User Manual)
 *    -  Read and control all MDA300 signals:
 *      ADC0, ADC1, ADC2, ADC3,...ADC11 inputs, DIO 0-5,
 *      counter, battery, humidity, temp
 *      LED: the led will be green if the MDA300 is connected to the mica2 and
 *      the program is running (and sending out packets).  Otherwise it is red.
 *-----------------------------------------------------------------------------------------------------
 *
 * @author Martin Turon, Alan Broad, Hu Siquan, Pi Peng
 */
/**********************************************************************
 * Data packet structure:
 *
 * PACKET #1 (of 2)
 * ----------------------------------------------------
 *  msg->data[0] : sensor id, MDA300 = 0x81
 *  msg->data[1] : packet number = 1
 *  msg->data[2] : node id
 *  msg->data[3] : reserved
 *  msg->data[4,5] : analog adc data Ch.0
 *  msg->data[6,7] : analog adc data Ch.1
 *  msg->data[8,9] : analog adc data Ch.2
 *  msg->data[10,11] : digital data Ch.0
 *  msg->data[12,13] : digital data Ch.1
 *  msg->data[14,15] : digital data Ch.2
```

```
 * PACKET #2 (of 2)
 * ----------------------------------------------------
 *  msg->data[0] : sensor id, MDA300 = 0x81
 *  msg->data[1] : packet number = 2 WAS 4
 *  msg->data[2] : node id
 *  msg->data[3] : reserved
 *  msg->data[4,5] : batt
 *  msg->data[6,7] : hum
 *  msg->data[8,9] : temp
 *  msg->data[10,11] : counter
 *  msg->data[14] : msg4_status (debug)
 * ***************************************************************************/

//include sensorboard.h definitions from tos/mda300 directory
//#include "appFeatures.h"

includes XCommand;
includes sensorboard;

module XMDA300M
{
   provides interface StdControl;

   uses {
         interface Leds;
         interface MhopSend as Send;
         interface RouteControl;
         interface XCommand;
         interface XEEControl;

         //Sampler Communication
         interface StdControl as SamplerControl;
         interface Sample;

         //Timer
         interface Timer;

         //support for plug and play
         command result_t PlugPlay();

      command void health_packet(bool enable, uint16_t intv);
      command HealthMsg* HealthMsgGet();
   }
}
```

```
implementation
{
#define ANALOG_SAMPLING_TIME    90
#define DIGITAL_SAMPLING_TIME  100
#define MISC_SAMPLING_TIME     110

#define ANALOG_SEND_FLAG  1
#define DIGITAL_SEND_FLAG 1
#define MISC_SEND_FLAG    1
#define ERR_SEND_FLAG     1

#define PACKET_FULL       0x1FF
#define MSG_LEN  29   // excludes TOS header, but includes xbow header

  enum {
        PENDING = 0,
        NO_MSG = 1,
        MDA300_PACKET1 = 1,
        MDA300_ERR_PACKET = 0xf8
  };

  /* Messages Buffers */
  bool      sleeping;         // application command state
  bool sending_packet;
  uint16_t    seqno;
        XDataMsg  *tmppack;

  TOS_Msg packet;
  TOS_Msg msg_send_buffer;
  TOS_MsgPtr msg_ptr;
  HealthMsg *h_msg;

  bool bBoardOn=TRUE;

  uint16_t msg_status, pkt_full;
  char test;
  uint8_t samplebatt=0;
  int8_t record[10];
task void send_radio_msg();
 static void initialize()
  {
   atomic
   {
        sleeping = FALSE;
```

```
            sending_packet = FALSE;
#ifdef APP_RATE
                    timer_rate = XSENSOR_SAMPLE_RATE;
#else
#ifdef USE_LOW_POWER
                    timer_rate = XSENSOR_SAMPLE_RATE  +
((TOS_LOCAL_ADDRESS%255) << 7);
#else
            timer_rate = XSENSOR_SAMPLE_RATE + ((TOS_LOCAL_ADDRESS%255)
<< 2);
#endif
#endif
     }
   }
  static void start()
   {
      bBoardOn=TRUE;
         call SamplerControl.start();
         if(call PlugPlay())
         {
         bBoardOn=TRUE;
            //channel parameteres are irrelevent
            record[0] = call

Sample.getSample(0,TEMPERATURE,MISC_SAMPLING_TIME,SAMPLER_DEFAU
LT);
            record[1] = call

Sample.getSample(0,HUMIDITY,MISC_SAMPLING_TIME,SAMPLER_DEFAULT);
            record[2] = call Sample.getSample(0,

BATTERY,MISC_SAMPLING_TIME,SAMPLER_DEFAULT);
            //start sampling  channels.
            record[3] = call

Sample.getSample(0,ANALOG,ANALOG_SAMPLING_TIME,SAMPLER_DEFAULT
| EXCITATION_33 | DELAY_BEFORE_MEASUREMENT);

            record[4] = call
Sample.getSample(1,ANALOG,ANALOG_SAMPLING_TIME,SAMPLER_DEFAULT
| EXCITATION_25 | DELAY_BEFORE_MEASUREMENT);
```

```
            record[5] = call
Sample.getSample(2,ANALOG,ANALOG_SAMPLING_TIME,SAMPLER_DEFAULT
| EXCITATION_50 | DELAY_BEFORE_MEASUREMENT);
            //start sampling digital channels

            record[6] = call
Sample.getSample(0,DIGITAL,DIGITAL_SAMPLING_TIME,DIG_LOGIC | EVENT);

            record[7] = call
Sample.getSample(1,DIGITAL,DIGITAL_SAMPLING_TIME,DIG_LOGIC | EVENT);

            record[8] = call
Sample.getSample(2,DIGITAL,DIGITAL_SAMPLING_TIME,DIG_LOGIC | EVENT);

            call Leds.greenOn();
         }
         else {
         bBoardOn=FALSE;
            record[9] = call Sample.getSample(0,

BATTERY,MISC_SAMPLING_TIME,SAMPLER_DEFAULT);
         }
         atomic samplebatt=1;
         call Sample.sampleNow();
         return;
   }
/*****************************************************************
  *Initialize the component. Initialize Leds
 *****************************************************************/
   command result_t StdControl.init() {
         call Leds.init();
         atomic {
            msg_ptr = &msg_send_buffer;     //sending_packet = FALSE;
         }
         msg_status = 0;
         pkt_full = PACKET_FULL;

   MAKE_BAT_MONITOR_OUTPUT();  // enable voltage ref power pin as output
   MAKE_ADC_INPUT();           // enable ADC7 as input

// usart1 is also connected to external serial flash
// set usart1 lines to correct state
   TOSH_MAKE_FLASH_OUT_OUTPUT();           //tx output
   TOSH_MAKE_FLASH_CLK_OUTPUT();           //usart clk
```

```
   call SamplerControl.init();
   initialize();
   return SUCCESS;
     }

/*************************************************************************
 * Start the component. Start the clock. Setup timer and sampling

*************************************************************************/
   command result_t StdControl.start() {

   h_msg = call HealthMsgGet();
   h_msg->rsvd_app_type = SENSOR_BOARD_ID;
   call Timer.start(TIMER_REPEAT, timer_rate);
   call health_packet(TRUE,TOS_HEALTH_UPDATE);
         return SUCCESS;
   }

/*************************************************************************
 * Stop the component.

*************************************************************************/
   command result_t StdControl.stop() {

      int i;
         for(i=0;i<10;i++)
         {
                  call Sample.stop(i);
         }
         call SamplerControl.stop();

         return SUCCESS;
  }

/*************************************************************************
 * Task to transmit radio message
 * NOTE that data payload was already copied from the corresponding UART packet
*************************************************************************/
   task void send_radio_msg()
         {
            uint8_t i;
      uint16_t  len;
            XDataMsg *data;
            if(sending_packet)
```

```
    return;
  atomic sending_packet=TRUE;
    // Fill the given data buffer.
    data = (XDataMsg*)call Send.getBuffer(msg_ptr, &len);
  tmppack=(XDataMsg *)packet.data;
    for (i = 0; i <= sizeof(XDataMsg)-1; i++)
      ((uint8_t*)data)[i] = ((uint8_t*)tmppack)[i];

    if(bBoardOn)
    {
  data->xmeshHeader.packet_id = 6;
  }
  else
  {
  data->xmeshHeader.packet_id = 7;
  }
    data->xmeshHeader.board_id  = SENSOR_BOARD_ID;
    //data->xmeshHeader.node_id   = TOS_LOCAL_ADDRESS;
    data->xmeshHeader.parent    = call RouteControl.getParent();
    data->xmeshHeader.packet_id = data->xmeshHeader.packet_id | 0x80;

      // Send the RF packet!
          call Leds.yellowOn();
      if (call
Send.send(BASE_STATION_ADDRESS,MODE_UPSTREAM,msg_ptr,
sizeof(XDataMsg)) != SUCCESS) {
          atomic sending_packet = FALSE;
          call Leds.yellowOn();
          call Leds.greenOff();
    }
    }

 /* Handle completion of sent RF packet.
  *
  * @author    Martin Turon
  * @version   2004/5/27      mturon       Initial revision
  */

event result_t Send.sendDone(TOS_MsgPtr msg, result_t success)
 {
   atomic {
                  msg_ptr = msg;
                  sending_packet = FALSE;
   }
```

```
    call Leds.yellowOff();
    return SUCCESS;
  }

/* Handle a single dataReady event for all MDA300 data types.
 *
 * @author    Leah Fera, Martin Turon
 *
 * @version   2004/3/17       leahfera    Intial revision
 * @n         2004/4/1        mturon      Improved state machine
 */

    event result_t
        Sample.dataReady(uint8_t channel,uint8_t channelType,uint16_t data)
        {
          switch (channelType) {
                case ANALOG:
                   switch (channel) {
                         // MSG 1 : first part of analog channels (0-2)

                         case 0:
          tmppack=(XDataMsg *)packet.data;
                            tmppack->xData.datap1.adc0 =data ;
                            atomic {msg_status|=0x01;}
                            break;

                         case 1:
          tmppack=(XDataMsg *)packet.data;
                            tmppack->xData.datap1.adc1 =data ;
                            atomic {msg_status|=0x02;}
                            break;

                         case 2:
          tmppack=(XDataMsg *)packet.data;
                            tmppack->xData.datap1.adc2 =data ;
                            atomic {msg_status|=0x04;}
                            break;

                         default:
                            break;
                   }  // case ANALOG (channel)
                   break;

                case DIGITAL:
```

```
switch (channel) {

        case 0:
atomic {
        tmppack=(XDataMsg *)packet.data;
                tmppack->xData.datap1.dig0=data;
                msg_status|=0x08;}
                break;

        case 1:
atomic {
        tmppack=(XDataMsg *)packet.data;
                tmppack->xData.datap1.dig1=data;
                msg_status|=0x10;}
                break;

        case 2:
atomic {
        tmppack=(XDataMsg *)packet.data;
                tmppack->xData.datap1.dig2=data;
                msg_status|=0x20;}
                break;

default:
                break;
        }  // case DIGITAL (channel)
        break;

    case BATTERY:
            if(samplebatt==0) break;
            atomic {
            samplebatt=0;
            tmppack=(XDataMsg *)packet.data;
            tmppack->xData.datap1.vref =data ;
            msg_status|=0x40;}
        if(!bBoardOn)
        {
        post send_radio_msg();
        }
        break;

    case HUMIDITY:
atomic {
            tmppack=(XDataMsg *)packet.data;
```

```
                    tmppack->xData.datap1.humid =data ;
                msg_status|=0x80;}
                break;

              case TEMPERATURE:
        atomic {
                    tmppack=(XDataMsg *)packet.data;
                    tmppack->xData.datap1.humtemp =data ;
                msg_status|=0x100;}
                break;

              default:
                break;

          }  // switch (channelType)

      if (sending_packet)
          return SUCCESS;

              if (msg_status == pkt_full) {
               atomic msg_status = 0;
               call StdControl.stop();
               post send_radio_msg();
              }

          return SUCCESS;
        }

/*****************************************************************************
 * Timer Fired -
 *****************************************************************************/
   event result_t Timer.fired() {
     if (sending_packet && msg_status!=0)
          return SUCCESS;             //don't overrun buffers
        }

 /* Handles all broadcast command messages sent over network.
  *
  * NOTE: Bcast messages will not be received if seq_no is not properly
  *      set in first two bytes of data payload.  Also, payload is
  *      the remaining data after the required seq_no.
  *
  * @version   2004/10/5   mturon     Initial version
  */
```

```
event result_t XCommand.received(XCommandOp *opcode) {

    switch (opcode->cmd) {

        case XCOMMAND_SET_RATE:
            // Change the data collection rate.
            timer_rate = opcode->param.newrate;
            call Timer.stop();
            call Timer.start(TIMER_REPEAT, timer_rate);
            break;

        case XCOMMAND_SLEEP:
            // Stop collecting data, and go to sleep.
            sleeping = TRUE;
            call StdControl.stop();
            call Timer.stop();
            call Leds.set(0);
      break;
         case XCOMMAND_WAKEUP:
            // Wake up from sleep state.
            if (sleeping) {
                initialize();
                call Timer.start(TIMER_REPEAT, timer_rate);
                sleeping = FALSE;
            }
            break;

        case XCOMMAND_RESET:
            // Reset the mote now.
            break;

        default:
            break;
    }
    return SUCCESS;
  }

  event result_t XEEControl.restoreDone(result_t result)
  {
            if(result) {
                        call Timer.stop();
                  call Timer.start(TIMER_REPEAT, timer_rate);
            }
```

```
        return SUCCESS;
  }
}
```

Sensorboardapp.h

```
/* Hardware specific definitions for the MDA300 data acquisition board
 * Copyright (c) 2004-2007 Crossbow Technology, Inc.
 * All rights reserved.
 * See license.txt file included with the distribution.
 *
 * $Id: sensorboardApp.h,v 1.2.4.2 2007/04/26 20:07:47 njain Exp $
 */
// controls for the voltage reference monitor

#define MAKE_BAT_MONITOR_OUTPUT() sbi(DDRA, 5)
#define MAKE_ADC_INPUT() cbi(DDRF, 7)
#define SET_BAT_MONITOR() sbi(PORTA, 5)
#define CLEAR_BAT_MONITOR() cbi(PORTA, 5)

// crossbow sensor board id
#define  SENSOR_BOARD_ID 0x81       //MDA300 sensor board id

#define NUM_MSG1_BYTES (28)                      // bytes 2-29
#define NUM_MSG2_BYTES (8)                       // bytes 2-9
#define NUM_MSG3_BYTES (13)                      // bytes 2-13


#define VOLTAGE_STABLE_TIME 100          //Time it takes for the supply voltage to
be stable enough
// format is:  byte 1 & 2: ADC reading in big-endian format

typedef struct XMeshHeader{
  uint8_t  board_id;
  uint8_t  packet_id; // 3
  //uint8_t  node_id;
  uint16_t parent;
}__attribute__ ((packed)) XMeshHeader;

//pp:multihop need only the packet1
typedef struct PData1 {
  uint16_t vref;
  uint16_t humid;
  uint16_t humtemp;
  uint16_t adc0;
```

```
  uint16_t adc1;
  uint16_t adc2;
  uint16_t dig0;
  uint16_t dig1;
  uint16_t dig2;
} __attribute__ ((packed)) PData1;

typedef struct XDataMsg {
  XMeshHeader xmeshHeader;
  union {
  PData1    datap1;
  }xData;
}  __attribute__ ((packed)) XDataMsg;

enum {
  AM_XSXMSG = 0,
};

enum {
    Sample_Packet = 1,
};

enum {
    RADIO_TEST,
   };
enum {
    AM_XDEBUG_MSG    = 49,
    AM_XSENSOR_MSG   = 50,
    AM_XMULTIHOP_MSG = 51,         // xsensor multihop
};
#ifdef APP_RATE
uint32_t XSENSOR_SAMPLE_RATE = APP_RATE;
#else
#ifdef USE_LOW_POWER
uint32_t XSENSOR_SAMPLE_RATE = 184320;
#else
// uint32_t XSENSOR_SAMPLE_RATE = 1843;
uint32_t XSENSOR_SAMPLE_RATE = 1024;
#endif
#endif

uint32_t   timer_rate;
```

appfeatures.h

```
/* Copyright (c) 2004-2007 Crossbow Technology, Inc.
 * All rights reserved.
 * See license.txt file included with the distribution.
 *
 * $Id: appFeatures.h,v 1.2.4.1 2007/04/26 20:07:30 njain Exp $
 */

/* Compile-time flags for defining application specific feature preferences.
 *
 * @file      appFeatures.h
 * @author    Martin Turon
 *
 * @version   2004/8/8      mturon      Initial version
 *
 */

// FEATURE_LEDS -- powers up the LEDs for debugging purposes
#ifndef FEATURE_LEDS
#define FEATURE_LEDS       0
#endif

#define  SENSOR_BOARD_ID 0x81            //MDA300 sensor board id

/* Define wiring macros for various application features.
 */

/* FEATURE_LEDS will enable debugging Leds when set to 1. */

#if FEATURE_LEDS
#define LEDS_COMPONENT              LedsC,
#define LEDS_WIRING(X)        X.Leds -> LedsC;
#else
#define LEDS_COMPONENT              NoLeds,
#define LEDS_WIRING(X)        X.Leds -> NoLeds;
#endif
```

Apppacket.h

```
/* Copyright (c) 2004-2007 Crossbow Technology, Inc.
 * All rights reserved.
 * See license.txt file included with the distribution.
 *
 * $Id: appPacket.h,v 1.1.4.1 2007/04/26 20:07:38 njain Exp $
 */
```

```
/* Definition of complete and final packet structure for this application.
 *
 * @file       appPacket.h
 * @author     Martin Turon
 *
 * @version    2005/9/26        mturon          Initial version
 *
 * These structure definitions are used by mig to auto-generate XML packet
 * descriptions for parsing by tools such as XServe 2.0.
 *
 * Usage:        mig xserve appPacket.h AppPacket
 */

#ifndef __APP_PACKET_H__
#define __APP_PACKET_H__

#include "XPacket.h"
#include "sensorboardApp.h"

enum { AM_APPPACKET = AM_XMULTIHOP_MSG };

typedef struct AppPacket {
   TosHeader_t    am;
   XMeshHeader_t  xmesh;
   XDataMsg       data;
} AppPacket;
```

APPENDIX G: BASELINE AND EXPERIMENT PERIOD SCHEDULE

The following reports the schedule for the study. Selected day's used in the analysis of baseline and experiment periods for physical activity (PA) and living pattern (LP) are noted. The day's that a persuasive message (PM) was delivered to the study participant is also reported.

	Wk	Date	Day	Home	Departed	Returned	PM	Notes
Baseline Period	1	11/2/09	Mon	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/3/09	Tues	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/4/09	Wed	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/5/09	Thur	Y			N	Baseline data—PA Incomplete LP data; power outage
		11/6/09	Fri	N	19:11:29		N	Baseline data—PA Experiment data—PA
		11/7/09	Sat	N			N	
		11/8/09	Sun	N			N	
	2	11/9/09	Mon	N		21:36:15	N	
		11/10/09	Tues	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/11/09	Wed	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/12/09	Thur	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/13/09	Fri	N	7:46:04		N	
		11/14/09	Sat	N		19:29:27	N	
		11/15/09	Sun	Y			N	Baseline data—PA and LP Experiment data—PA and LP
	3	11/16/09	Mon	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/17/09	Tues	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/18/09	Wed	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/19/09	Thur	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/20/09	Fri	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/21/09	Sat	N	8:09:04		N	
		11/22/09	Sun	N		20:37:06	N	

	Wk	Date	Day	Home	Departed	Returned	PM	Notes
Baseline Period	4	11/23/09	Mon	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/24/09	Tues	Y			N	Baseline data—PA and LP Experiment data—PA and LP
		11/25/09	Wed	N	14:30:21		N	
		11/26/09	Thur	N			N	
		11/27/09	Fri	Y			N	Baseline data—PA Experiment data—PA
		11/28/09	Sat	Y			N	Baseline data—PA Experiment data—PA
		11/29/09	Sun	Y			N	Baseline data—PA Experiment data—PA
Experiment Period	1	11/30/09	Mon	Y			Y	Experiment data—LP and PA
		12/1/09	Tues	Y			Y	Experiment data—LP and PA
		12/2/09	Wed	Y			Y	Experiment data—LP and PA
		12/3/09	Thur	N	18:27:31		Y	Experiment data—PA
		12/4/09	Fri	N			N	
		12/5/09	Sat	N			N	
		12/6/09	Sun	N		14:39:27	N	Poor weather: Rain
	2	12/7/09	Mon	Y			Y	Experiment data—LP and PA Poor weather: Rain/Strong Wind
		12/8/09	Tues	Y			Y	Experiment data—LP and PA
		12/9/09	Wed	Y			Y	Experiment data—PA Incomplete LP data; unexpected system reboot
		12/10/09	Thur	Y			Y	Experiment data—LP and PA
		12/11/09	Fri	Y			Y	Experiment data—LP and PA Poor weather: Rain
		12/12/09	Sat	Y			Y	Experiment data—LP and PA Poor weather: Rain
		12/13/09	Sun	Y			Y	Experiment data—LP and PA
	3	12/14/09	Mon	Y			Y	Experiment data—PA Incomplete LP data from 8 am - 12 pm due to researcher error to restart the system
		12/15/09	Tues	N	18:07:22		N	Experiment data—PA
		12/16/09	Wed	N			N	
		12/17/09	Thur	N			N	
		12/18/09	Fri	N		7:32:37	Y	Experiment data—PA
		12/19/09	Sat	Y			N	Experiment data—LP and PA
		12/20/09	Sun	Y			Y	Experiment data—PA Incomplete LP data from 7 am - 4 pm due to researcher error to restart the system

	Wk	Date	Day	Home	Departed	Returned	PM	Notes
Experiment Period	4	12/21/09	Mon	Y			Y	Experiment data—LP and PA
		12/22/09	Tues	Y			Y	Experiment data—LP and PA Poor weather: Rain/Strong Winds
		12/23/09	Wed	Y			Y	Experiment data—LP and PA
		12/24/09	Thur	N	9:56:30		Y	
		12/25/09	Fri	N			N	
		12/26/09	Sat	N		15:43:23	N	
		12/27/09	Sun	Y			Y	
	5	12/28/09	Mon	Y			Y	
		12/29/09	Tues	Y			Y	
		12/30/09	Wed	N	17:41:34		Y	Poor weather: Rain
		12/31/09	Thur	N			N	
		1/1/10	Fri	N			N	
		1/2/10	Sat	N		10:13:15	N	
		1/3/10	Sun	Y			N	
	6	1/4/10	Mon	Y			Y	
		1/5/10	Tues	Y			Y	
		1/6/10	Wed	Y			Y	
		1/7/10	Thur	Y			Y	
		1/8/10	Fri	Y			Y	
		1/9/10	Sat	Y			Y	
		1/10/10	Sun	N	9:10:38		N	
	7	1/11/10	Mon	N			N	
		1/12/10	Tues	N			N	
		1/13/10	Wed	N		9:21:57	Y	Poor weather: Rain
		1/14/10	Thur	Y			Y	Incomplete data; researcher error in evaluation
		1/15/10	Fri	Y			Y	
		1/16/10	Sat	Y			Y	
		1/17/10	Sun	Y			Y	

APPENDIX H: PHYSICAL ACTIVITY AND LIVING PATTERN ANALYSIS METHODOLOGY

Two specially created Microsoft Excel workbooks were created to analyze the living pattern data from the Behavior Modification Sensor System (BMSS). The two workbooks were MasterAnalysis(FIRST) and MasterAnalysis(SECOND). Two workbooks were needed since the amount of raw data that was analyzed (e.g., 100,000 rows x 6 columns) tended to crash the program if they were combined into one workbook.

The MasterAnalysis(FIRST) workbook was used to move the data from node 1 to the same row as node 2. This created a dataset of approximately 50,000 rows x 12 columns of unfiltered data. One column represented the data from one sensor (e.g., living room, bathroom, microwave, etc.). Moving the data from node 1 to node 2 was needed to support the filtering and analysis of data from both nodes. The MasterAnalysis(FIRST) workbook had two worksheets—1) "Data" that contained the raw data from each node and 2) "Data Joined" that contained the joined data from node 1 and node 2. This data was copied to the "DataFiltered" worksheet in the MasterAnalysis(SECOND) workbook.

The MasterAnalysis(SECOND) workbook was used to scrub and obtain the daily living pattern data from the BMSS. It contained six worksheets: 1) "DataFiltered", 2) "BeginEndTimes", 3) "CouchTV Times", 4) "TotalTimes", 5) "Presence", and 6) "WalkingData". Data from the "DataFiltered" worksheet was scrubbed to eliminate times when all the sensors were in a non-triggered state (e.g., 20 as determined by a SubTotal column). Each column in this worksheet represented a different sensor (e.g., kitchen, bedroom, outside the home, etc.). Each column was scrubbed to zero out (i.e., original value changed to 0) the values between the beginning and ending trigger times of each sensor.

The "BeginEndTimes" and the "CouchTV Times" worksheets linked to the "DataFiltered" worksheet and extracted the beginning and ending times of each sensor node and measurement parameter of interest. For each measurement of interest, the data from both worksheets were manually copied to the "TotalTimes" worksheet. This worksheet had one column for each sensor measurement of interest (e.g., kitchen, living room, couch-TV, etc.). The "Presence" worksheet linked to the "TotalTimes" worksheet and the "WalkingData" worksheet that contained the raw walking data obtained from the Omron Health Management Software (downloaded as a CSV data set) to build and visually display the daily living and walking pattern of the study participant.

The steps taken in analyzing each day's living pattern and walking activity are summarized in the following steps:

1. Downloaded the data from the BMSS, CSV format w/Tab.
2. Opened BMSS data using Excel.
3. Copied data into MasterAnalysis(FIRST) workbook—"Data" worksheet.
4. "Data Joined" worksheet
    a. Moved Node 1 data up to synchronize with Node 2 data
    b. General cell formula: IF(AND(Data!$A2=2,Data!$A3=1),Data!C3,"")
    c. Notes:
        i. Multiple Node 1 or Node 2 rows that follow each other were filtered and only one node row was kept. This was not a problem since multiple rows from the same node typically had the same data set and the sample time between each row was typically 1 second.
        ii. Node 2 remained locked; sample time was accurate.
        iii. Data associated with Node 1 was off in time by 2-5 seconds. This was acceptable since the sample rate of the room presence sensors were approximately 3 seconds.
5. Copied data from "Data Joined" worksheet and Paste Special as "values" only into MasterAnalysis(SECOND)—"DataFiltered" worksheet
    a. Filtered "Sub Total" column and deleted rows with 20.
    b. Deleted "Sub Total" column
    c. NOTE: Filter and delete operations could be done in MasterAnalysis(FIRST) first.
6. "BeginEndTimes" worksheet
    a. Determined "Begin" and "End" times for each sensor. "Single" denotes one sensor firing only.
    b. General cell formula: IF(DataFiltered!D2=0,IF(DataFiltered!D1>0,IF(DataFiltered!D3=0,"Begin", "Single"),IF(DataFiltered!D3>0,"End","")),"")
7. "CouchTV" worksheet
    a. Summarized times when Couch and LivingRM TV sensors were triggered.
    b. General cell formula: IF(AND(C2=0,D2=0),IF(OR(C1>0,D1>0),IF(OR(C3=0,D3=0),"Begin", "Single"),IF(OR(C3>0,D3>0),"End","")),"")
8. Copied selected and filtered sensor data from "BeginEndTimes" or "CouchTV" to the appropriate sensor column in "Total Times" worksheet
    a. "Ck" column was used to identify readings that crossed hours (denoted by "X"); needed to edit so that all times were within the associated hour.
9. "Presence" worksheet
    a. Showed total times per hour
10. Assumptions:
    a. LivingRM was the difference between times from the Dining Room, Kitchen, BedRM, BathRM, and Outside Home.
    b. BedRM was the total time from the BedRM sensor or Bed sensor.

"DataFiltered" Worksheet Example

	Date_Time	Time	adc0 [V] Couch	adc1 [V] Dining Room	adc2 [V] Kitchen	digi0 uWave	digi1 Food Cabinet	digi2 Fridge	adc0 [V] Main Door	adc1 [V] BedRm Entry	adc2 [V] BathRm Entry	digi0 TV-BedRm	digi1 Bed	digi2 TV-LvngR
2	0:05:13	0:5:13	2	2	2	1	1	1	2	2	2	1	0	1
2	0:05:15	0:5:15	2	2	2	1	1	1	2	2	2	1	0	1
2	0:05:21	0:5:21	2	2	2	1	1	1	2	2	2	1	0	1

"BeginEndTimes" Worksheet Example

Date_Tir	Time	adc0 [V] Couc	adc1 [V] Dining Room	adc2 [V] Kitche	digi0 uWav	digi1 Food Cabine	digi2 Fridge	adc0 [V] Main Door	adc1 [V] BedRm Entry	adc2 [V] BathRm Entry	digi0 TV-BedRr	digi1 Bed	digi2 TV-LvngR
0:05:13	0:5:13											Begin	
6:56:34	6:56:34											End	

"CouchTV" Worksheet Example

Date_Tir	Time	adc0 [V] Couc	digi2 TV-LvngR	Couch-TV Tim
9:50:38	9:50:38	0	0	Begin
9:53:08	9:53:8	0	0	End
10:02:25	10:2:25	0	0	Begin
10:06:33	10:6:33	0	0	End

"Total Times" Worksheet Example

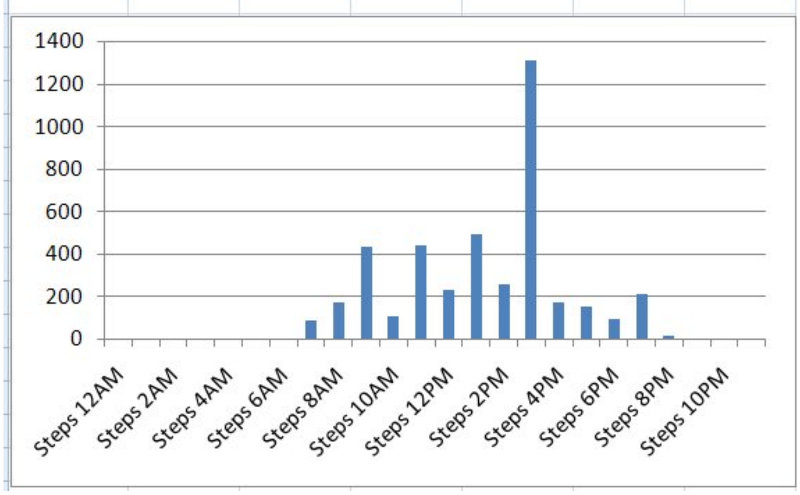
Hour	Date_Time	adc2 [V] Kitchen	Sub Total	Ck	Hour	Date_Time	adc1 [V] BedRm	Sub Total	Ck	Hour	Date_Time	digi1 Bed	Sub Tota
7	7:00:26	Begin		X	6	6:56:39	Begin		X	0	0:05:13	Begin	
7	7:00:30	End	0:00:04		6	6:56:44	End	0:00:05		0	0:59:59	End	0:54:46
7	7:01:38	Begin			7	7:00:22	Begin			1	1:00:00	Begin	
7	7:01:49	End	0:00:11		7	7:00:24	End	0:00:02		1	1:59:59	End	0:59:59

“Presence” Worksheet Example

Date:	Tuesday, December 01, 2009				Week	1		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:54:46	0:54:46	0:00:00	0:05:13	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:56:39	0:56:34	0:00:00	0:03:20	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:43:06	0:02:23	0:00:02	0:00:00	0:09:43	0:04:45	0:00:00	0:00:00	0:00:00	0:00:00	0:00:19	0:00:00	88	0	Breakfest
8:00:00	0:11:44	0:06:13	0:19:47	0:00:00	0:09:52	0:12:23	0:00:00	0:00:00	0:00:00	0:00:00	0:00:06	0:00:09	170	0	
9:00:00	0:19:23	0:03:50	0:02:14	0:00:00	0:05:29	0:12:00	0:17:03	0:02:30	0:00:00	0:00:00	0:00:00	0:00:00	433	0	
10:00:00	0:01:13	0:00:16	0:00:45	0:00:00	0:02:32	0:55:13	0:00:00	0:07:49	0:00:00	0:00:00	0:00:00	0:00:00	107	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	443	0	
12:00:00	0:01:23	0:01:19	0:00:04	0:00:00	0:00:00	0:57:13	0:00:00	0:00:00	0:00:00	0:00:00	0:00:13	0:00:01	231	0	
13:00:00	0:10:30	0:02:35	0:03:14	0:00:00	0:12:50	0:30:50	0:00:00	0:12:42	0:00:00	0:00:00	0:00:00	0:00:00	495	0	
14:00:00	0:00:00	0:00:21	0:00:48	0:00:00	0:00:29	0:58:21	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	259	0	
15:00:00	0:07:43	0:31:08	0:01:16	0:00:00	0:05:00	0:03:40	0:11:12	0:00:27	0:00:00	0:00:04	0:00:16	0:01:08	1312	1157	Lunch
16:00:00	0:01:17	0:01:18	0:01:08	0:00:00	0:03:22	0:51:46	0:01:08	0:49:37	0:00:00	0:00:00	0:00:00	0:00:13	170	74	
17:00:00	0:00:35	0:01:21	0:29:42	0:00:00	0:03:42	0:24:39	0:00:00	0:22:53	0:00:00	0:00:00	0:00:00	0:00:00	151	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	94	0	
19:00:00	0:01:00	0:07:56	0:00:09	0:00:00	0:03:19	0:47:35	0:00:00	0:40:18	0:00:00	0:00:00	0:00:59	0:00:07	213	0	Dinner
20:00:00	0:00:53	0:03:20	0:02:17	0:00:00	0:05:56	0:47:33	0:00:00	0:46:07	0:00:00	0:00:00	0:00:02	0:00:00	18	0	
21:00:00	0:00:00	0:00:37	0:50:54	0:46:47	0:07:57	0:00:31	0:00:00	0:00:00	0:24:02	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:38:47	1:02:37	10:43:38	9:38:00	1:10:11	8:55:00	0:29:23	3:02:23	0:24:02	0:00:04	0:01:55	0:01:38	4184	1231	
TOTAL	Steps:	4184		SLEEP	Total Hrs:	9:12:16					Met?		WEATHER	69/S	
	Aerobic:	1231			Interupted:	N		GOAL	Weekly:	3445	Y				
	Miles:	2.24							Strategy:	Praise					
	Calories:	109													

“WalkingData” Worksheet Example

Date	Total Steps	Aerobic Steps	Aerobic Walking Time	Calories	Distance	Fat Burned
12/1/2009	4184	1231	12	109	2.24	6.1



APPENDIX I: PHYSICAL ACTIVITY DATA

The following reports the physical activity data from the baseline and experiment periods. Physical activity was captured using the Omron HJ-720ITC Pocket Pedometer. The selected days for analysis of physical activity as discussed in Chapter 6 are highlighted in yellow.

Study Period	Date	Total Steps	Aerobic Steps	Aerobic Walking Time	Calories	Distance	Fat Burned
Baseline	11/2/2009	4086	0	0	110	2.19	6.1
Baseline	11/3/2009	6108	1714	18	180	3.27	10.4
Baseline	11/4/2009	1669	0	0	34	0.89	1.8
Baseline	11/5/2009	3560	0	0	86	1.91	4.7
Baseline	11/6/2009	3064	0	0	62	1.64	3.4
Baseline	11/7/2009	4901	0	0	107	2.62	5.8
Baseline	11/8/2009	2752	0	0	57	1.47	3.1
Baseline	11/9/2009	3718	0	0	65	1.99	3.5
Baseline	11/10/2009	2699	0	0	49	1.44	2.6
Baseline	11/11/2009	3735	0	0	102	2	5.6
Baseline	11/12/2009	3398	0	0	71	1.82	3.9
Baseline	11/13/2009	3416	0	0	43	1.83	2.3
Baseline	11/14/2009	3327	0	0	61	1.78	3.3
Baseline	11/15/2009	3741	0	0	102	2	5.6
Baseline	11/16/2009	3307	0	0	80	1.77	4.4
Baseline	11/17/2009	3340	0	0	81	1.79	4.4
Baseline	11/18/2009	2404	0	0	59	1.29	3.2
Baseline	11/19/2009	2678	0	0	65	1.43	3.6
Baseline	11/20/2009	2921	0	0	77	1.56	4.2
Baseline	11/21/2009	5616	0	0	151	3.01	8.2
Baseline	11/22/2009	2248	0	0	35	1.2	1.8
Baseline	11/23/2009	3266	0	0	79	1.75	4.3
Baseline	11/24/2009	1892	0	0	34	1.01	1.8
Baseline	11/25/2009	3551	0	0	81	1.9	4.4
Baseline	11/26/2009	1326	0	0	29	0.71	1.5
Baseline	11/27/2009	2234	0	0	37	1.19	2
Baseline	11/28/2009	2406	0	0	47	1.29	2.5
Baseline	11/29/2009	2450	0	0	55	1.31	3

Study Period	Date	Steps 12AM	Steps 1AM	Steps 2AM	Steps 3AM	Steps 4AM	Steps 5AM	Steps 6AM
Baseline	11/2/2009	0	0	0	0	0	0	0
Baseline	11/3/2009	0	0	0	0	0	0	230
Baseline	11/4/2009	0	0	0	0	0	0	0
Baseline	11/5/2009	0	0	0	0	0	61	103
Baseline	11/6/2009	0	0	0	0	22	52	44
Baseline	11/7/2009	0	0	0	0	0	0	0
Baseline	11/8/2009	0	0	0	0	0	0	51
Baseline	11/9/2009	0	0	0	0	0	124	47
Baseline	11/10/2009	0	0	0	0	0	0	0
Baseline	11/11/2009	0	0	0	0	0	0	0
Baseline	11/12/2009	0	0	0	75	0	0	0
Baseline	11/13/2009	0	0	0	0	0	250	99
Baseline	11/14/2009	0	0	0	0	0	0	0
Baseline	11/15/2009	0	0	0	0	0	0	0
Baseline	11/16/2009	0	0	0	0	8	78	7
Baseline	11/17/2009	0	0	0	0	7	0	0
Baseline	11/18/2009	0	0	0	0	0	0	0
Baseline	11/19/2009	0	0	0	0	0	0	0
Baseline	11/20/2009	0	0	0	0	7	109	63
Baseline	11/21/2009	0	0	0	0	0	0	0
Baseline	11/22/2009	0	0	0	0	0	0	0
Baseline	11/23/2009	0	0	0	0	0	0	0
Baseline	11/24/2009	0	0	0	0	0	97	37
Baseline	11/25/2009	0	0	0	0	0	0	0
Baseline	11/26/2009	0	0	0	0	0	0	0
Baseline	11/27/2009	0	0	0	0	0	0	0
Baseline	11/28/2009	0	0	0	0	0	0	0
Baseline	11/29/2009	0	0	0	0	0	0	0

Study Period	Date	Steps 7AM	Steps 8AM	Steps 9AM	Steps 10AM	Steps 11AM	Steps 12PM	Steps 1PM
Baseline	11/2/2009	68	273	530	174	639	556	104
Baseline	11/3/2009	188	234	78	273	190	398	355
Baseline	11/4/2009	0	166	108	174	300	96	25
Baseline	11/5/2009	101	374	593	148	508	252	303
Baseline	11/6/2009	399	273	282	0	373	222	91
Baseline	11/7/2009	216	99	372	476	597	524	195
Baseline	11/8/2009	25	34	96	137	185	209	143
Baseline	11/9/2009	269	161	599	202	119	207	616
Baseline	11/10/2009	0	375	446	345	111	137	154
Baseline	11/11/2009	0	206	255	653	644	1548	59
Baseline	11/12/2009	106	180	813	305	121	694	276
Baseline	11/13/2009	111	215	46	283	205	365	355
Baseline	11/14/2009	0	0	286	569	261	140	238
Baseline	11/15/2009	71	132	343	413	217	501	1059
Baseline	11/16/2009	180	963	103	549	620	526	27
Baseline	11/17/2009	70	177	828	401	569	87	154
Baseline	11/18/2009	0	96	430	7	828	162	599
Baseline	11/19/2009	13	162	666	91	464	489	249
Baseline	11/20/2009	135	64	83	150	516	609	219
Baseline	11/21/2009	79	463	234	217	155	207	789
Baseline	11/22/2009	0	0	0	0	327	426	429
Baseline	11/23/2009	21	110	766	104	231	995	62
Baseline	11/24/2009	69	0	432	173	155	45	259
Baseline	11/25/2009	0	131	711	91	109	487	184
Baseline	11/26/2009	0	0	0	210	257	227	94
Baseline	11/27/2009	0	0	191	280	351	329	558
Baseline	11/28/2009	0	0	69	139	223	817	78
Baseline	11/29/2009	41	55	429	543	645	63	74

Study Period	Date	Steps 2PM	Steps 3PM	Steps 4PM	Steps 5PM	Steps 6PM	Steps 7PM	Steps 8PM
Baseline	11/2/2009	1095	112	37	83	66	303	46
Baseline	11/3/2009	3199	411	174	186	0	140	52
Baseline	11/4/2009	12	547	32	55	89	65	0
Baseline	11/5/2009	215	300	115	36	25	236	167
Baseline	11/6/2009	110	56	372	253	205	109	201
Baseline	11/7/2009	286	499	677	542	162	43	213
Baseline	11/8/2009	145	0	220	362	526	608	11
Baseline	11/9/2009	233	192	244	153	152	184	158
Baseline	11/10/2009	410	62	96	153	0	222	166
Baseline	11/11/2009	23	0	42	155	110	26	14
Baseline	11/12/2009	245	177	46	97	61	19	65
Baseline	11/13/2009	210	68	480	207	212	195	115
Baseline	11/14/2009	256	145	92	169	413	452	306
Baseline	11/15/2009	279	107	108	123	44	0	189
Baseline	11/16/2009	18	26	39	19	8	136	0
Baseline	11/17/2009	609	131	52	0	0	104	134
Baseline	11/18/2009	81	77	54	15	0	0	19
Baseline	11/19/2009	307	50	10	41	8	14	114
Baseline	11/20/2009	55	81	130	271	149	252	28
Baseline	11/21/2009	543	110	1008	711	993	53	54
Baseline	11/22/2009	173	217	105	152	101	41	277
Baseline	11/23/2009	346	162	74	52	95	200	41
Baseline	11/24/2009	163	41	25	168	90	91	39
Baseline	11/25/2009	198	687	369	189	87	114	175
Baseline	11/26/2009	0	118	117	119	85	50	49
Baseline	11/27/2009	210	99	85	0	102	29	0
Baseline	11/28/2009	156	0	260	194	132	0	38
Baseline	11/29/2009	33	89	129	93	66	33	107

Study Period	Date	Steps 9PM	Steps 10PM	Steps 11PM	Aerobic Steps 12AM	Aerobic Steps 1AM	Aerobic Steps 2AM	Aerobic Steps 3AM
Baseline	11/2/2009	0	0	0	0	0	0	0
Baseline	11/3/2009	0	0	0	0	0	0	0
Baseline	11/4/2009	0	0	0	0	0	0	0
Baseline	11/5/2009	23	0	0	0	0	0	0
Baseline	11/6/2009	0	0	0	0	0	0	0
Baseline	11/7/2009	0	0	0	0	0	0	0
Baseline	11/8/2009	0	0	0	0	0	0	0
Baseline	11/9/2009	58	0	0	0	0	0	0
Baseline	11/10/2009	22	0	0	0	0	0	0
Baseline	11/11/2009	0	0	0	0	0	0	0
Baseline	11/12/2009	118	0	0	0	0	0	0
Baseline	11/13/2009	0	0	0	0	0	0	0
Baseline	11/14/2009	0	0	0	0	0	0	0
Baseline	11/15/2009	155	0	0	0	0	0	0
Baseline	11/16/2009	0	0	0	0	0	0	0
Baseline	11/17/2009	17	0	0	0	0	0	0
Baseline	11/18/2009	36	0	0	0	0	0	0
Baseline	11/19/2009	0	0	0	0	0	0	0
Baseline	11/20/2009	0	0	0	0	0	0	0
Baseline	11/21/2009	0	0	0	0	0	0	0
Baseline	11/22/2009	0	0	0	0	0	0	0
Baseline	11/23/2009	7	0	0	0	0	0	0
Baseline	11/24/2009	8	0	0	0	0	0	0
Baseline	11/25/2009	19	0	0	0	0	0	0
Baseline	11/26/2009	0	0	0	0	0	0	0
Baseline	11/27/2009	0	0	0	0	0	0	0
Baseline	11/28/2009	203	97	0	0	0	0	0
Baseline	11/29/2009	50	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 4AM	Aerobic Steps 5AM	Aerobic Steps 6AM	Aerobic Steps 7AM	Aerobic Steps 8AM	Aerobic Steps 9AM	Aerobic Steps 10AM
Baseline	11/2/2009	0	0	0	0	0	0	0
Baseline	11/3/2009	0	0	0	0	0	0	0
Baseline	11/4/2009	0	0	0	0	0	0	0
Baseline	11/5/2009	0	0	0	0	0	0	0
Baseline	11/6/2009	0	0	0	0	0	0	0
Baseline	11/7/2009	0	0	0	0	0	0	0
Baseline	11/8/2009	0	0	0	0	0	0	0
Baseline	11/9/2009	0	0	0	0	0	0	0
Baseline	11/10/2009	0	0	0	0	0	0	0
Baseline	11/11/2009	0	0	0	0	0	0	0
Baseline	11/12/2009	0	0	0	0	0	0	0
Baseline	11/13/2009	0	0	0	0	0	0	0
Baseline	11/14/2009	0	0	0	0	0	0	0
Baseline	11/15/2009	0	0	0	0	0	0	0
Baseline	11/16/2009	0	0	0	0	0	0	0
Baseline	11/17/2009	0	0	0	0	0	0	0
Baseline	11/18/2009	0	0	0	0	0	0	0
Baseline	11/19/2009	0	0	0	0	0	0	0
Baseline	11/20/2009	0	0	0	0	0	0	0
Baseline	11/21/2009	0	0	0	0	0	0	0
Baseline	11/22/2009	0	0	0	0	0	0	0
Baseline	11/23/2009	0	0	0	0	0	0	0
Baseline	11/24/2009	0	0	0	0	0	0	0
Baseline	11/25/2009	0	0	0	0	0	0	0
Baseline	11/26/2009	0	0	0	0	0	0	0
Baseline	11/27/2009	0	0	0	0	0	0	0
Baseline	11/28/2009	0	0	0	0	0	0	0
Baseline	11/29/2009	0	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 11AM	Aerobic Steps 12PM	Aerobic Steps 1PM	Aerobic Steps 2PM	Aerobic Steps 3PM	Aerobic Steps 4PM	Aerobic Steps 5PM
Baseline	11/2/2009	0	0	0	0	0	0	0
Baseline	11/3/2009	0	0	0	1714	0	0	0
Baseline	11/4/2009	0	0	0	0	0	0	0
Baseline	11/5/2009	0	0	0	0	0	0	0
Baseline	11/6/2009	0	0	0	0	0	0	0
Baseline	11/7/2009	0	0	0	0	0	0	0
Baseline	11/8/2009	0	0	0	0	0	0	0
Baseline	11/9/2009	0	0	0	0	0	0	0
Baseline	11/10/2009	0	0	0	0	0	0	0
Baseline	11/11/2009	0	0	0	0	0	0	0
Baseline	11/12/2009	0	0	0	0	0	0	0
Baseline	11/13/2009	0	0	0	0	0	0	0
Baseline	11/14/2009	0	0	0	0	0	0	0
Baseline	11/15/2009	0	0	0	0	0	0	0
Baseline	11/16/2009	0	0	0	0	0	0	0
Baseline	11/17/2009	0	0	0	0	0	0	0
Baseline	11/18/2009	0	0	0	0	0	0	0
Baseline	11/19/2009	0	0	0	0	0	0	0
Baseline	11/20/2009	0	0	0	0	0	0	0
Baseline	11/21/2009	0	0	0	0	0	0	0
Baseline	11/22/2009	0	0	0	0	0	0	0
Baseline	11/23/2009	0	0	0	0	0	0	0
Baseline	11/24/2009	0	0	0	0	0	0	0
Baseline	11/25/2009	0	0	0	0	0	0	0
Baseline	11/26/2009	0	0	0	0	0	0	0
Baseline	11/27/2009	0	0	0	0	0	0	0
Baseline	11/28/2009	0	0	0	0	0	0	0
Baseline	11/29/2009	0	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 6PM	Aerobic Steps 7PM	Aerobic Steps 8PM	Aerobic Steps 9PM	Aerobic Steps 10PM	Aerobic Steps 11PM
Baseline	11/2/2009	0	0	0	0	0	0
Baseline	11/3/2009	0	0	0	0	0	0
Baseline	11/4/2009	0	0	0	0	0	0
Baseline	11/5/2009	0	0	0	0	0	0
Baseline	11/6/2009	0	0	0	0	0	0
Baseline	11/7/2009	0	0	0	0	0	0
Baseline	11/8/2009	0	0	0	0	0	0
Baseline	11/9/2009	0	0	0	0	0	0
Baseline	11/10/2009	0	0	0	0	0	0
Baseline	11/11/2009	0	0	0	0	0	0
Baseline	11/12/2009	0	0	0	0	0	0
Baseline	11/13/2009	0	0	0	0	0	0
Baseline	11/14/2009	0	0	0	0	0	0
Baseline	11/15/2009	0	0	0	0	0	0
Baseline	11/16/2009	0	0	0	0	0	0
Baseline	11/17/2009	0	0	0	0	0	0
Baseline	11/18/2009	0	0	0	0	0	0
Baseline	11/19/2009	0	0	0	0	0	0
Baseline	11/20/2009	0	0	0	0	0	0
Baseline	11/21/2009	0	0	0	0	0	0
Baseline	11/22/2009	0	0	0	0	0	0
Baseline	11/23/2009	0	0	0	0	0	0
Baseline	11/24/2009	0	0	0	0	0	0
Baseline	11/25/2009	0	0	0	0	0	0
Baseline	11/26/2009	0	0	0	0	0	0
Baseline	11/27/2009	0	0	0	0	0	0
Baseline	11/28/2009	0	0	0	0	0	0
Baseline	11/29/2009	0	0	0	0	0	0

Study Period	Date	Total Steps	Aerobic Steps	Aerobic Walking Time	Calories	Distance	Fat Burned
Experiment	11/30/2009	5017	1315	13	148	2.69	8.3
Experiment	12/1/2009	4184	1231	12	109	2.24	6.1
Experiment	12/2/2009	5939	2799	28	182	3.18	10.4
Experiment	12/3/2009	6434	2415	24	174	3.45	9.8
Experiment	12/4/2009	2610	0	0	35	1.4	1.9
Experiment	12/5/2009	2366	0	0	36	1.26	1.9
Experiment	12/6/2009	2807	0	0	35	1.5	1.9
Experiment	12/7/2009	3894	0	0	96	2.08	5.3
Experiment	12/8/2009	5810	1299	13	150	3.11	8.4
Experiment	12/9/2009	5439	0	0	134	2.91	7.4
Experiment	12/10/2009	4889	1293	13	126	2.62	7
Experiment	12/11/2009	3615	941	10	88	1.93	4.9
Experiment	12/12/2009	2847	1340	13	74	1.52	4.2
Experiment	12/13/2009	3142	0	0	80	1.68	4.4
Experiment	12/14/2009	6217	1305	13	177	3.33	9.9
Experiment	12/15/2009	6090	1243	11	183	3.26	10.2
Experiment	12/16/2009	3302	0	0	50	1.77	2.7
Experiment	12/17/2009	1410	0	0	12	0.75	0.6
Experiment	12/18/2009	5237	1078	11	157	2.81	8.8
Experiment	12/19/2009	3819	0	0	88	2.04	4.8
Experiment	12/20/2009	3029	0	0	68	1.62	3.7
Experiment	12/21/2009	6735	2911	30	211	3.61	13.3
Experiment	12/22/2009	5371	1050	11	138	2.88	7.7
Experiment	12/23/2009	7300	3997	41	233	3.91	13.6
Experiment	12/24/2009	6150	0	0	148	3.3	8
Experiment	12/25/2009	1365	0	0	20	0.73	1
Experiment	12/26/2009	4992	0	0	138	2.67	7.5
Experiment	12/27/2009	4507	0	0	128	2.41	7.1
Experiment	12/28/2009	5630	2577	25	148	3.02	8.3
Experiment	12/29/2009	4909	1138	11	144	2.63	8.1
Experiment	12/30/2009	5666	1124	11	143	3.04	8.1
Experiment	12/31/2009	3269	0	0	53	1.75	2.8

Study Period	Date	Total Steps	Aerobic Steps	Aerobic Walking Time	Calories	Distance	Fat Burned
Experiment	1/1/2010	2300	0	0	44	1.23	2.3
Experiment	1/2/2010	6435	1121	11	179	3.45	10
Experiment	1/3/2010	4498	2634	26	142	2.41	8.2
Experiment	1/4/2010	5208	1399	13	152	2.79	8.6
Experiment	1/5/2010	5879	2567	26	172	3.15	9.7
Experiment	1/6/2010	4454	1190	12	126	2.39	7.1
Experiment	1/7/2010	6168	2659	26	173	3.3	10
Experiment	1/8/2010	3987	0	0	95	2.13	5.3
Experiment	1/9/2010	4589	0	0	123	2.46	6.8
Experiment	1/10/2010	2491	0	0	36	1.33	1.9
Experiment	1/11/2010	2021	0	0	23	1.08	1.2
Experiment	1/12/2010	3037	0	0	34	1.62	1.8
Experiment	1/13/2010	5097	1122	11	146	2.73	8.2
Experiment	1/14/2010	5262	2328	23	150	2.82	8.5
Experiment	1/15/2010	6160	2403	25	170	3.3	9.6
Experiment	1/16/2010	4377	0	0	110	2.34	6
Experiment	1/17/2010	4222	1309	13	114	2.26	6.4
Experiment	1/18/2010	2289	0	0	40	1.22	2.2
Experiment	1/19/2010	2803	0	0	64	1.5	3.5
Experiment	1/20/2010	1627	0	0	24	0.87	1.3
Experiment	1/21/2010	2271	0	0	26	1.21	1.4
Experiment	1/22/2010	3417	0	0	57	1.83	3.1
Experiment	1/23/2010	2601	0	0	31	1.39	1.7
Experiment	1/24/2010	1718	0	0	44	0.92	2.4

Study Period	Date	Steps 12AM	Steps 1AM	Steps 2AM	Steps 3AM	Steps 4AM	Steps 5AM	Steps 6AM
Experiment	11/30/2009	0	0	0	0	0	57	41
Experiment	12/1/2009	0	0	0	0	0	0	0
Experiment	12/2/2009	0	0	0	0	0	111	35
Experiment	12/3/2009	0	0	0	0	67	47	18
Experiment	12/4/2009	0	0	0	0	0	0	0
Experiment	12/5/2009	0	0	0	0	0	0	0
Experiment	12/6/2009	0	0	0	0	0	0	0
Experiment	12/7/2009	0	0	0	0	18	0	0
Experiment	12/8/2009	0	0	0	0	0	15	53
Experiment	12/9/2009	0	0	0	0	0	0	0
Experiment	12/10/2009	0	0	0	0	0	0	108
Experiment	12/11/2009	0	0	0	0	0	36	25
Experiment	12/12/2009	0	0	0	0	0	90	92
Experiment	12/13/2009	0	0	0	0	0	0	0
Experiment	12/14/2009	0	0	0	0	0	88	87
Experiment	12/15/2009	0	0	0	0	0	35	93
Experiment	12/16/2009	0	0	0	0	0	0	0
Experiment	12/17/2009	0	0	0	0	0	0	0
Experiment	12/18/2009	0	0	0	0	0	0	147
Experiment	12/19/2009	0	0	0	0	0	0	0
Experiment	12/20/2009	0	0	0	0	0	0	193
Experiment	12/21/2009	0	0	0	0	0	111	53
Experiment	12/22/2009	0	0	0	0	0	0	68
Experiment	12/23/2009	0	0	0	0	0	0	121
Experiment	12/24/2009	0	0	0	0	0	0	0
Experiment	12/25/2009	90	0	0	0	0	0	0
Experiment	12/26/2009	0	0	0	0	0	0	0
Experiment	12/27/2009	0	0	0	0	0	0	0
Experiment	12/28/2009	0	0	0	0	0	99	0
Experiment	12/29/2009	0	0	0	0	0	0	0
Experiment	12/30/2009	0	0	0	0	0	36	88
Experiment	12/31/2009	0	0	0	0	0	0	0

Study Period	Date	Steps 12AM	Steps 1AM	Steps 2AM	Steps 3AM	Steps 4AM	Steps 5AM	Steps 6AM
Experiment	1/1/2010	11	0	0	0	0	0	0
Experiment	1/2/2010	0	0	0	0	0	0	0
Experiment	1/3/2010	0	0	0	0	0	0	0
Experiment	1/4/2010	0	0	0	0	0	0	0
Experiment	1/5/2010	0	0	0	0	0	0	16
Experiment	1/6/2010	0	0	0	0	0	0	0
Experiment	1/7/2010	0	0	0	0	0	0	0
Experiment	1/8/2010	0	0	0	0	32	68	91
Experiment	1/9/2010	0	0	0	0	0	0	0
Experiment	1/10/2010	0	0	0	0	0	0	0
Experiment	1/11/2010	0	0	0	0	0	0	0
Experiment	1/12/2010	0	0	0	0	0	0	0
Experiment	1/13/2010	0	0	0	0	0	0	0
Experiment	1/14/2010	0	0	0	0	0	0	0
Experiment	1/15/2010	0	0	0	0	0	39	272
Experiment	1/16/2010	0	0	0	0	0	0	0
Experiment	1/17/2010	0	0	0	0	0	0	0
Experiment	1/18/2010	0	0	0	0	0	0	0
Experiment	1/19/2010	0	0	0	0	0	0	47
Experiment	1/20/2010	0	0	0	0	0	0	0
Experiment	1/21/2010	0	0	0	0	0	36	285
Experiment	1/22/2010	0	0	0	0	0	0	0
Experiment	1/23/2010	0	0	0	0	0	0	0
Experiment	1/24/2010	0	0	0	0	0	0	0

Study Period	Date	Steps 7AM	Steps 8AM	Steps 9AM	Steps 10AM	Steps 11AM	Steps 12PM	Steps 1PM
Experiment	11/30/2009	204	469	586	165	684	873	61
Experiment	12/1/2009	88	170	433	107	443	231	495
Experiment	12/2/2009	252	1760	918	36	204	495	329
Experiment	12/3/2009	12	156	1444	211	566	591	195
Experiment	12/4/2009	56	100	142	205	168	195	518
Experiment	12/5/2009	73	112	233	308	203	265	49
Experiment	12/6/2009	0	123	59	409	340	175	166
Experiment	12/7/2009	0	188	691	825	460	557	118
Experiment	12/8/2009	143	111	1339	178	157	154	1106
Experiment	12/9/2009	68	285	629	1327	823	422	216
Experiment	12/10/2009	57	109	591	186	707	14	272
Experiment	12/11/2009	0	213	627	0	1255	168	79
Experiment	12/12/2009	95	78	41	579	122	56	1430
Experiment	12/13/2009	241	58	524	411	169	30	492
Experiment	12/14/2009	228	430	737	327	519	969	179
Experiment	12/15/2009	411	1093	75	229	470	1482	137
Experiment	12/16/2009	120	66	167	595	480	259	310
Experiment	12/17/2009	0	44	117	255	147	145	259
Experiment	12/18/2009	495	291	373	21	1686	149	96
Experiment	12/19/2009	156	245	194	893	196	102	275
Experiment	12/20/2009	34	382	130	349	241	344	290
Experiment	12/21/2009	74	731	64	139	459	434	185
Experiment	12/22/2009	143	186	2013	0	435	333	80
Experiment	12/23/2009	149	1664	3301	249	390	197	870
Experiment	12/24/2009	234	896	301	1079	557	289	136
Experiment	12/25/2009	0	74	100	0	7	159	102
Experiment	12/26/2009	0	0	589	1246	1080	381	108
Experiment	12/27/2009	315	343	384	533	154	110	1457
Experiment	12/28/2009	17	163	1483	105	68	502	682
Experiment	12/29/2009	43	170	219	222	140	1520	344
Experiment	12/30/2009	81	1505	629	92	139	100	53
Experiment	12/31/2009	64	119	210	310	418	284	146

Study Period	Date	Steps 7AM	Steps 8AM	Steps 9AM	Steps 10AM	Steps 11AM	Steps 12PM	Steps 1PM
Experiment	1/1/2010	0	0	336	217	129	382	313
Experiment	1/2/2010	28	290	481	1088	419	1705	282
Experiment	1/3/2010	19	203	379	139	241	1479	62
Experiment	1/4/2010	134	114	2066	171	682	502	156
Experiment	1/5/2010	102	208	2127	19	578	0	21
Experiment	1/6/2010	67	147	1390	170	65	491	185
Experiment	1/7/2010	219	92	82	319	503	1702	92
Experiment	1/8/2010	50	175	73	174	35	86	240
Experiment	1/9/2010	0	103	113	316	1273	461	220
Experiment	1/10/2010	123	347	433	258	92	137	99
Experiment	1/11/2010	0	0	296	374	274	34	145
Experiment	1/12/2010	47	0	166	266	191	359	232
Experiment	1/13/2010	169	227	96	431	1250	949	140
Experiment	1/14/2010	27	61	622	203	1371	474	77
Experiment	1/15/2010	172	159	281	850	214	2092	54
Experiment	1/16/2010	40	73	176	373	1759	97	412
Experiment	1/17/2010	30	468	442	193	1894	81	204
Experiment	1/18/2010	96	163	601	154	628	78	63
Experiment	1/19/2010	103	118	521	507	159	567	46
Experiment	1/20/2010	126	199	710	48	66	58	11
Experiment	1/21/2010	77	60	99	195	260	88	38
Experiment	1/22/2010	184	126	568	66	253	400	469
Experiment	1/23/2010	0	7	209	335	213	173	240
Experiment	1/24/2010	157	71	467	462	75	35	0

Study Period	Date	Steps 2PM	Steps 3PM	Steps 4PM	Steps 5PM	Steps 6PM	Steps 7PM	Steps 8PM
Experiment	11/30/2009	144	0	1533	87	46	9	15
Experiment	12/1/2009	259	1312	170	151	94	213	18
Experiment	12/2/2009	19	1446	173	56	30	75	0
Experiment	12/3/2009	317	1451	283	98	343	182	218
Experiment	12/4/2009	253	248	45	186	30	144	104
Experiment	12/5/2009	297	69	118	288	132	219	0
Experiment	12/6/2009	371	401	204	103	122	164	92
Experiment	12/7/2009	466	245	118	11	96	86	15
Experiment	12/8/2009	187	1600	118	280	0	166	129
Experiment	12/9/2009	191	457	530	159	37	108	163
Experiment	12/10/2009	310	1542	174	601	118	100	0
Experiment	12/11/2009	72	90	587	29	170	143	94
Experiment	12/12/2009	9	92	66	57	8	32	0
Experiment	12/13/2009	119	128	521	87	63	162	53
Experiment	12/14/2009	853	1425	96	41	111	127	0
Experiment	12/15/2009	777	69	290	196	161	249	180
Experiment	12/16/2009	213	509	310	76	67	78	52
Experiment	12/17/2009	73	92	5	100	103	35	35
Experiment	12/18/2009	26	115	1315	49	0	275	79
Experiment	12/19/2009	893	10	0	200	291	170	194
Experiment	12/20/2009	160	189	145	208	181	71	112
Experiment	12/21/2009	38	3934	229	107	43	83	51
Experiment	12/22/2009	85	136	723	465	34	229	441
Experiment	12/23/2009	117	33	28	109	23	49	0
Experiment	12/24/2009	144	544	538	268	223	319	25
Experiment	12/25/2009	21	52	122	70	206	59	218
Experiment	12/26/2009	76	274	664	296	171	64	43
Experiment	12/27/2009	904	51	144	72	40	0	0
Experiment	12/28/2009	408	1237	605	127	32	15	39
Experiment	12/29/2009	260	1293	67	136	194	233	68
Experiment	12/30/2009	1460	425	90	188	83	397	55
Experiment	12/31/2009	116	249	40	181	324	167	213

Study Period	Date	Steps 2PM	Steps 3PM	Steps 4PM	Steps 5PM	Steps 6PM	Steps 7PM	Steps 8PM
Experiment	1/1/2010	118	21	201	191	133	14	121
Experiment	1/2/2010	68	1480	121	137	41	148	128
Experiment	1/3/2010	304	1370	136	104	53	9	0
Experiment	1/4/2010	664	406	113	166	15	19	0
Experiment	1/5/2010	322	300	1317	258	0	277	326
Experiment	1/6/2010	123	1476	87	81	66	47	59
Experiment	1/7/2010	590	2057	174	83	65	172	18
Experiment	1/8/2010	1488	283	460	124	27	287	271
Experiment	1/9/2010	1572	136	93	30	99	97	25
Experiment	1/10/2010	104	237	190	214	169	88	0
Experiment	1/11/2010	243	222	96	104	113	94	26
Experiment	1/12/2010	122	236	285	198	142	289	234
Experiment	1/13/2010	102	1508	41	84	54	16	30
Experiment	1/14/2010	110	1443	51	719	70	34	0
Experiment	1/15/2010	113	122	1239	169	7	138	220
Experiment	1/16/2010	377	170	453	147	92	150	58
Experiment	1/17/2010	201	471	166	22	50	0	0
Experiment	1/18/2010	70	180	55	76	10	115	0
Experiment	1/19/2010	18	105	18	156	129	257	40
Experiment	1/20/2010	58	78	47	34	41	70	81
Experiment	1/21/2010	77	174	450	21	206	180	25
Experiment	1/22/2010	258	430	196	213	123	85	46
Experiment	1/23/2010	141	296	64	302	94	60	54
Experiment	1/24/2010	0	18	97	116	220	0	0

Study Period	Date	Steps 9PM	Steps 10PM	Steps 11PM	Aerobic Steps 12AM	Aerobic Steps 1AM	Aerobic Steps 2AM	Aerobic Steps 3AM
Experiment	11/30/2009	43	0	0	0	0	0	0
Experiment	12/1/2009	0	0	0	0	0	0	0
Experiment	12/2/2009	0	0	0	0	0	0	0
Experiment	12/3/2009	235	0	0	0	0	0	0
Experiment	12/4/2009	76	79	61	0	0	0	0
Experiment	12/5/2009	0	0	0	0	0	0	0
Experiment	12/6/2009	61	17	0	0	0	0	0
Experiment	12/7/2009	0	0	0	0	0	0	0
Experiment	12/8/2009	74	0	0	0	0	0	0
Experiment	12/9/2009	24	0	0	0	0	0	0
Experiment	12/10/2009	0	0	0	0	0	0	0
Experiment	12/11/2009	27	0	0	0	0	0	0
Experiment	12/12/2009	0	0	0	0	0	0	0
Experiment	12/13/2009	84	0	0	0	0	0	0
Experiment	12/14/2009	0	0	0	0	0	0	0
Experiment	12/15/2009	126	5	12	0	0	0	0
Experiment	12/16/2009	0	0	0	0	0	0	0
Experiment	12/17/2009	0	0	0	0	0	0	0
Experiment	12/18/2009	120	0	0	0	0	0	0
Experiment	12/19/2009	0	0	0	0	0	0	0
Experiment	12/20/2009	0	0	0	0	0	0	0
Experiment	12/21/2009	0	0	0	0	0	0	0
Experiment	12/22/2009	0	0	0	0	0	0	0
Experiment	12/23/2009	0	0	0	0	0	0	0
Experiment	12/24/2009	352	129	116	0	0	0	0
Experiment	12/25/2009	85	0	0	0	0	0	0
Experiment	12/26/2009	0	0	0	0	0	0	0
Experiment	12/27/2009	0	0	0	0	0	0	0
Experiment	12/28/2009	48	0	0	0	0	0	0
Experiment	12/29/2009	0	0	0	0	0	0	0
Experiment	12/30/2009	160	85	0	0	0	0	0
Experiment	12/31/2009	96	193	139	0	0	0	0

Study Period	Date	Steps 9PM	Steps 10PM	Steps 11PM	Aerobic Steps 12AM	Aerobic Steps 1AM	Aerobic Steps 2AM	Aerobic Steps 3AM
Experiment	1/1/2010	113	0	0	0	0	0	0
Experiment	1/2/2010	19	0	0	0	0	0	0
Experiment	1/3/2010	0	0	0	0	0	0	0
Experiment	1/4/2010	0	0	0	0	0	0	0
Experiment	1/5/2010	8	0	0	0	0	0	0
Experiment	1/6/2010	0	0	0	0	0	0	0
Experiment	1/7/2010	0	0	0	0	0	0	0
Experiment	1/8/2010	14	0	0	0	0	0	0
Experiment	1/9/2010	51	0	0	0	0	0	0
Experiment	1/10/2010	0	0	0	0	0	0	0
Experiment	1/11/2010	0	0	0	0	0	0	0
Experiment	1/12/2010	270	0	0	0	0	0	0
Experiment	1/13/2010	0	0	0	0	0	0	0
Experiment	1/14/2010	0	0	0	0	0	0	0
Experiment	1/15/2010	19	0	0	0	0	0	0
Experiment	1/16/2010	0	0	0	0	0	0	0
Experiment	1/17/2010	0	0	0	0	0	0	0
Experiment	1/18/2010	0	0	0	0	0	0	0
Experiment	1/19/2010	12	0	0	0	0	0	0
Experiment	1/20/2010	0	0	0	0	0	0	0
Experiment	1/21/2010	0	0	0	0	0	0	0
Experiment	1/22/2010	0	0	0	0	0	0	0
Experiment	1/23/2010	186	227	0	0	0	0	0
Experiment	1/24/2010	0	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 4AM	Aerobic Steps 5AM	Aerobic Steps 6AM	Aerobic Steps 7AM	Aerobic Steps 8AM	Aerobic Steps 9AM	Aerobic Steps 10AM
Experiment	11/30/2009	0	0	0	0	0	0	0
Experiment	12/1/2009	0	0	0	0	0	0	0
Experiment	12/2/2009	0	0	0	0	1507	0	0
Experiment	12/3/2009	0	0	0	0	0	1152	0
Experiment	12/4/2009	0	0	0	0	0	0	0
Experiment	12/5/2009	0	0	0	0	0	0	0
Experiment	12/6/2009	0	0	0	0	0	0	0
Experiment	12/7/2009	0	0	0	0	0	0	0
Experiment	12/8/2009	0	0	0	0	0	0	0
Experiment	12/9/2009	0	0	0	0	0	0	0
Experiment	12/10/2009	0	0	0	0	0	0	0
Experiment	12/11/2009	0	0	0	0	0	0	0
Experiment	12/12/2009	0	0	0	0	0	0	0
Experiment	12/13/2009	0	0	0	0	0	0	0
Experiment	12/14/2009	0	0	0	0	0	0	0
Experiment	12/15/2009	0	0	0	340	903	0	0
Experiment	12/16/2009	0	0	0	0	0	0	0
Experiment	12/17/2009	0	0	0	0	0	0	0
Experiment	12/18/2009	0	0	0	0	0	0	0
Experiment	12/19/2009	0	0	0	0	0	0	0
Experiment	12/20/2009	0	0	0	0	0	0	0
Experiment	12/21/2009	0	0	0	0	0	0	0
Experiment	12/22/2009	0	0	0	0	0	1050	0
Experiment	12/23/2009	0	0	0	0	1212	2785	0
Experiment	12/24/2009	0	0	0	0	0	0	0
Experiment	12/25/2009	0	0	0	0	0	0	0
Experiment	12/26/2009	0	0	0	0	0	0	0
Experiment	12/27/2009	0	0	0	0	0	0	0
Experiment	12/28/2009	0	0	0	0	0	1257	0
Experiment	12/29/2009	0	0	0	0	0	0	0
Experiment	12/30/2009	0	0	0	0	1124	0	0
Experiment	12/31/2009	0	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 4AM	Aerobic Steps 5AM	Aerobic Steps 6AM	Aerobic Steps 7AM	Aerobic Steps 8AM	Aerobic Steps 9AM	Aerobic Steps 10AM
Experiment	1/1/2010	0	0	0	0	0	0	0
Experiment	1/2/2010	0	0	0	0	0	0	0
Experiment	1/3/2010	0	0	0	0	0	0	0
Experiment	1/4/2010	0	0	0	0	0	1399	0
Experiment	1/5/2010	0	0	0	0	0	1474	0
Experiment	1/6/2010	0	0	0	0	0	0	0
Experiment	1/7/2010	0	0	0	0	0	0	0
Experiment	1/8/2010	0	0	0	0	0	0	0
Experiment	1/9/2010	0	0	0	0	0	0	0
Experiment	1/10/2010	0	0	0	0	0	0	0
Experiment	1/11/2010	0	0	0	0	0	0	0
Experiment	1/12/2010	0	0	0	0	0	0	0
Experiment	1/13/2010	0	0	0	0	0	0	0
Experiment	1/14/2010	0	0	0	0	0	0	0
Experiment	1/15/2010	0	0	0	0	0	0	0
Experiment	1/16/2010	0	0	0	0	0	0	0
Experiment	1/17/2010	0	0	0	0	0	0	0
Experiment	1/18/2010	0	0	0	0	0	0	0
Experiment	1/19/2010	0	0	0	0	0	0	0
Experiment	1/20/2010	0	0	0	0	0	0	0
Experiment	1/21/2010	0	0	0	0	0	0	0
Experiment	1/22/2010	0	0	0	0	0	0	0
Experiment	1/23/2010	0	0	0	0	0	0	0
Experiment	1/24/2010	0	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 11AM	Aerobic Steps 12PM	Aerobic Steps 1PM	Aerobic Steps 2PM	Aerobic Steps 3PM	Aerobic Steps 4PM	Aerobic Steps 5PM
Experiment	11/30/2009	0	0	0	0	0	1315	0
Experiment	12/1/2009	0	0	0	0	1157	74	0
Experiment	12/2/2009	0	0	0	0	1292	0	0
Experiment	12/3/2009	0	0	0	317	946	0	0
Experiment	12/4/2009	0	0	0	0	0	0	0
Experiment	12/5/2009	0	0	0	0	0	0	0
Experiment	12/6/2009	0	0	0	0	0	0	0
Experiment	12/7/2009	0	0	0	0	0	0	0
Experiment	12/8/2009	0	0	0	0	1299	0	0
Experiment	12/9/2009	0	0	0	0	0	0	0
Experiment	12/10/2009	0	0	0	0	1293	0	0
Experiment	12/11/2009	941	0	0	0	0	0	0
Experiment	12/12/2009	0	0	1340	0	0	0	0
Experiment	12/13/2009	0	0	0	0	0	0	0
Experiment	12/14/2009	0	0	0	0	1305	0	0
Experiment	12/15/2009	0	0	0	0	0	0	0
Experiment	12/16/2009	0	0	0	0	0	0	0
Experiment	12/17/2009	0	0	0	0	0	0	0
Experiment	12/18/2009	1078	0	0	0	0	0	0
Experiment	12/19/2009	0	0	0	0	0	0	0
Experiment	12/20/2009	0	0	0	0	0	0	0
Experiment	12/21/2009	0	0	0	0	2911	0	0
Experiment	12/22/2009	0	0	0	0	0	0	0
Experiment	12/23/2009	0	0	0	0	0	0	0
Experiment	12/24/2009	0	0	0	0	0	0	0
Experiment	12/25/2009	0	0	0	0	0	0	0
Experiment	12/26/2009	0	0	0	0	0	0	0
Experiment	12/27/2009	0	0	0	0	0	0	0
Experiment	12/28/2009	0	0	0	0	964	356	0
Experiment	12/29/2009	0	0	0	0	1138	0	0
Experiment	12/30/2009	0	0	0	0	0	0	0
Experiment	12/31/2009	0	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 11AM	Aerobic Steps 12PM	Aerobic Steps 1PM	Aerobic Steps 2PM	Aerobic Steps 3PM	Aerobic Steps 4PM	Aerobic Steps 5PM
Experiment	1/1/2010	0	0	0	0	0	0	0
Experiment	1/2/2010	0	0	0	0	1121	0	0
Experiment	1/3/2010	0	1306	0	199	1129	0	0
Experiment	1/4/2010	0	0	0	0	0	0	0
Experiment	1/5/2010	0	0	0	0	191	902	0
Experiment	1/6/2010	0	0	0	0	1190	0	0
Experiment	1/7/2010	0	1440	0	0	1219	0	0
Experiment	1/8/2010	0	0	0	0	0	0	0
Experiment	1/9/2010	0	0	0	0	0	0	0
Experiment	1/10/2010	0	0	0	0	0	0	0
Experiment	1/11/2010	0	0	0	0	0	0	0
Experiment	1/12/2010	0	0	0	0	0	0	0
Experiment	1/13/2010	0	0	0	0	1122	0	0
Experiment	1/14/2010	1033	0	0	0	1295	0	0
Experiment	1/15/2010	0	1335	0	0	0	1068	0
Experiment	1/16/2010	0	0	0	0	0	0	0
Experiment	1/17/2010	1309	0	0	0	0	0	0
Experiment	1/18/2010	0	0	0	0	0	0	0
Experiment	1/19/2010	0	0	0	0	0	0	0
Experiment	1/20/2010	0	0	0	0	0	0	0
Experiment	1/21/2010	0	0	0	0	0	0	0
Experiment	1/22/2010	0	0	0	0	0	0	0
Experiment	1/23/2010	0	0	0	0	0	0	0
Experiment	1/24/2010	0	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 6PM	Aerobic Steps 7PM	Aerobic Steps 8PM	Aerobic Steps 9PM	Aerobic Steps 10PM	Aerobic Steps 11PM
Experiment	11/30/2009	0	0	0	0	0	0
Experiment	12/1/2009	0	0	0	0	0	0
Experiment	12/2/2009	0	0	0	0	0	0
Experiment	12/3/2009	0	0	0	0	0	0
Experiment	12/4/2009	0	0	0	0	0	0
Experiment	12/5/2009	0	0	0	0	0	0
Experiment	12/6/2009	0	0	0	0	0	0
Experiment	12/7/2009	0	0	0	0	0	0
Experiment	12/8/2009	0	0	0	0	0	0
Experiment	12/9/2009	0	0	0	0	0	0
Experiment	12/10/2009	0	0	0	0	0	0
Experiment	12/11/2009	0	0	0	0	0	0
Experiment	12/12/2009	0	0	0	0	0	0
Experiment	12/13/2009	0	0	0	0	0	0
Experiment	12/14/2009	0	0	0	0	0	0
Experiment	12/15/2009	0	0	0	0	0	0
Experiment	12/16/2009	0	0	0	0	0	0
Experiment	12/17/2009	0	0	0	0	0	0
Experiment	12/18/2009	0	0	0	0	0	0
Experiment	12/19/2009	0	0	0	0	0	0
Experiment	12/20/2009	0	0	0	0	0	0
Experiment	12/21/2009	0	0	0	0	0	0
Experiment	12/22/2009	0	0	0	0	0	0
Experiment	12/23/2009	0	0	0	0	0	0
Experiment	12/24/2009	0	0	0	0	0	0
Experiment	12/25/2009	0	0	0	0	0	0
Experiment	12/26/2009	0	0	0	0	0	0
Experiment	12/27/2009	0	0	0	0	0	0
Experiment	12/28/2009	0	0	0	0	0	0
Experiment	12/29/2009	0	0	0	0	0	0
Experiment	12/30/2009	0	0	0	0	0	0
Experiment	12/31/2009	0	0	0	0	0	0

Study Period	Date	Aerobic Steps 6PM	Aerobic Steps 7PM	Aerobic Steps 8PM	Aerobic Steps 9PM	Aerobic Steps 10PM	Aerobic Steps 11PM
Experiment	1/1/2010	0	0	0	0	0	0
Experiment	1/2/2010	0	0	0	0	0	0
Experiment	1/3/2010	0	0	0	0	0	0
Experiment	1/4/2010	0	0	0	0	0	0
Experiment	1/5/2010	0	0	0	0	0	0
Experiment	1/6/2010	0	0	0	0	0	0
Experiment	1/7/2010	0	0	0	0	0	0
Experiment	1/8/2010	0	0	0	0	0	0
Experiment	1/9/2010	0	0	0	0	0	0
Experiment	1/10/2010	0	0	0	0	0	0
Experiment	1/11/2010	0	0	0	0	0	0
Experiment	1/12/2010	0	0	0	0	0	0
Experiment	1/13/2010	0	0	0	0	0	0
Experiment	1/14/2010	0	0	0	0	0	0
Experiment	1/15/2010	0	0	0	0	0	0
Experiment	1/16/2010	0	0	0	0	0	0
Experiment	1/17/2010	0	0	0	0	0	0
Experiment	1/18/2010	0	0	0	0	0	0
Experiment	1/19/2010	0	0	0	0	0	0
Experiment	1/20/2010	0	0	0	0	0	0
Experiment	1/21/2010	0	0	0	0	0	0
Experiment	1/22/2010	0	0	0	0	0	0
Experiment	1/23/2010	0	0	0	0	0	0
Experiment	1/24/2010	0	0	0	0	0	0

APPENDIX J: STATISTICAL ANALYSIS DATA

Fist 19 Days vs. Random Sample

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Random Walking Steps	19	100.0%	0	.0%	19	100.0%
First 19 Days Walking Steps	19	100.0%	0	.0%	19	100.0%

Descriptives

			Statistic	Std. Error
Random Walking Steps	Mean		4955.37	235.175
	95% Confidence Interval for Mean	Lower Bound	4461.28	
		Upper Bound	5449.45	
	5% Trimmed Mean		4957.24	
	Median		5017.00	
	Variance		1050841.246	
	Std. Deviation		1025.105	
	Minimum		3142	
	Maximum		6735	
	Range		3593	
	Interquartile Range		1892	
	Skewness		-.041	.524
	Kurtosis		-1.110	1.014
First 19 Days Walking Steps	Mean		5000.42	306.543
	95% Confidence Interval for Mean	Lower Bound	4356.40	
		Upper Bound	5644.44	
	5% Trimmed Mean		4992.30	
	Median		5237.00	
	Variance		1785401.146	
	Std. Deviation		1336.189	
	Minimum		2847	
	Maximum		7300	
	Range		4453	
	Interquartile Range		2271	
	Skewness		-.139	.524
	Kurtosis		-1.085	1.014

Pre and Post-Treatment Data

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Baseline (Pre-Treatment) Total Steps	19	100.0%	0	.0%	19	100.0%
Baseline (Pre-Treatment) Aerobic Steps	19	100.0%	0	.0%	19	100.0%
Baseline (Pre-Treatment) Aerobic Walking Time	19	100.0%	0	.0%	19	100.0%
Baseline (Pre-Treatment) Calories	19	100.0%	0	.0%	19	100.0%
Baseline (Pre-Treatment) Distance	19	100.0%	0	.0%	19	100.0%
Exp. (Post-Treatment) Total Steps	19	100.0%	0	.0%	19	100.0%
Exp. (Post-Treatment) Aerobic Steps	19	100.0%	0	.0%	19	100.0%
Exp. (Post-Treatment) Aerobic Walking Time	19	100.0%	0	.0%	19	100.0%
Exp. (Post-Treatment) Calories	19	100.0%	0	.0%	19	100.0%
Exp. (Post-Treatment) Distance	19	100.0%	0	.0%	19	100.0%

Descriptives

			Statistic	Std. Error
Baseline (Pre-Treatment) Total Steps	Mean		3103.05	224.783
	95% Confidence Interval for Mean	Lower Bound	2630.80	
		Upper Bound	3575.30	
	5% Trimmed Mean		3015.78	
	Median		3064.00	
	Variance		960019.608	
	Std. Deviation		979.806	
	Minimum		1669	
	Maximum		6108	
	Range		4439	
	Interquartile Range		1154	
	Skewness		1.469	.524
	Kurtosis		4.049	1.014

Descriptives				
			Statistic	Std. Error
Baseline (Pre-Treatment) Aerobic Steps	Mean		90.21	90.211
	95% Confidence Interval for Mean	Lower Bound	-99.31	
		Upper Bound	279.74	
	5% Trimmed Mean		5.01	
	Median		.00	
	Variance		154620.842	
	Std. Deviation		393.219	
	Minimum		0	
	Maximum		1714	
	Range		1714	
	Interquartile Range		0	
	Skewness		4.359	.524
	Kurtosis		19.000	1.014
Baseline (Pre-Treatment) Aerobic Walking Time	Mean		.95	.947
	95% Confidence Interval for Mean	Lower Bound	-1.04	
		Upper Bound	2.94	
	5% Trimmed Mean		.05	
	Median		.00	
	Variance		17.053	
	Std. Deviation		4.129	
	Minimum		0	
	Maximum		18	
	Range		18	
	Interquartile Range		0	
	Skewness		4.359	.524
	Kurtosis		19.000	1.014
Baseline (Pre-Treatment) Calories	Mean		74.21	7.856
	95% Confidence Interval for Mean	Lower Bound	57.71	
		Upper Bound	90.71	
	5% Trimmed Mean		70.57	
	Median		71.00	
	Variance		1172.509	
	Std. Deviation		34.242	
	Minimum		34	
	Maximum		180	
	Range		146	
	Interquartile Range		37	
	Skewness		1.615	.524
	Kurtosis		4.128	1.014

Descriptives				
			Statistic	Std. Error
Baseline (Pre-Treatment) Distance	Mean		1.66	.121
	95% Confidence Interval for Mean	Lower Bound	1.41	
		Upper Bound	1.91	
	5% Trimmed Mean		1.61	
	Median		1.64	
	Variance		.276	
	Std. Deviation		.526	
	Minimum		1	
	Maximum		3	
	Range		2	
	Interquartile Range		1	
	Skewness		1.459	.524
	Kurtosis		4.009	1.014
Exp. (Post-Treatment) Total Steps	Mean		5000.42	306.543
	95% Confidence Interval for Mean	Lower Bound	4356.40	
		Upper Bound	5644.44	
	5% Trimmed Mean		4992.30	
	Median		5237.00	
	Variance		1785401.146	
	Std. Deviation		1336.189	
	Minimum		2847	
	Maximum		7300	
	Range		4453	
	Interquartile Range		2271	
	Skewness		-.139	.524
	Kurtosis		-1.085	1.014
Exp. (Post-Treatment) Aerobic Steps	Mean		1274.58	253.903
	95% Confidence Interval for Mean	Lower Bound	741.15	
		Upper Bound	1808.01	
	5% Trimmed Mean		1194.14	
	Median		1243.00	
	Variance		1224869.591	
	Std. Deviation		1106.738	
	Minimum		0	
	Maximum		3997	
	Range		3997	
	Interquartile Range		1340	
	Skewness		.878	.524
	Kurtosis		.690	1.014

Descriptives				
			Statistic	Std. Error
Exp. (Post-Treatment) Aerobic Walking Time	Mean		12.79	2.585
	95% Confidence Interval for Mean	Lower Bound	7.36	
		Upper Bound	18.22	
	5% Trimmed Mean		11.93	
	Median		12.00	
	Variance		126.953	
	Std. Deviation		11.267	
	Minimum		0	
	Maximum		41	
	Range		41	
	Interquartile Range		13	
	Skewness		.954	.524
	Kurtosis		.877	1.014
Exp. (Post-Treatment) Calories	Mean		137.68	11.063
	95% Confidence Interval for Mean	Lower Bound	114.44	
		Upper Bound	160.93	
	5% Trimmed Mean		136.26	
	Median		138.00	
	Variance		2325.561	
	Std. Deviation		48.224	
	Minimum		68	
	Maximum		233	
	Range		165	
	Interquartile Range		89	
	Skewness		.237	.524
	Kurtosis		-.835	1.014
Exp. (Post-Treatment) Distance	Mean		2.68	.165
	95% Confidence Interval for Mean	Lower Bound	2.33	
		Upper Bound	3.02	
	5% Trimmed Mean		2.67	
	Median		2.81	
	Variance		.515	
	Std. Deviation		.718	
	Minimum		2	
	Maximum		4	
	Range		2	
	Interquartile Range		1	
	Skewness		-.142	.524
	Kurtosis		-1.089	1.014

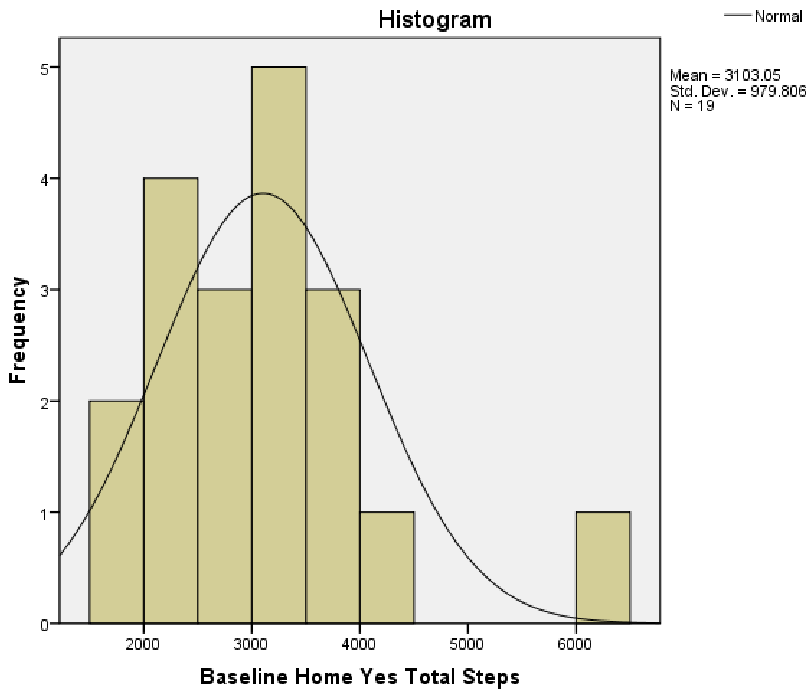
Tests of Normality

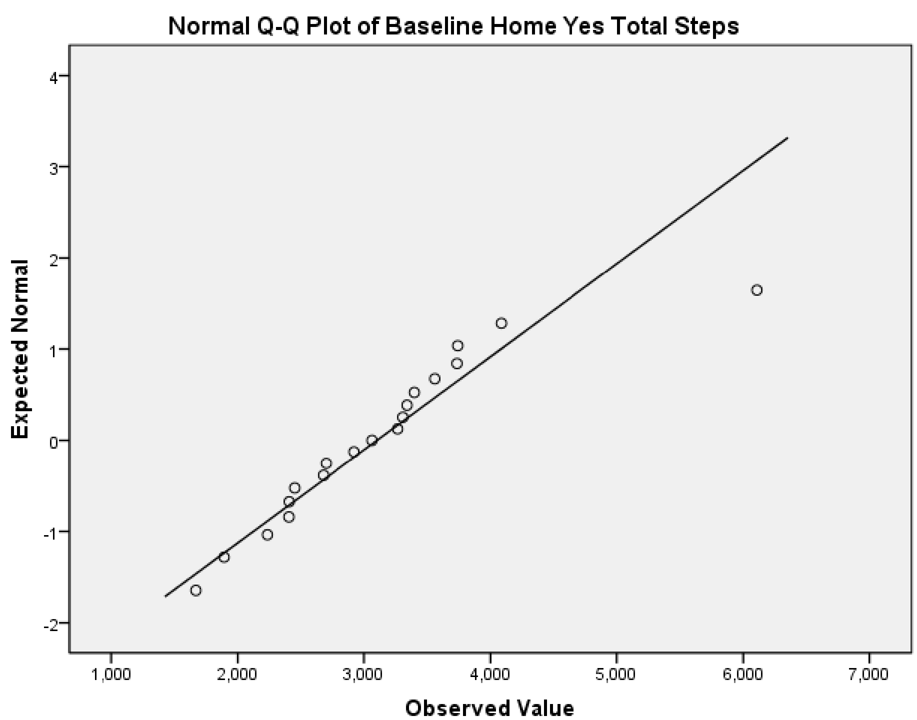
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Baseline (Pre-Treatment) Total Steps	.152	19	.200*	.890	19	.033
Baseline (Pre-Treatment) Aerobic Steps	.538	19	.000	.244	19	.000
Baseline (Pre-Treatment) Aerobic Walking Time	.538	19	.000	.244	19	.000
Baseline (Pre-Treatment) Calories	.158	19	.200*	.869	19	.014
Baseline (Pre-Treatment) Distance	.154	19	.200*	.891	19	.034
Exp. (Post-Treatment) Total Steps	.112	19	.200*	.957	19	.515
Exp. (Post-Treatment) Aerobic Steps	.266	19	.001	.871	19	.015
Exp. (Post-Treatment) Aerobic Walking Time	.282	19	.000	.863	19	.011
Exp. (Post-Treatment) Calories	.122	19	.200*	.958	19	.530
Exp. (Post-Treatment) Distance	.113	19	.200*	.957	19	.507

a. Lilliefors Significance Correction

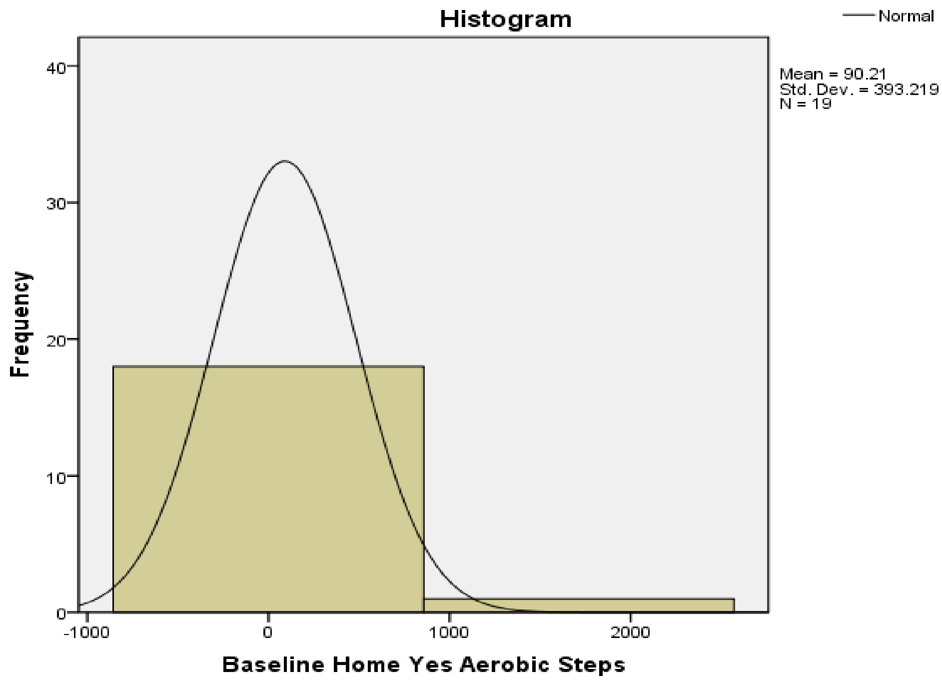
* This is a lower bound of the true significance.

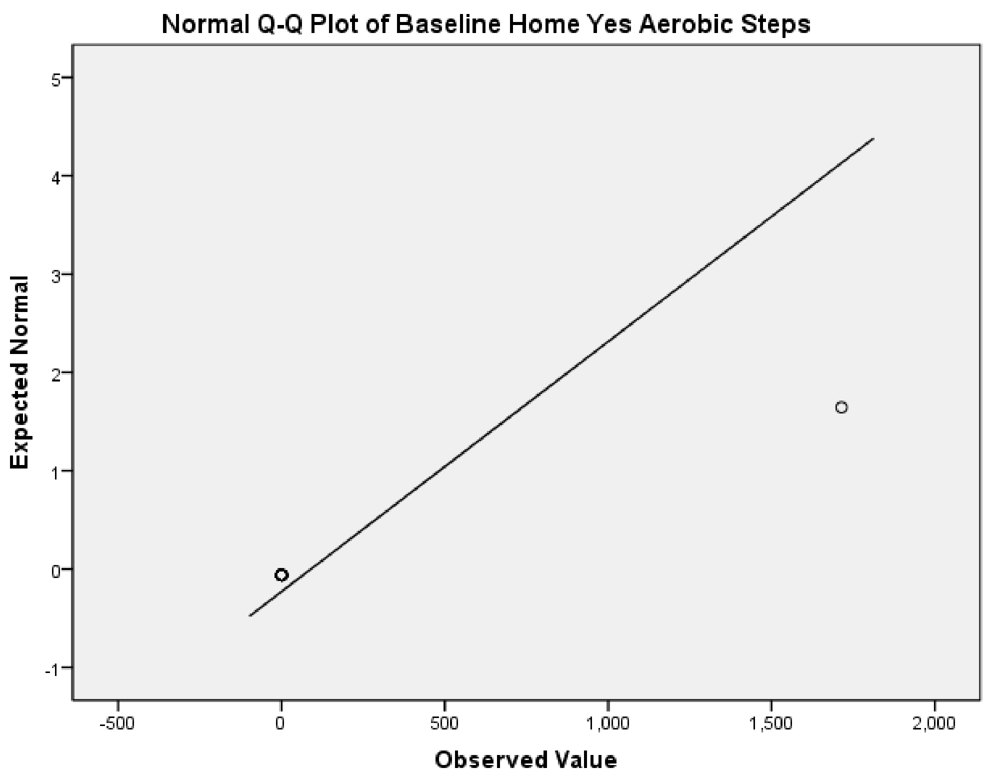
Baseline (Pre-Treatment) Total Steps



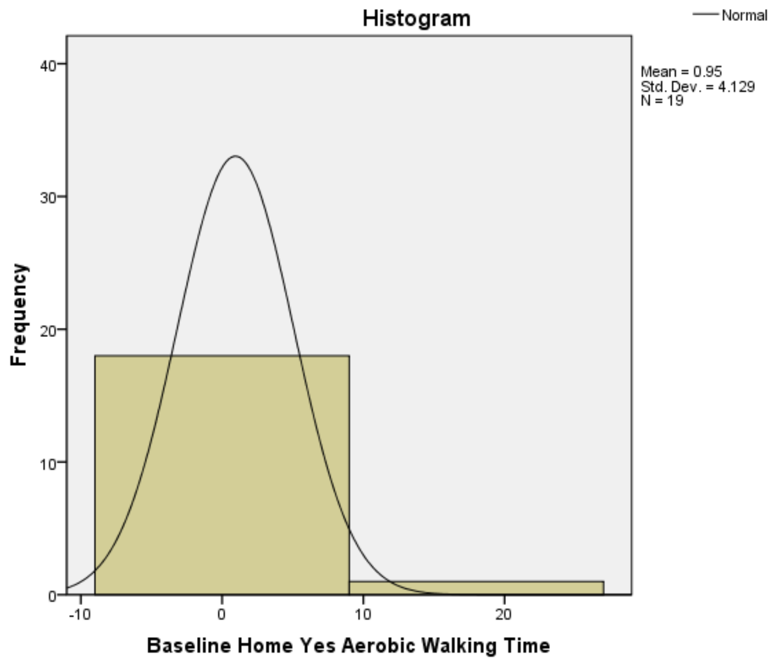


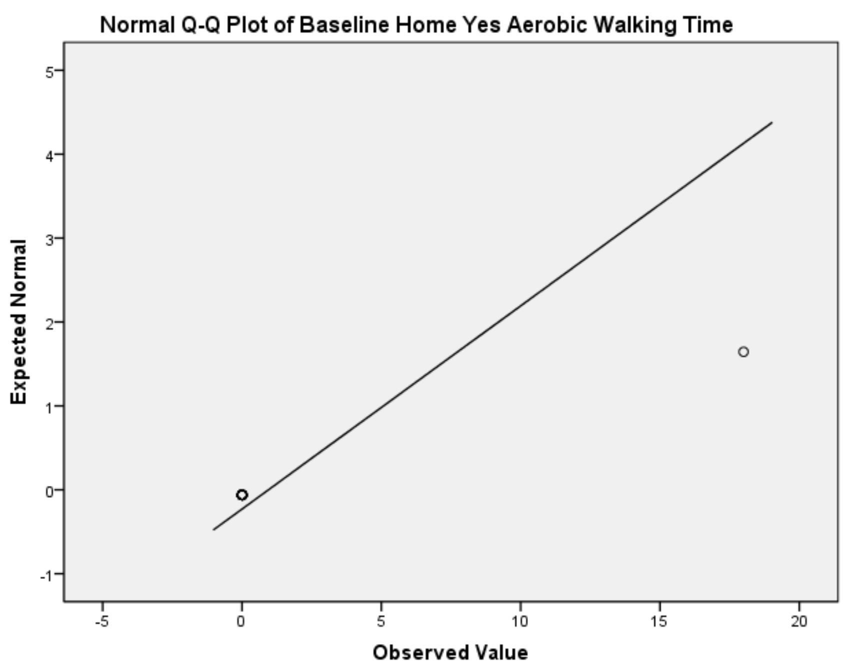
Baseline (Pre-Treatment) Aerobic Steps



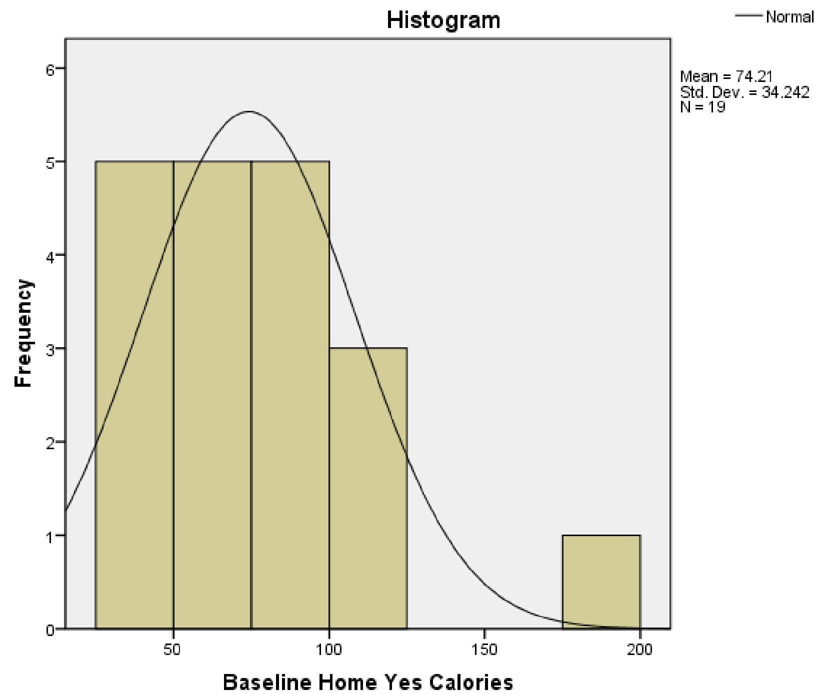


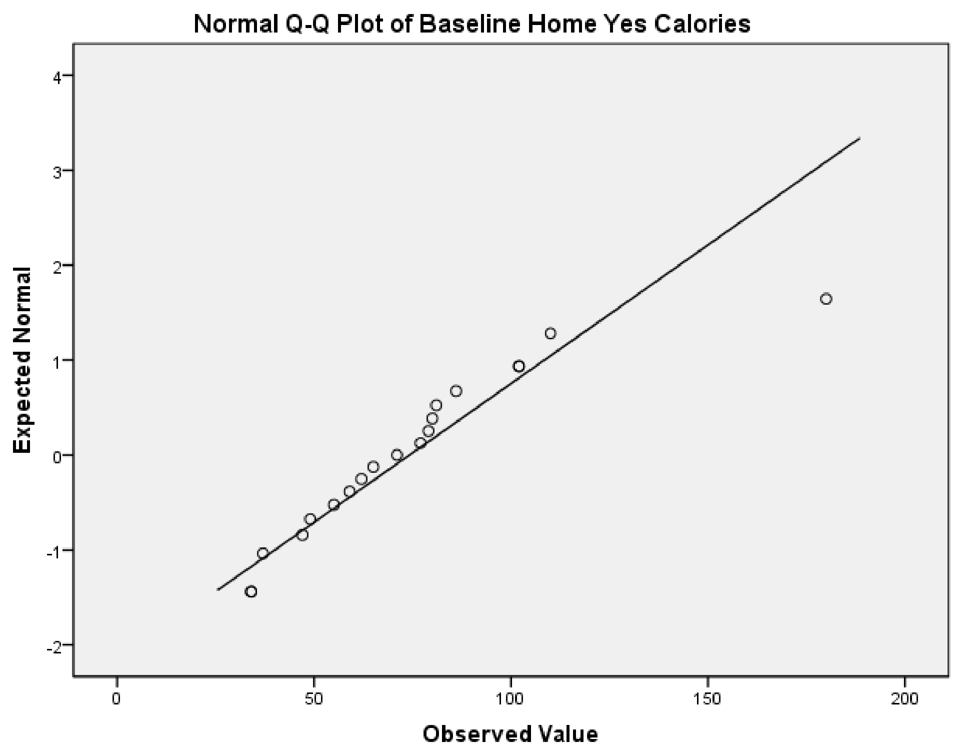
Baseline (Pre-Treatment) Aerobic Walking Time



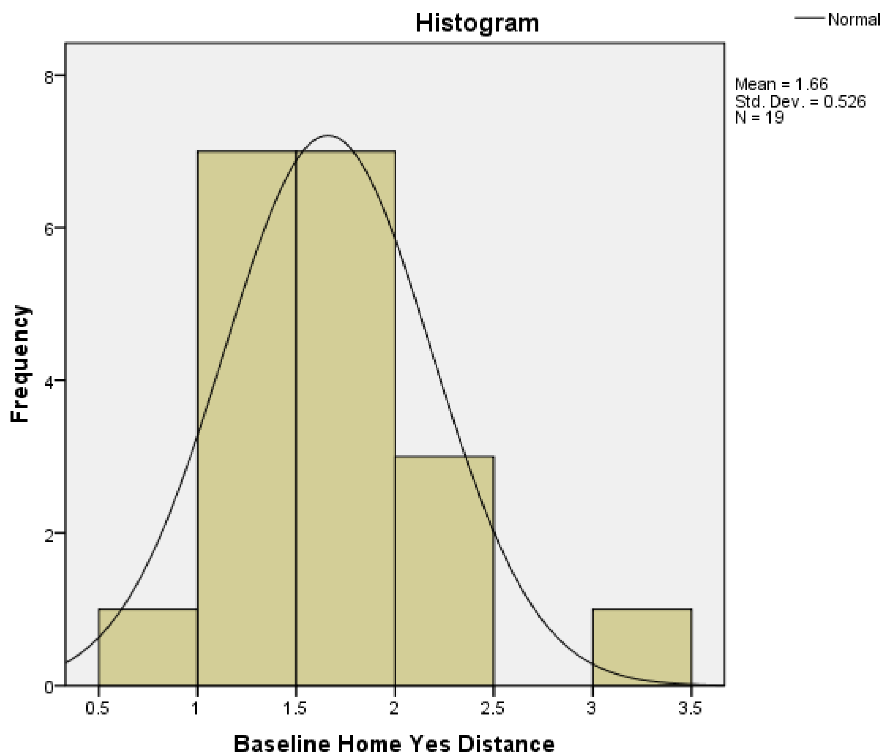


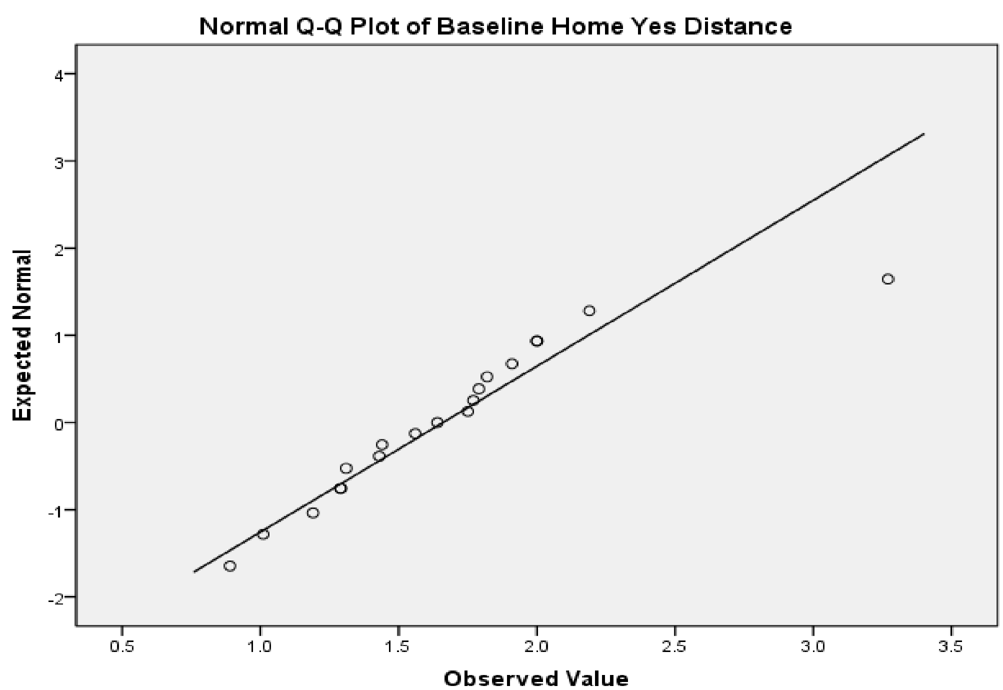
Baseline (Pre-Treatment) Calories



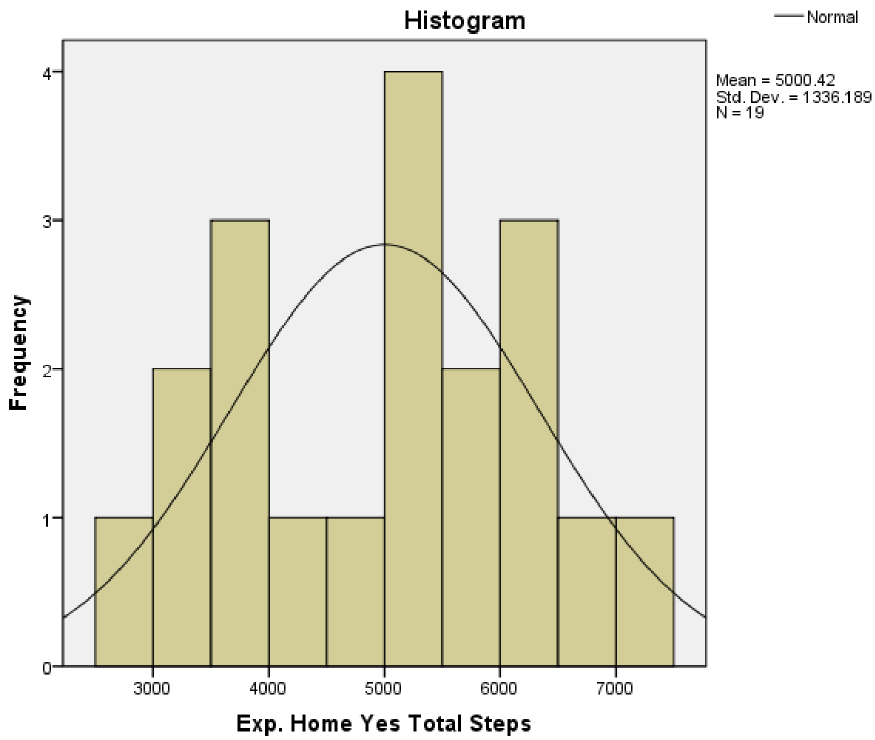


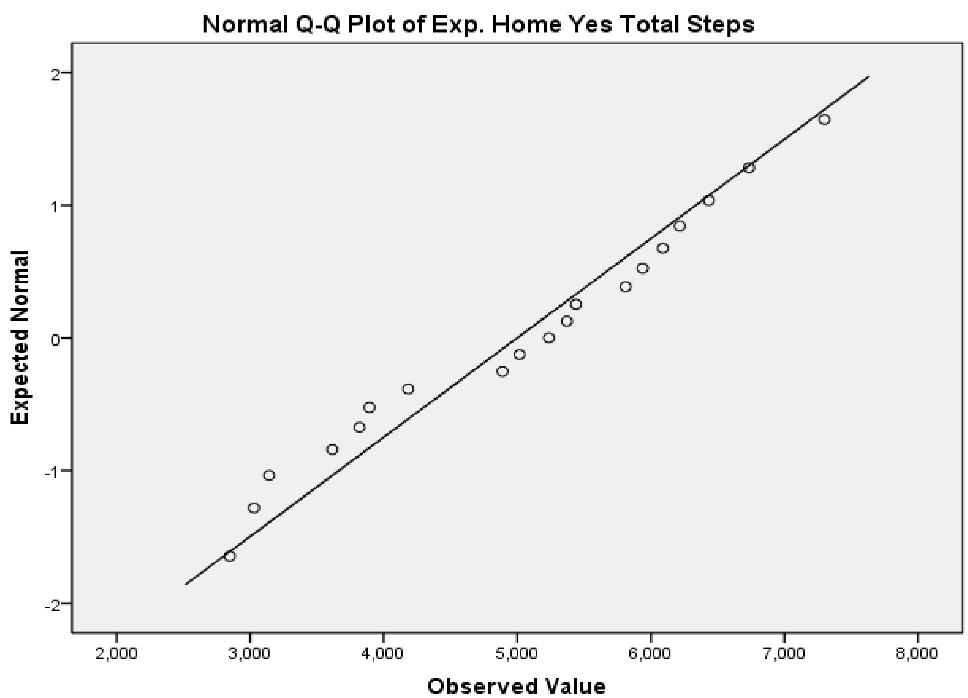
Baseline (Pre-Treatment) Distance



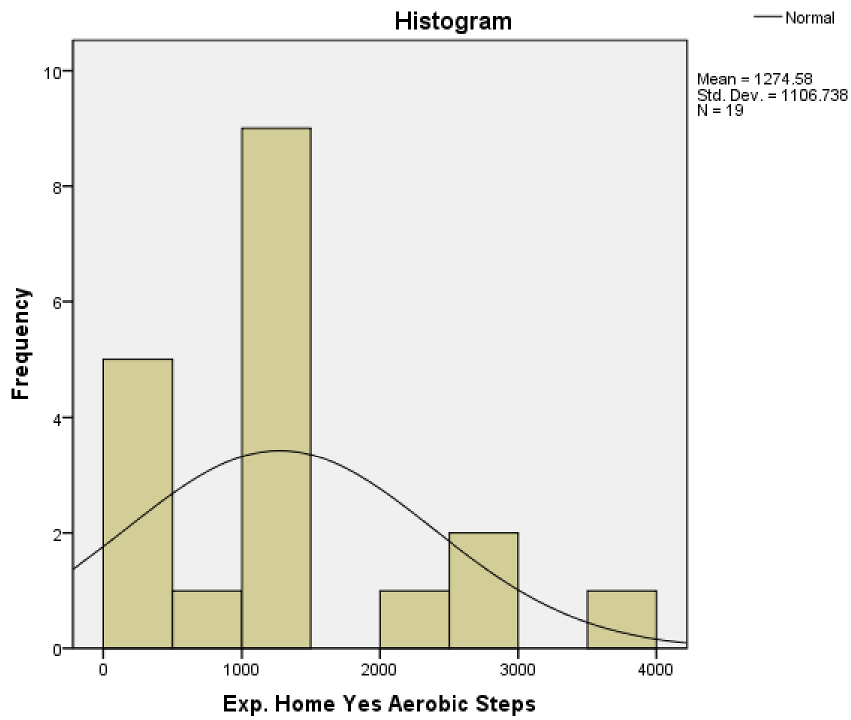


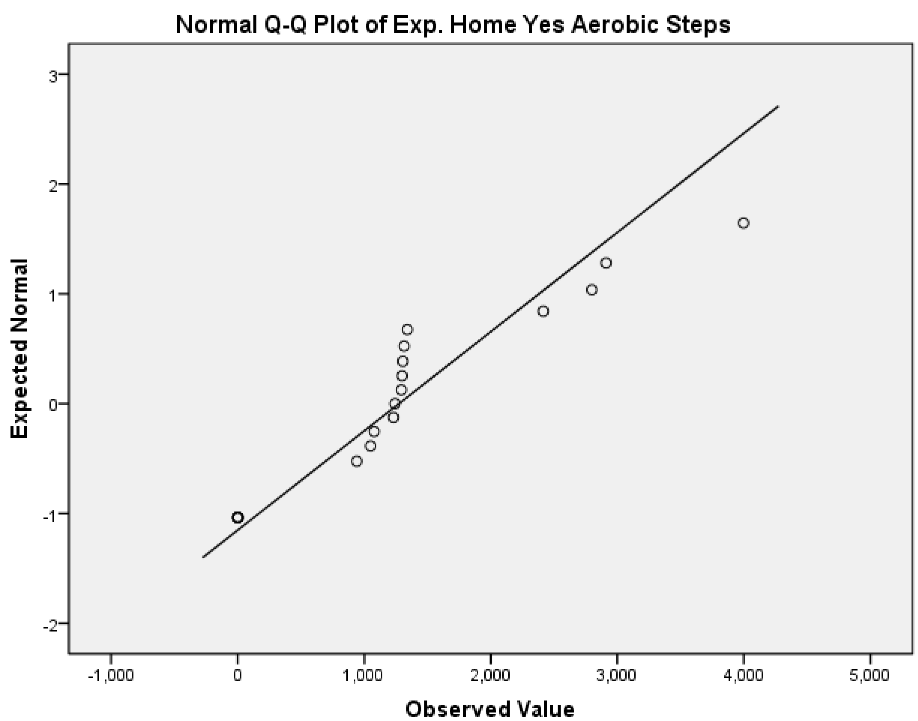
Exp. (Post-Treatment) Total Steps



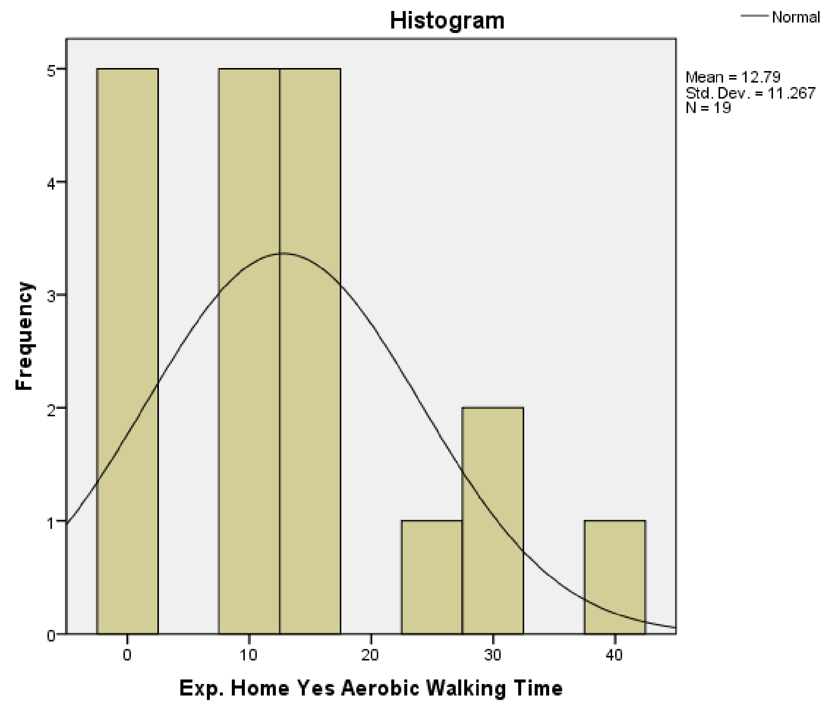


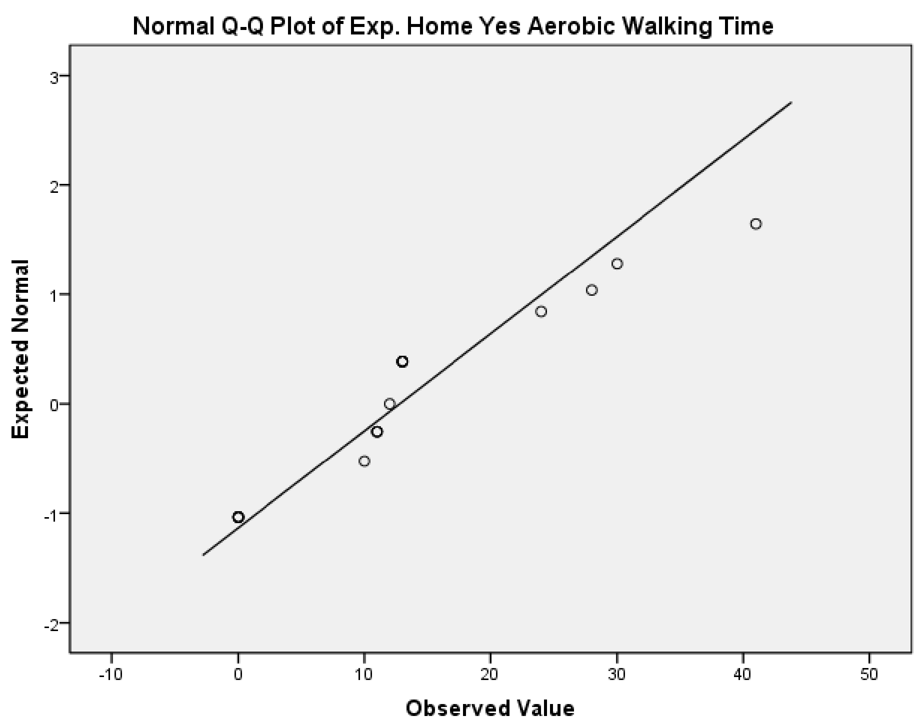
Exp. (Post-Treatment) Aerobic Steps



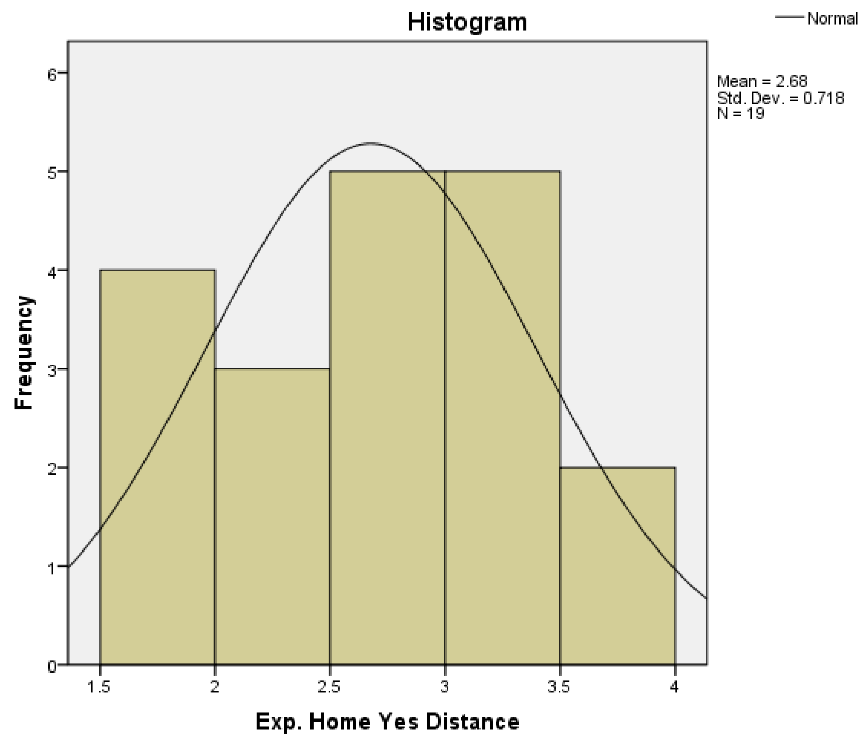


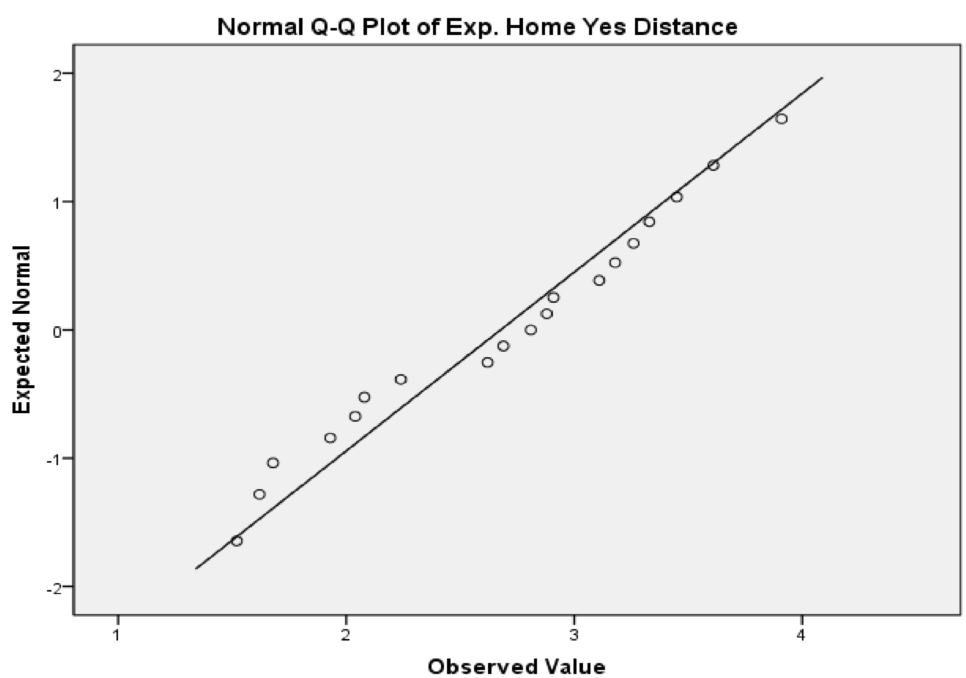
Exp. (Post-Treatment) Aerobic Walking Time



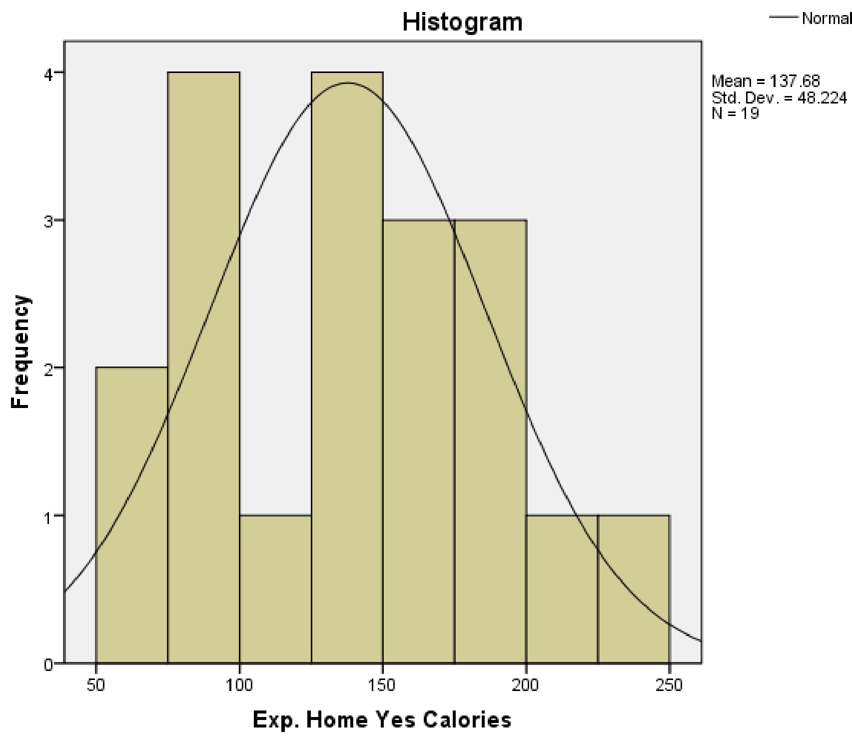


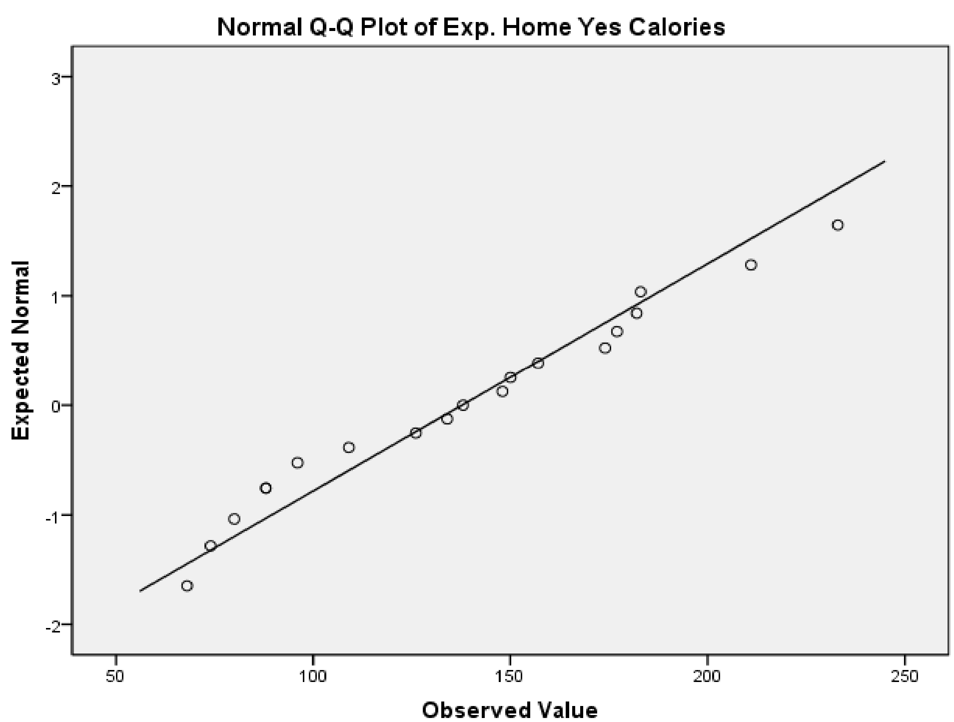
Exp. (Post-Treatment) Distance





Exp. (Post-Treatment) Calories





Frequency Table

Baseline (Pre-Treatment) Total Steps					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**1669**	1	5.3	5.3	5.3
	1892	1	5.3	5.3	10.5
	2234	1	5.3	5.3	15.8
	2404	1	5.3	5.3	21.1
	2406	1	5.3	5.3	26.3
	2450	1	5.3	5.3	31.6
	2678	1	5.3	5.3	36.8
	2699	1	5.3	5.3	42.1
	2921	1	5.3	5.3	47.4
	3064	1	5.3	5.3	52.6
	3266	1	5.3	5.3	57.9
	3307	1	5.3	5.3	63.2
	3340	1	5.3	5.3	68.4
	3398	1	5.3	5.3	73.7
	3560	1	5.3	5.3	78.9
	3735	1	5.3	5.3	84.2
	3741	1	5.3	5.3	89.5
	4086	1	5.3	5.3	94.7
	6108	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Exp. (Post-Treatment) Total Steps					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**2847**	1	5.3	5.3	5.3
	3029	1	5.3	5.3	10.5
	3142	1	5.3	5.3	15.8
	3615	1	5.3	5.3	21.1
	3819	1	5.3	5.3	26.3
	3894	1	5.3	5.3	31.6
	4184	1	5.3	5.3	36.8
	4889	1	5.3	5.3	42.1
	5017	1	5.3	5.3	47.4
	5237	1	5.3	5.3	52.6
	5371	1	5.3	5.3	57.9
	5439	1	5.3	5.3	63.2
	5810	1	5.3	5.3	68.4
	5939	1	5.3	5.3	73.7
	6090	1	5.3	5.3	78.9
	6217	1	5.3	5.3	84.2
	6434	1	5.3	5.3	89.5
	6735	1	5.3	5.3	94.7
	7300	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Baseline (Pre-Treatment) Aerobic Walking Time					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	18	94.7	94.7	94.7
	18	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Exp. (Post-Treatment) Aerobic Walking Time					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**0**	5	26.3	26.3	26.3
	10	1	5.3	5.3	31.6
	11	3	15.8	15.8	47.4
	12	1	5.3	5.3	52.6
	13	5	26.3	26.3	78.9
	24	1	5.3	5.3	84.2
	28	1	5.3	5.3	89.5
	30	1	5.3	5.3	94.7
	41	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Baseline (Pre-Treatment) Distance					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**.89**	1	5.3	5.3	5.3
	1.01	1	5.3	5.3	10.5
	1.19	1	5.3	5.3	15.8
	1.29	2	10.5	10.5	26.3
	1.31	1	5.3	5.3	31.6
	1.43	1	5.3	5.3	36.8
	1.44	1	5.3	5.3	42.1
	1.56	1	5.3	5.3	47.4
	1.64	1	5.3	5.3	52.6
	1.75	1	5.3	5.3	57.9
	1.77	1	5.3	5.3	63.2
	1.79	1	5.3	5.3	68.4
	1.82	1	5.3	5.3	73.7
	1.91	1	5.3	5.3	78.9
	2.00	2	10.5	10.5	89.5
	2.19	1	5.3	5.3	94.7
	3.27	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Exp. (Post-Treatment) Distance					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**1.52**	1	5.3	5.3	5.3
	1.62	1	5.3	5.3	10.5
	1.68	1	5.3	5.3	15.8
	1.93	1	5.3	5.3	21.1
	2.04	1	5.3	5.3	26.3
	2.08	1	5.3	5.3	31.6
	2.24	1	5.3	5.3	36.8
	2.62	1	5.3	5.3	42.1
	2.69	1	5.3	5.3	47.4
	2.81	1	5.3	5.3	52.6
	2.88	1	5.3	5.3	57.9
	2.91	1	5.3	5.3	63.2
	3.11	1	5.3	5.3	68.4
	3.18	1	5.3	5.3	73.7
	3.26	1	5.3	5.3	78.9
	3.33	1	5.3	5.3	84.2
	3.45	1	5.3	5.3	89.5
	3.61	1	5.3	5.3	94.7
	3.91	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Living Pattern Statistics

Case Processing Summary							
		Cases					
		Valid		Missing		Total	
	Treatment	N	Percent	N	Percent	N	Percent
Baseline Dining Room	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Dining Room	Post	14	100.0%	0	.0%	14	100.0%
Baseline Kitchen	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Kitchen	Post	14	100.0%	0	.0%	14	100.0%
Baseline Bedroom	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Bedroom	Post	14	100.0%	0	.0%	14	100.0%
Baseline Bed	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Bed	Post	14	100.0%	0	.0%	14	100.0%
Baseline Bathroom	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Bathroom	Post	14	100.0%	0	.0%	14	100.0%
Baseline Living Room	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Living Room	Post	14	100.0%	0	.0%	14	100.0%
Baseline Outside Home	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Outside Home	Post	14	100.0%	0	.0%	14	100.0%
Baseline Couch-TV	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Couch-TV	Post	14	100.0%	0	.0%	14	100.0%
Baseline Total Steps	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Total Steps	Post	14	100.0%	0	.0%	14	100.0%
Baseline Aerobic Steps	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Aerobic Steps	Post	14	100.0%	0	.0%	14	100.0%
Baseline Aerobic Walking Time	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Aerobic Walking Time	Post	14	100.0%	0	.0%	14	100.0%
Baseline Distance	Pre	14	100.0%	0	.0%	14	100.0%
Exp. Distance	Post	14	100.0%	0	.0%	14	100.0%

Descriptives				
			Statistic	Std. Error
Baseline (Pre-Treatment) Dining Room	Mean		2.0657	.27810
	95% Confidence Interval for Mean	Lower Bound	1.4649	
		Upper Bound	2.6665	
	5% Trimmed Mean		2.0175	
	Median		2.0400	
	Variance		1.083	
	Std. Deviation		1.04055	
	Minimum		.55	
	Maximum		4.45	
	Range		3.90	
	Interquartile Range		1.58	
	Skewness		.708	.597
	Kurtosis		.782	1.154

Descriptives				
			Statistic	Std. Error
Experiment (Post-Treatment) Dining Room	Mean		2.3257	.18288
	95% Confidence Interval for Mean	Lower Bound	1.9306	
		Upper Bound	2.7208	
	5% Trimmed Mean		2.2969	
	Median		2.2000	
	Variance		.468	
	Std. Deviation		.68428	
	Minimum		1.50	
	Maximum		3.67	
	Range		2.17	
	Interquartile Range		1.07	
	Skewness		.752	.597
	Kurtosis		-.306	1.154
Baseline (Pre-Treatment) Kitchen	Mean		1.6043	.10505
	95% Confidence Interval for Mean	Lower Bound	1.3773	
		Upper Bound	1.8312	
	5% Trimmed Mean		1.6120	
	Median		1.7050	
	Variance		.154	
	Std. Deviation		.39305	
	Minimum		.80	
	Maximum		2.27	
	Range		1.47	
	Interquartile Range		.60	
	Skewness		-.486	.597
	Kurtosis		-.013	1.154
Experiment (Post-Treatment) Kitchen	Mean		1.2350	.07956
	95% Confidence Interval for Mean	Lower Bound	1.0631	
		Upper Bound	1.4069	
	5% Trimmed Mean		1.2333	
	Median		1.1800	
	Variance		.089	
	Std. Deviation		.29770	
	Minimum		.73	
	Maximum		1.77	
	Range		1.04	
	Interquartile Range		.40	
	Skewness		.368	.597
	Kurtosis		-.305	1.154

Descriptives				
			Statistic	Std. Error
Baseline (Pre-Treatment) Bedroom	Mean		9.5879	.30636
	95% Confidence Interval for Mean	Lower Bound	8.9260	
		Upper Bound	10.2497	
	5% Trimmed Mean		9.5915	
	Median		9.7700	
	Variance		1.314	
	Std. Deviation		1.14630	
	Minimum		7.73	
	Maximum		11.38	
	Range		3.65	
	Interquartile Range		2.01	
	Skewness		-.334	.597
	Kurtosis		-1.047	1.154
Experiment (Post-Treatment) Bedroom	Mean		9.5136	.24151
	95% Confidence Interval for Mean	Lower Bound	8.9918	
		Upper Bound	10.0353	
	5% Trimmed Mean		9.4873	
	Median		9.3750	
	Variance		.817	
	Std. Deviation		.90363	
	Minimum		8.40	
	Maximum		11.10	
	Range		2.70	
	Interquartile Range		1.44	
	Skewness		.499	.597
	Kurtosis		-.914	1.154
Baseline (Pre-Treatment) Bed	Mean		8.8636	.29212
	95% Confidence Interval for Mean	Lower Bound	8.2325	
		Upper Bound	9.4947	
	5% Trimmed Mean		8.8651	
	Median		9.0300	
	Variance		1.195	
	Std. Deviation		1.09300	
	Minimum		7.17	
	Maximum		10.53	
	Range		3.36	
	Interquartile Range		1.95	
	Skewness		-.282	.597
	Kurtosis		-1.233	1.154

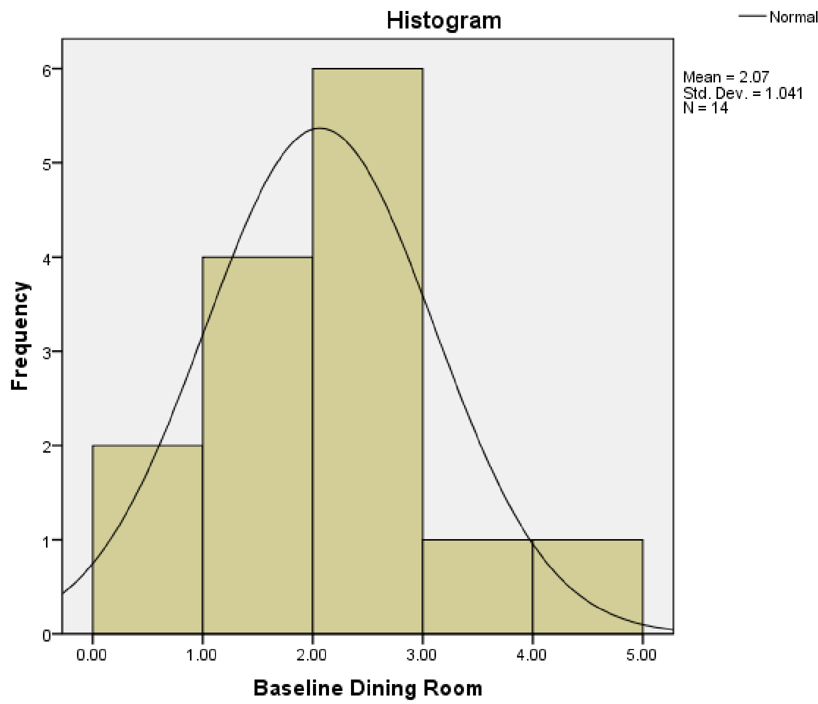
Descriptives				
			Statistic	Std. Error
Experiment (Post-Treatment) Bed	Mean		8.5957	.21020
	95% Confidence Interval for Mean	Lower Bound	8.1416	
		Upper Bound	9.0498	
	5% Trimmed Mean		8.5802	
	Median		8.4050	
	Variance		.619	
	Std. Deviation		.78649	
	Minimum		7.52	
	Maximum		9.95	
	Range		2.43	
	Interquartile Range		1.28	
	Skewness		.425	.597
	Kurtosis		-1.013	1.154

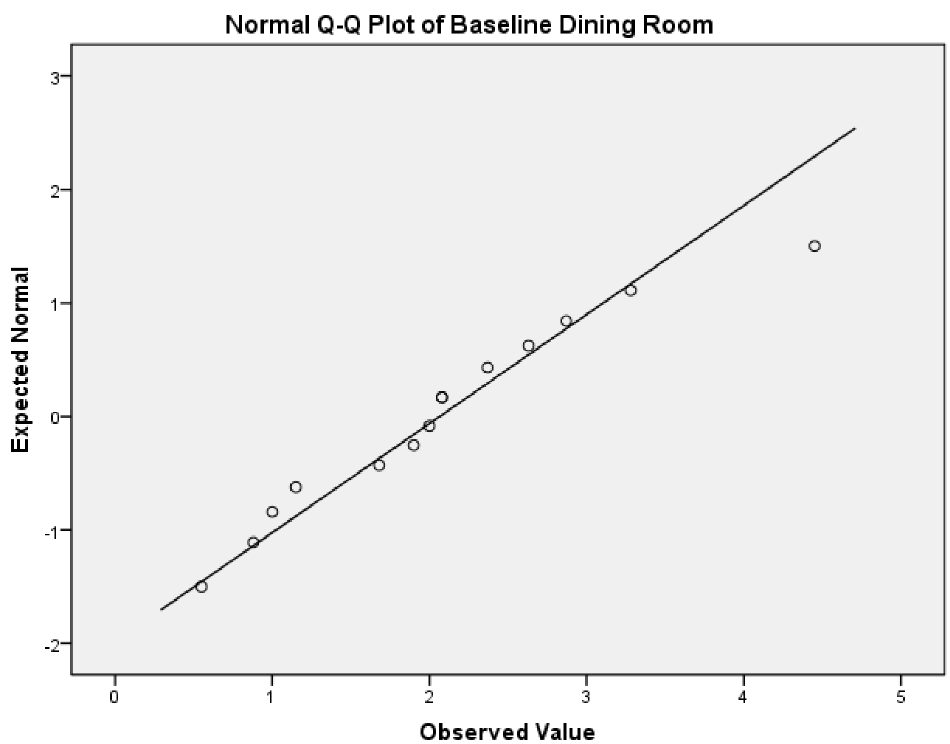
Tests of Normality

Baseline: Pre-Treatment Exp.: Post-Treatment	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Baseline Dining Room	.137	14	.200*	.958	14	.682
Exp. Dining Room	.159	14	.200*	.922	14	.232
Baseline Kitchen	.148	14	.200*	.970	14	.879
Exp. Kitchen	.138	14	.200*	.964	14	.790
Baseline Bedroom	.161	14	.200*	.941	14	.436
Exp. Bedroom	.122	14	.200*	.928	14	.288
Baseline Bed	.148	14	.200*	.935	14	.360
Exp. Bed	.179	14	.200*	.937	14	.386
Baseline Bathroom	.145	14	.200*	.963	14	.765
Exp. Bathroom	.096	14	.200*	.987	14	.998
Baseline Living Room	.170	14	.200*	.913	14	.175
Exp. Living Room	.143	14	.200*	.920	14	.218
Baseline Outside Home	.186	14	.200*	.918	14	.204
Exp. Outside Home	.152	14	.200*	.940	14	.419
Baseline Couch-TV	.181	14	.200*	.920	14	.222
Exp. Couch-TV	.142	14	.200*	.946	14	.503
Baseline Total Steps	.176	14	.200*	.901	14	.115
Exp. Total Steps	.107	14	.200*	.970	14	.877
Baseline Aerobic Steps	.534	14	.000	.297	14	.000
Exp. Aerobic Steps	.272	14	.006	.864	14	.035
Baseline Aerobic Walking Time	.534	14	.000	.297	14	.000
Exp. Aerobic Walking Time	.290	14	.002	.856	14	.027
Baseline Distance	.177	14	.200*	.901	14	.117
Exp. Distance	.109	14	.200*	.970	14	.876

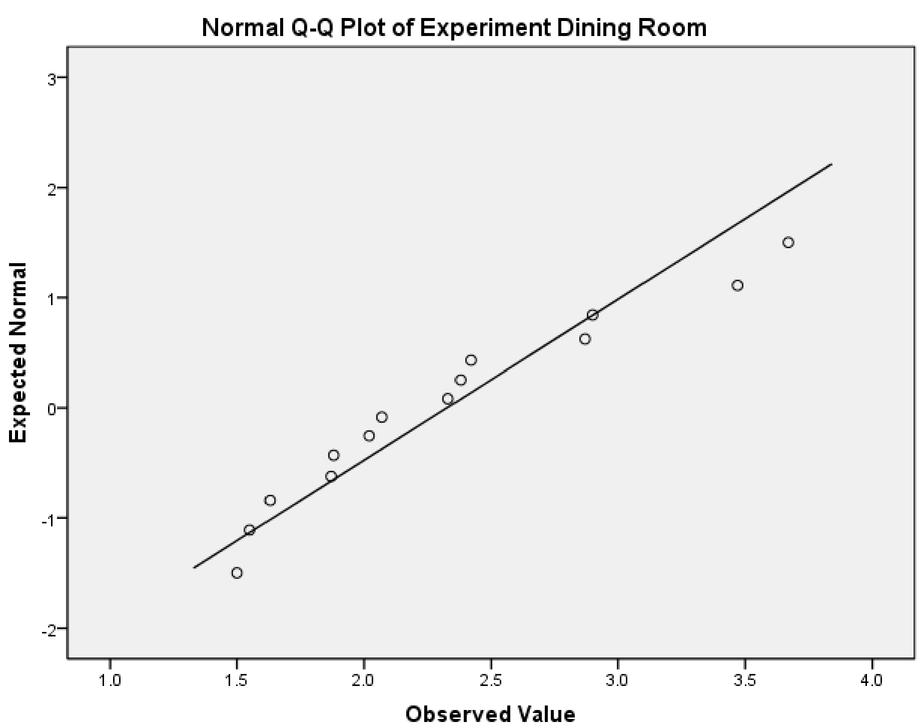
a. Lilliefors Significance Correction
*. This is a lower bound of the true significance.

Baseline (Pre-Treatment) Dining Room

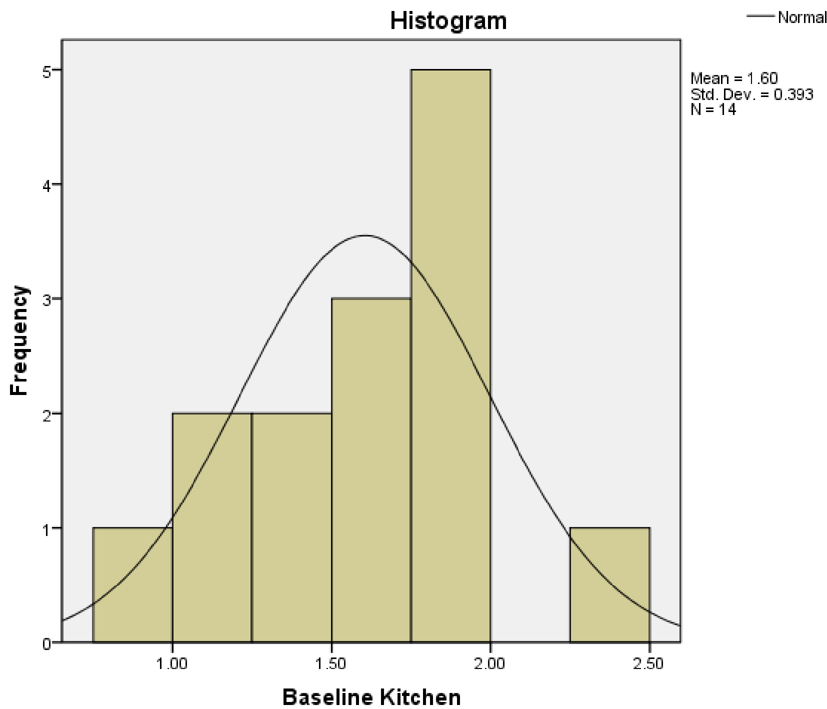


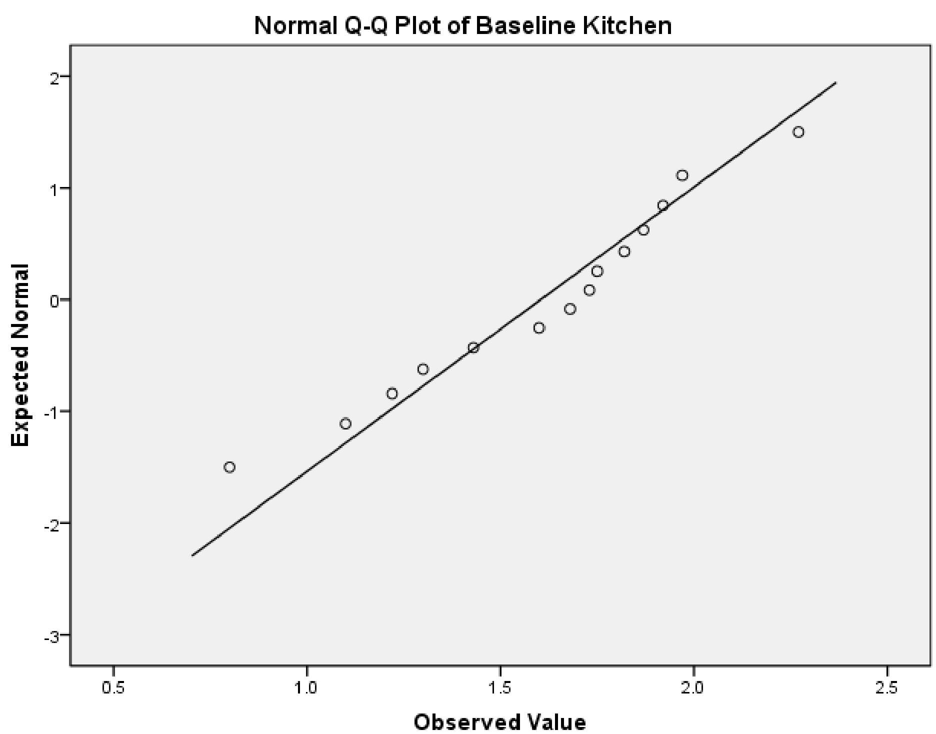


Experiment (Post-Treatment) Dining Room

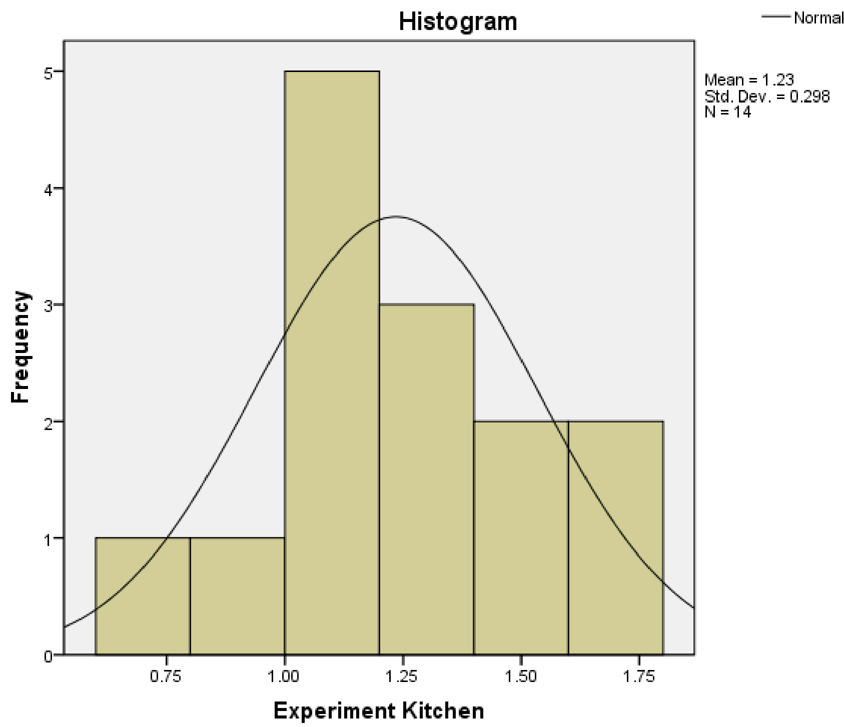


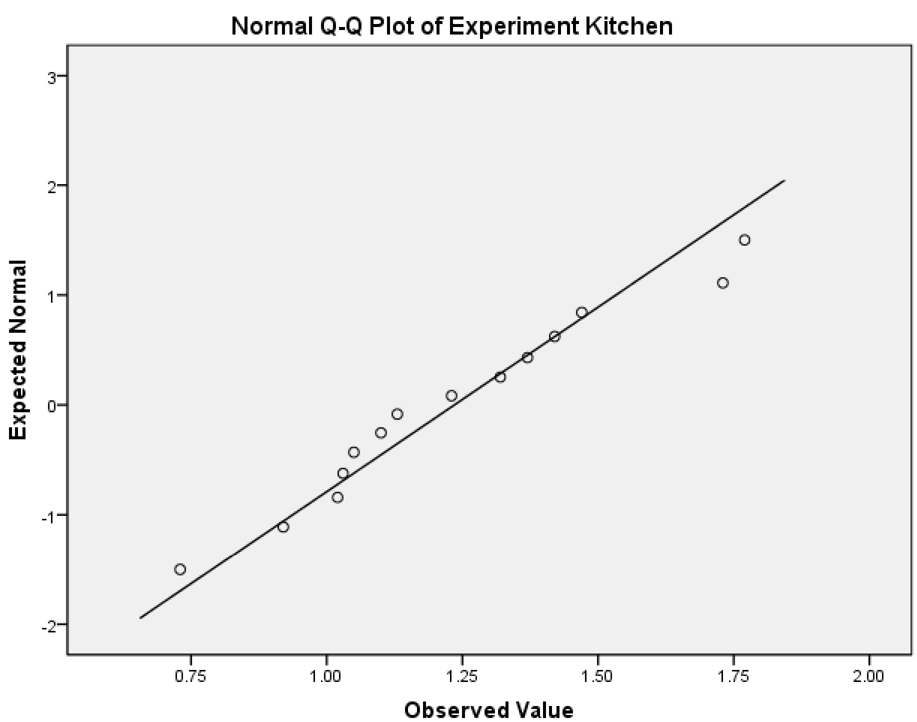
Baseline (Pre-Treatment) Kitchen



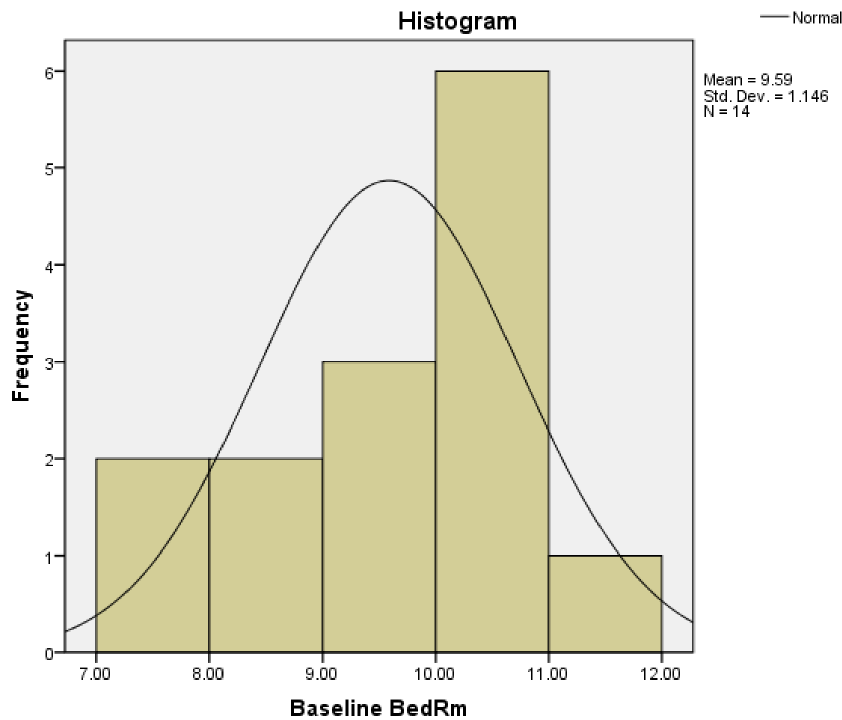


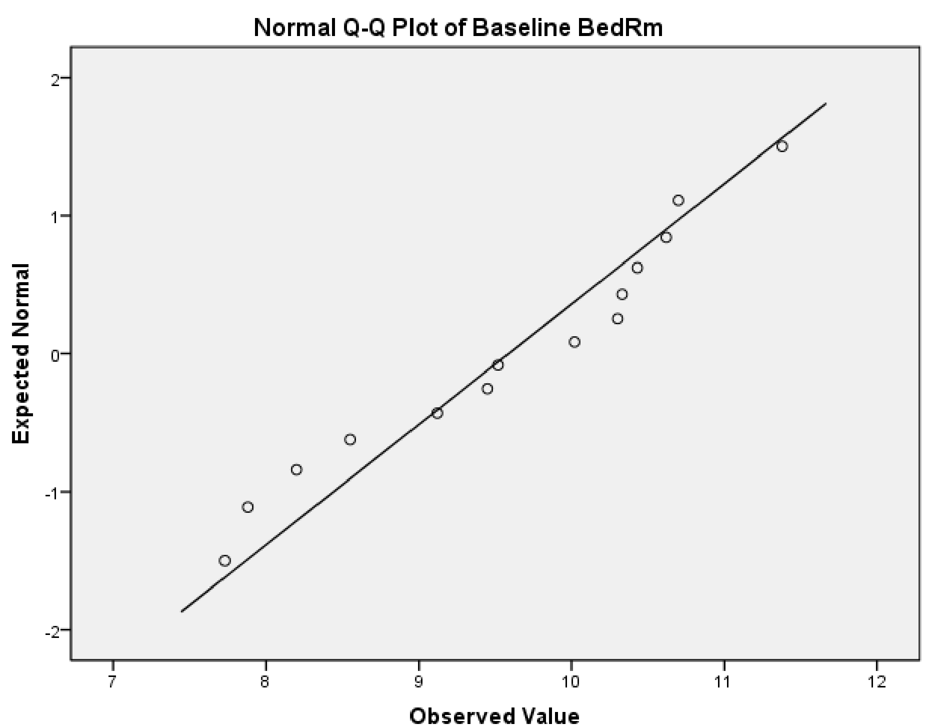
Experiment (Post-Treatment) Kitchen



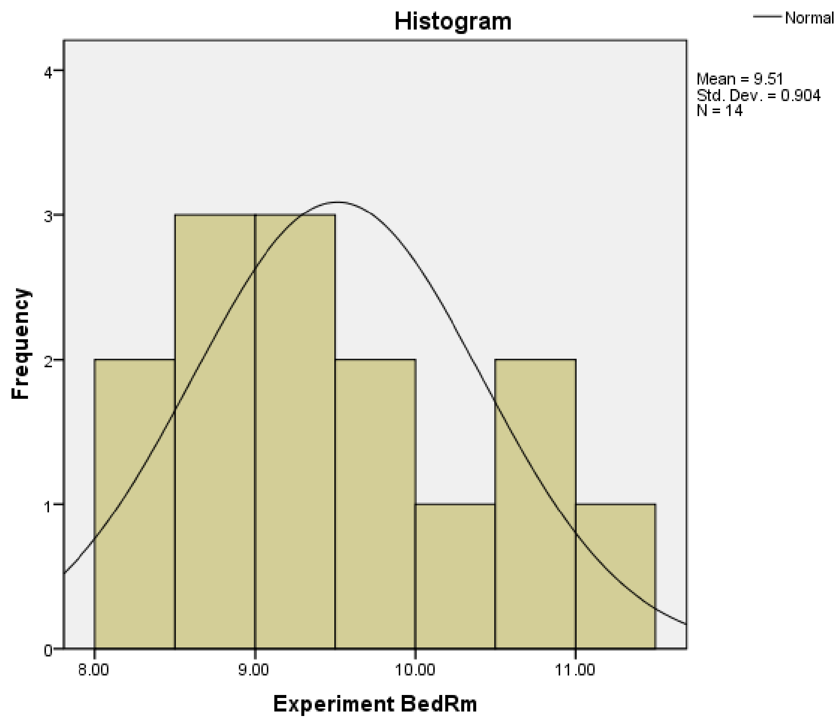


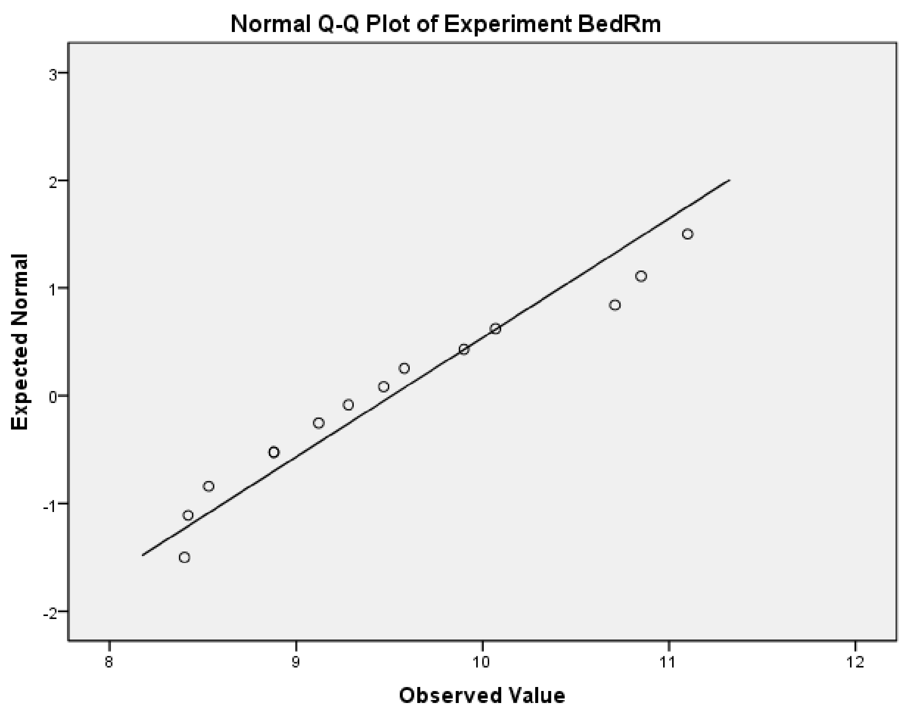
Baseline (Pre-Treatment) Bedroom



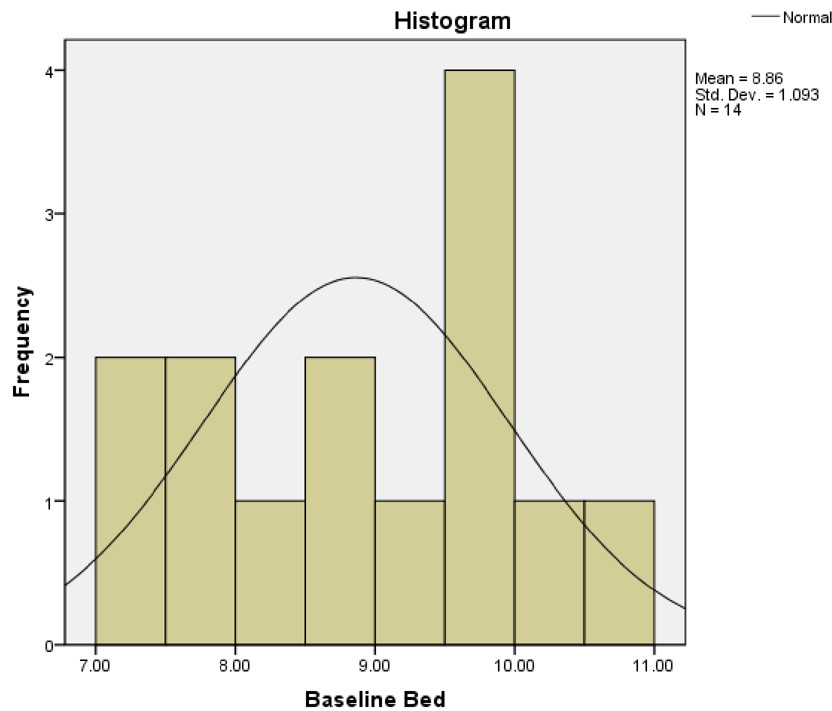


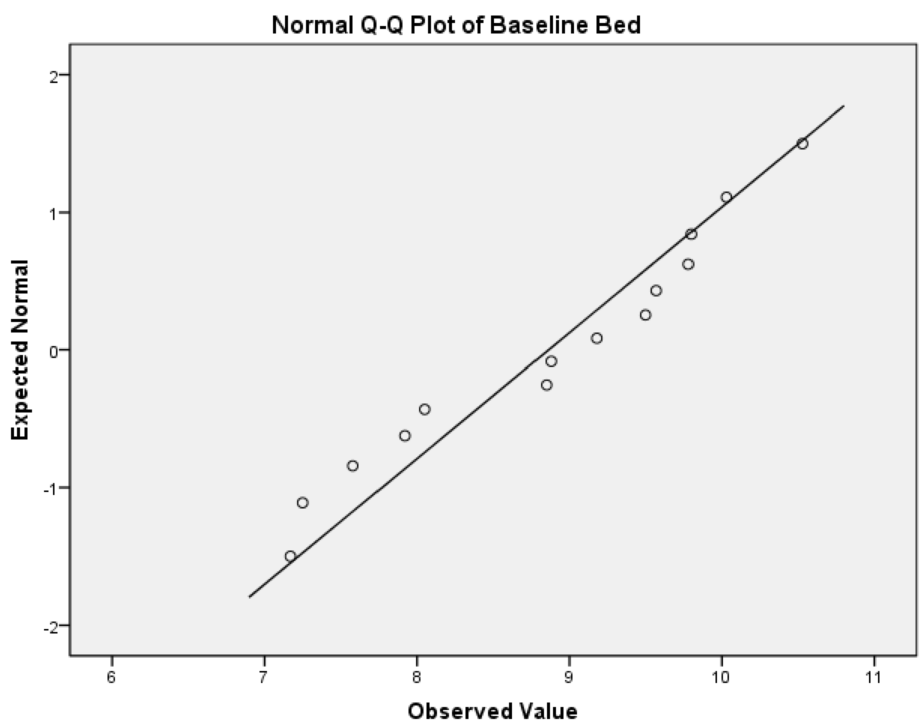
Experiment (Post-Treatment) Bedroom



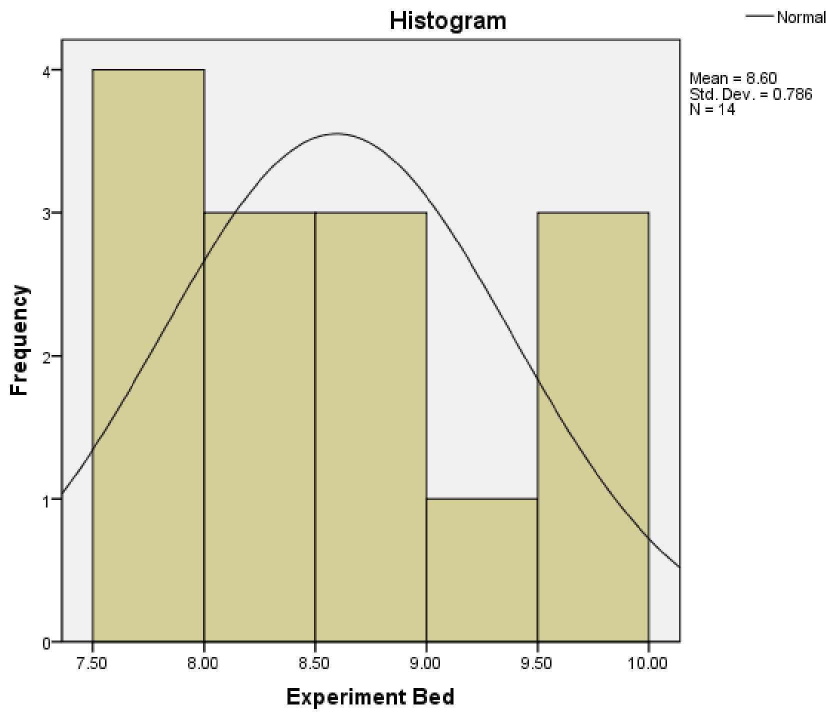


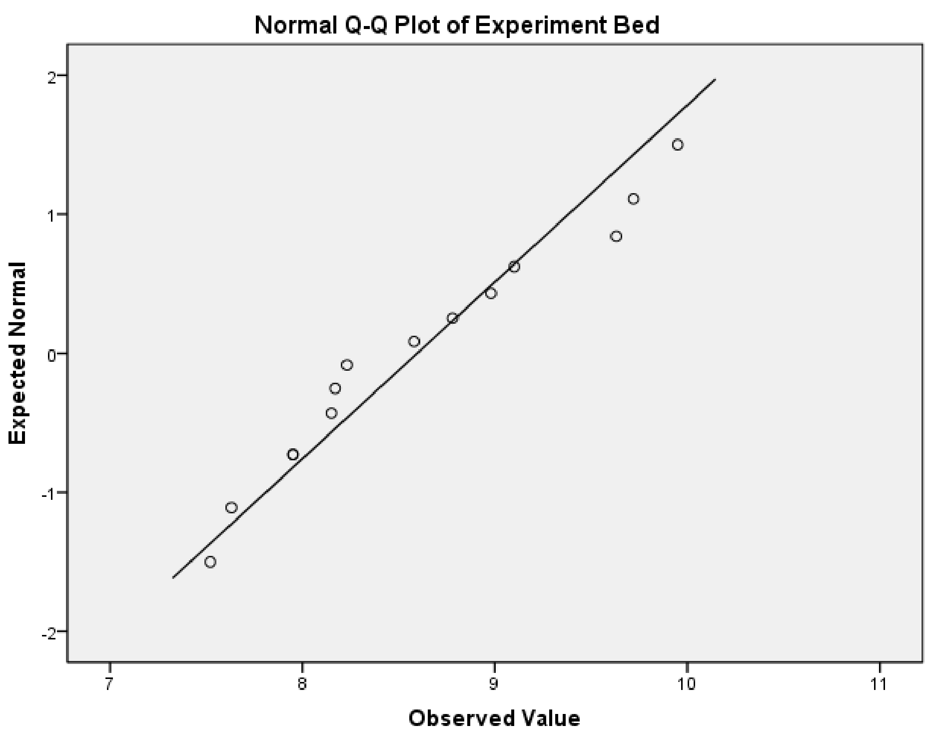
Baseline (Pre-Treatment) Bed



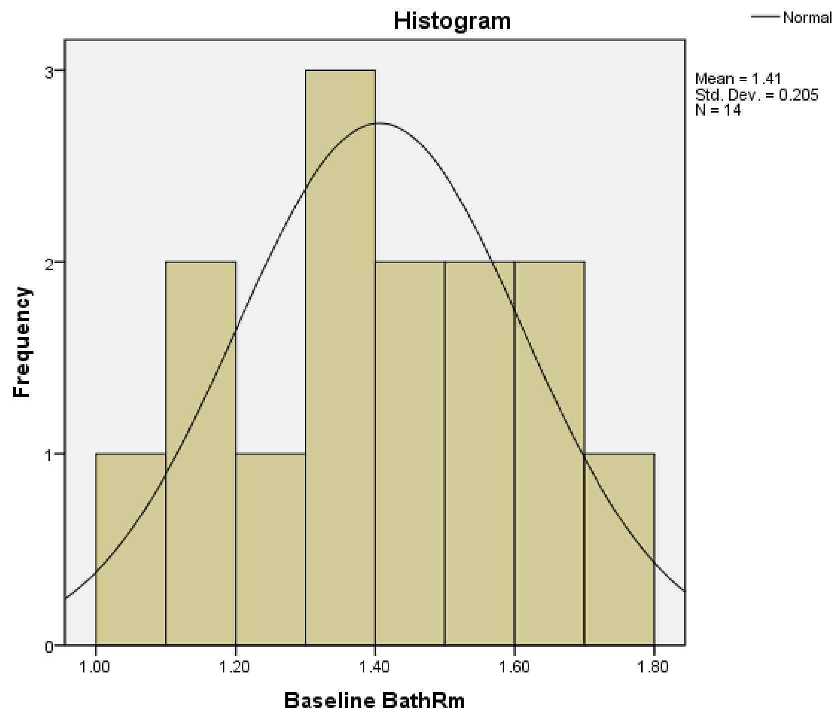


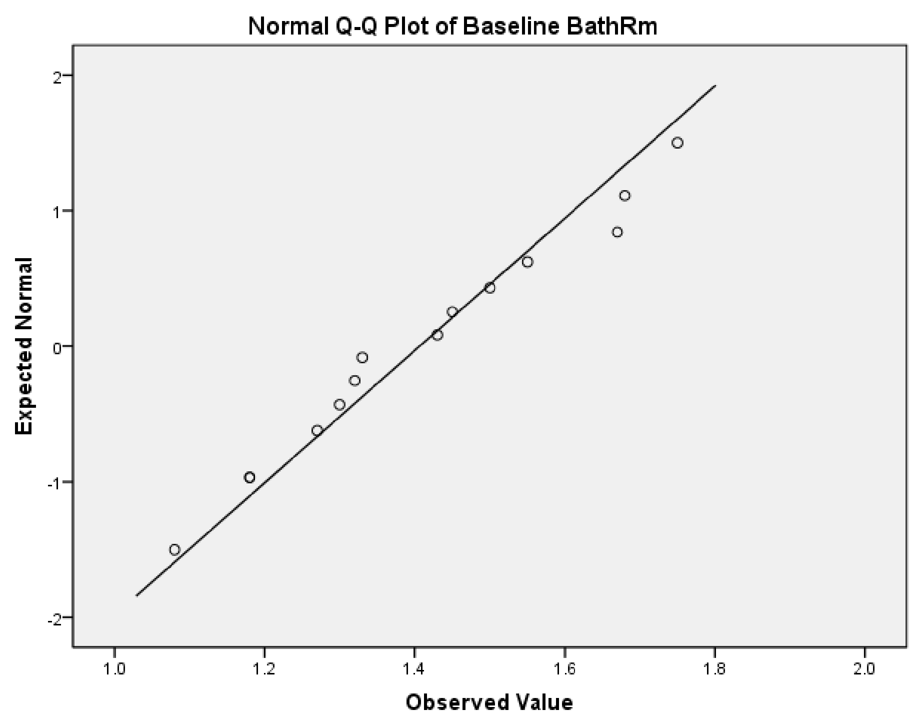
Experiment (Post-Treatment) Bed



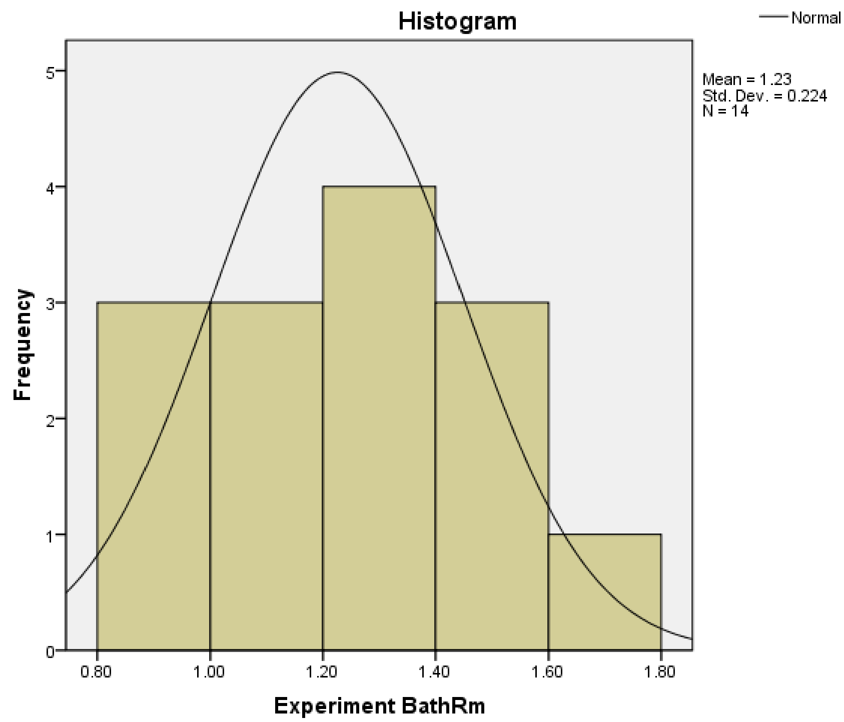


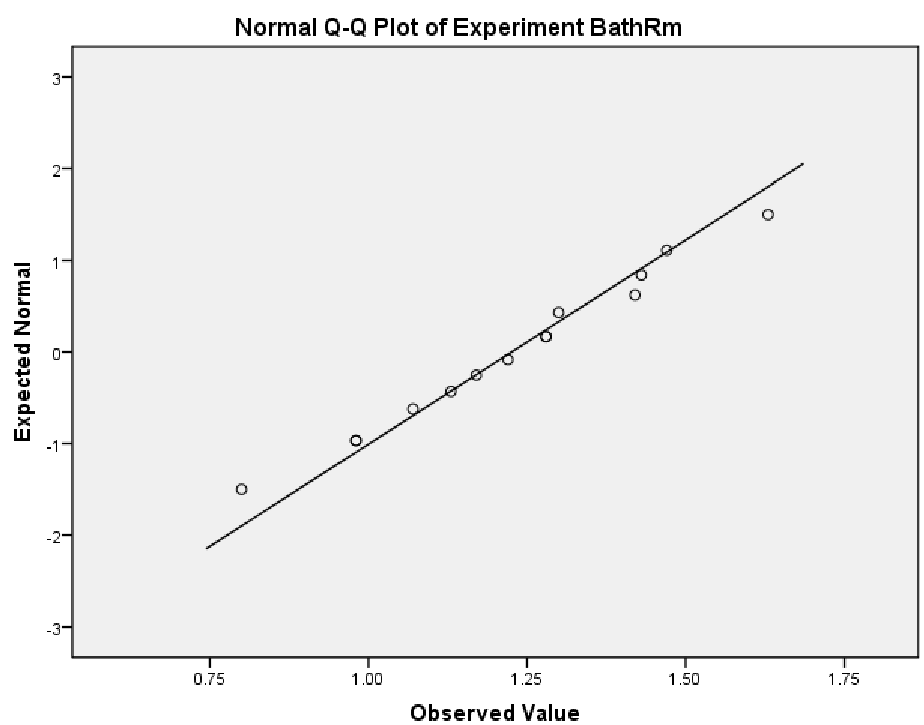
Baseline (Pre-Treatment) Bathroom



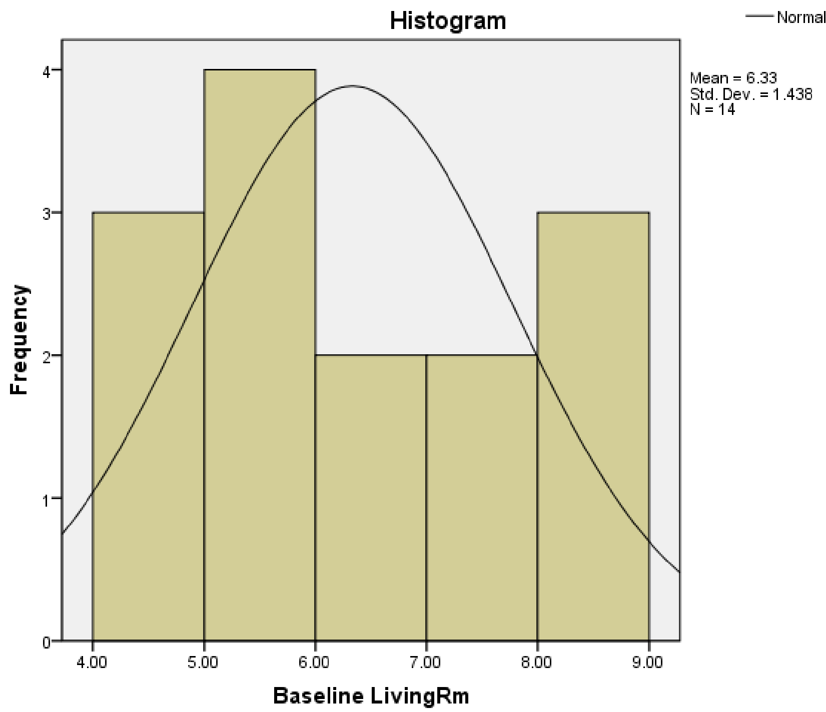


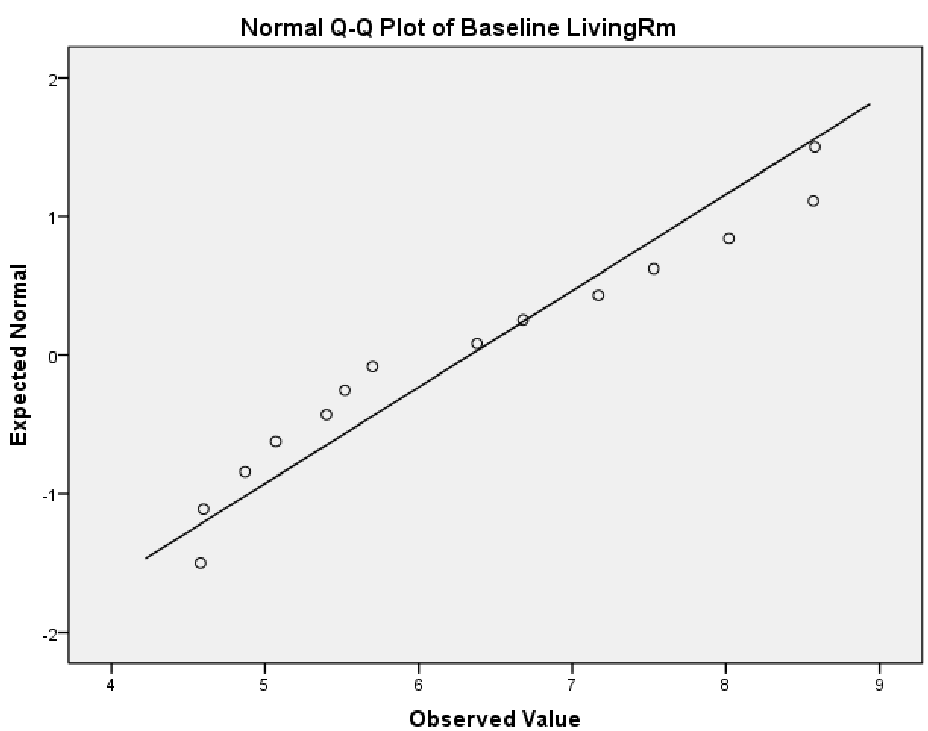
Experiment (Post-Treatment) Bathroom



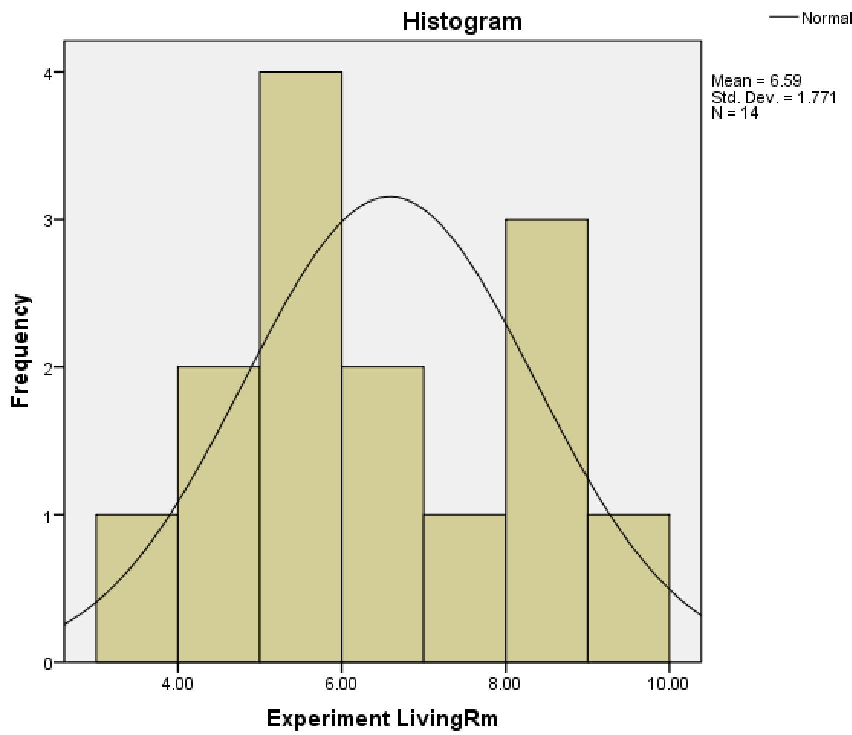


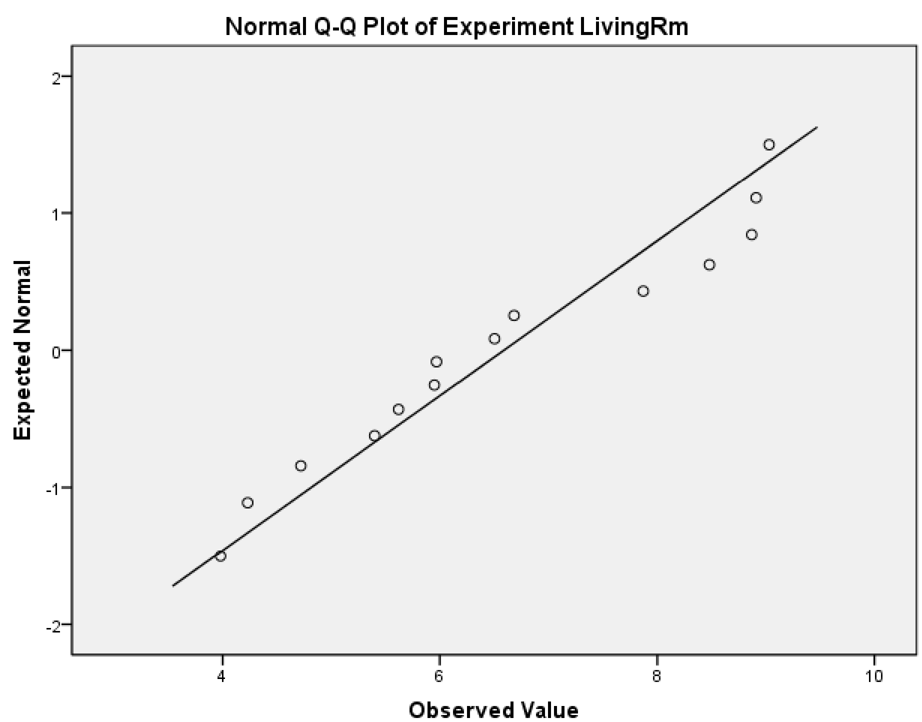
Baseline (Pre-Treatment) Living Room



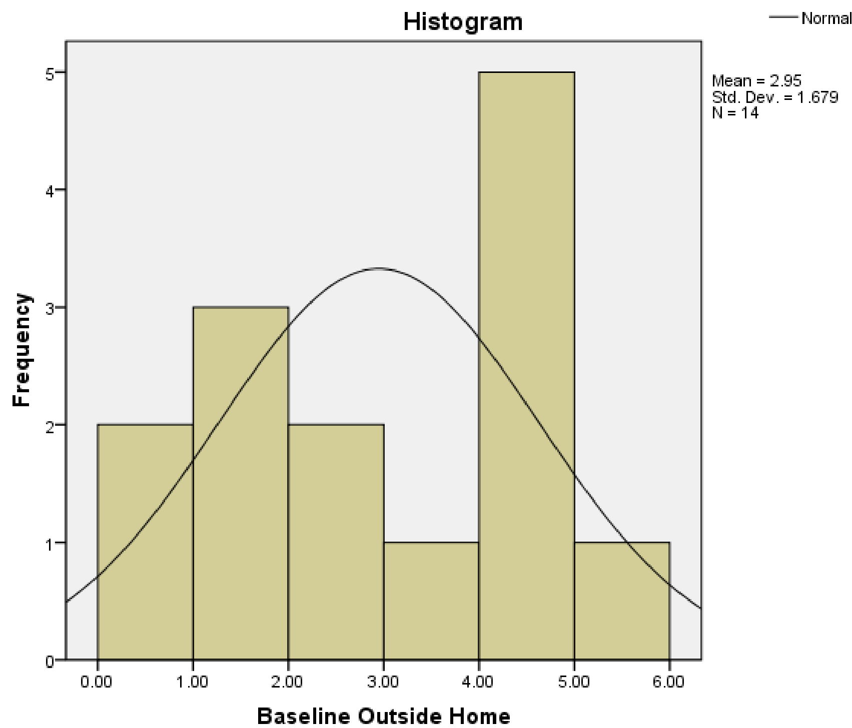


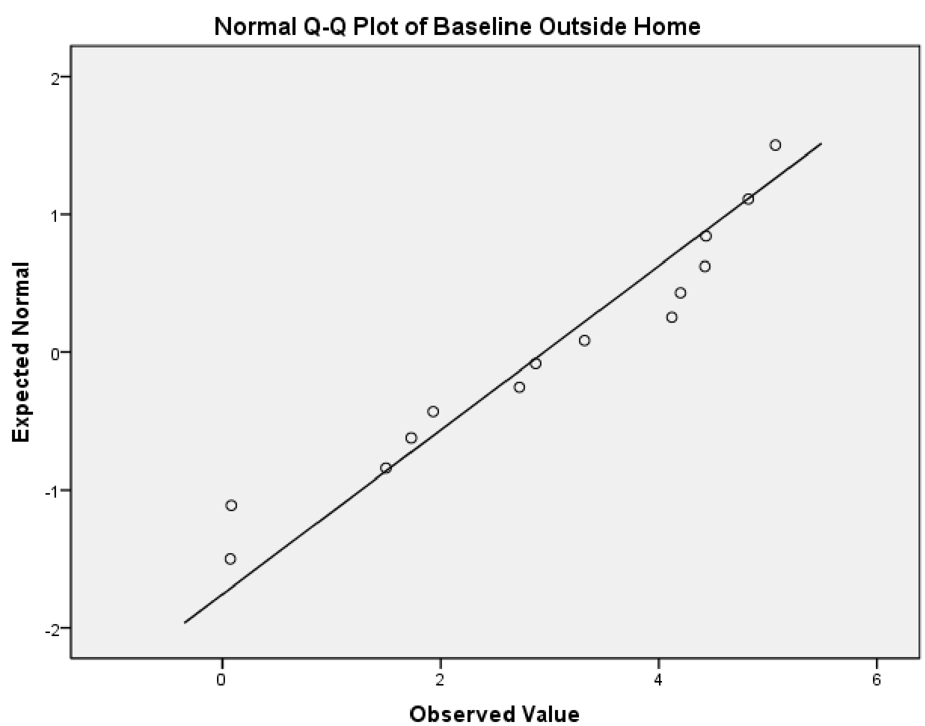
Experiment (Post-Treatment) Living Room



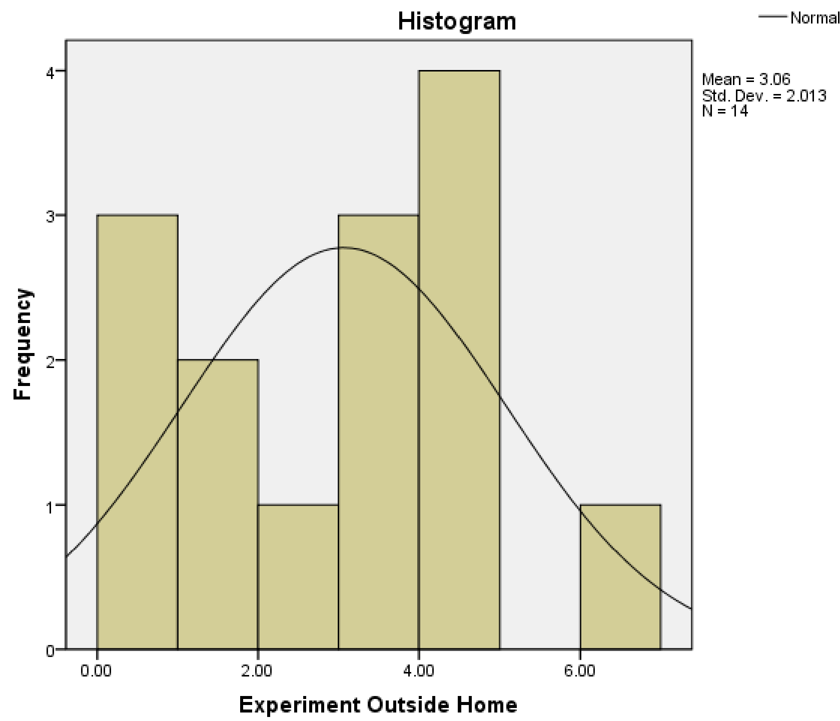


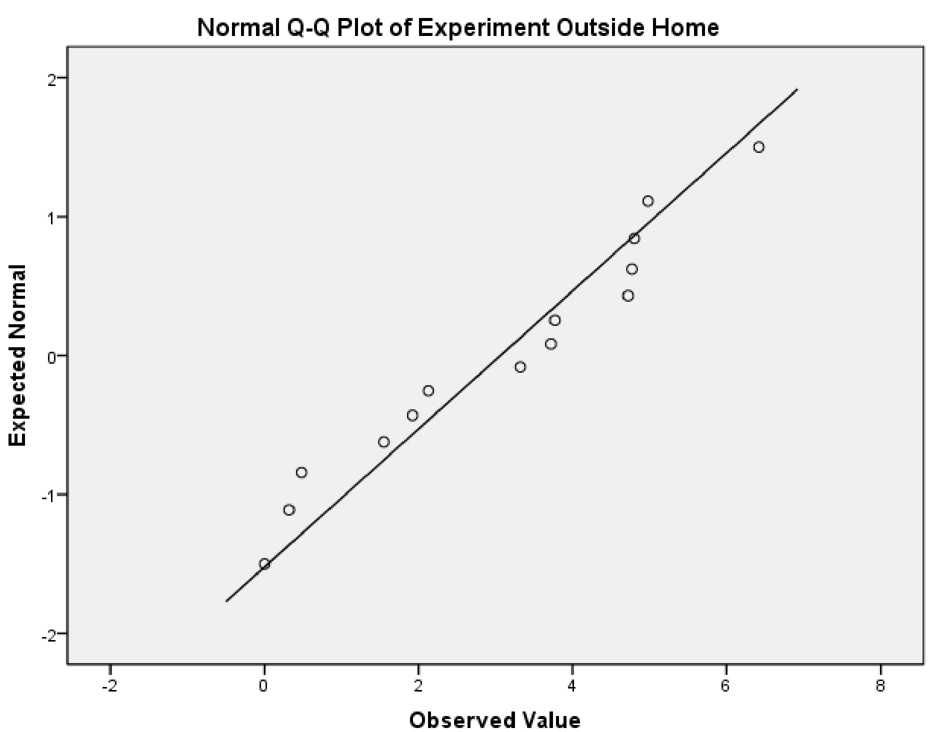
Baseline (Pre-Treatment) Outside Home



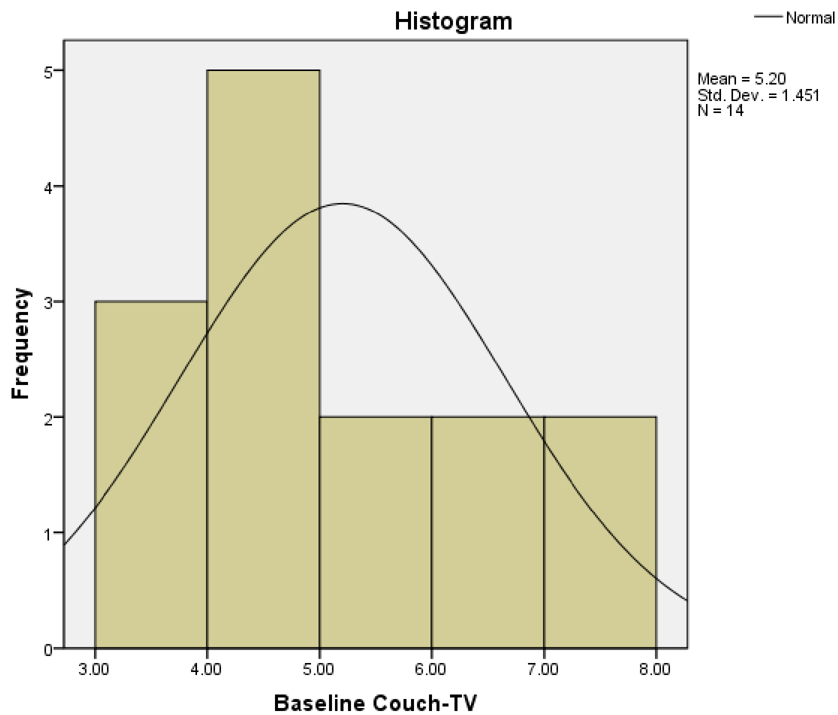


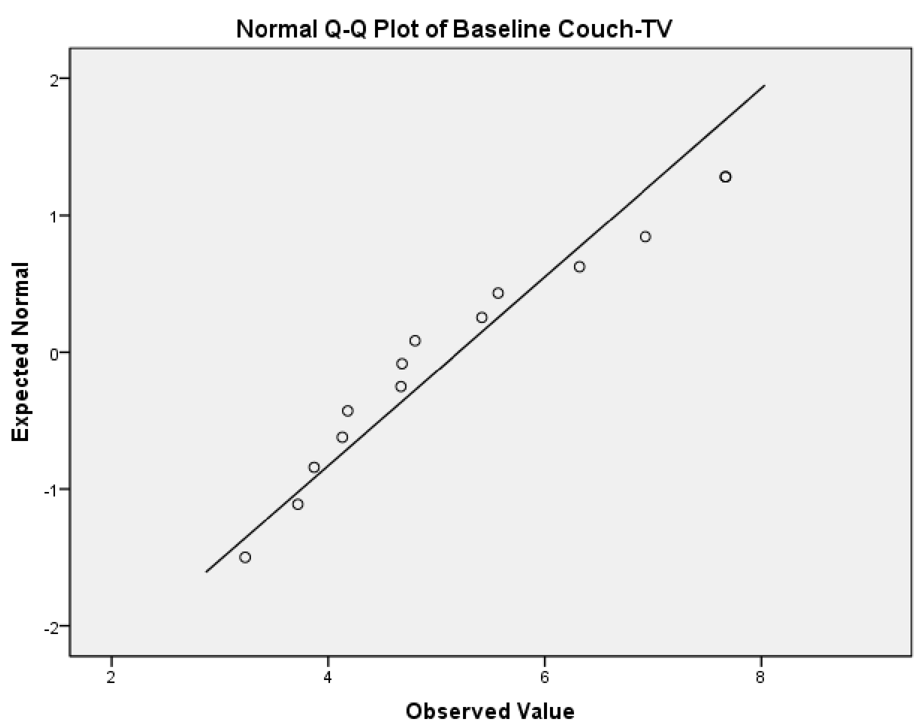
Experiment (Post-Treatment) Outside Home



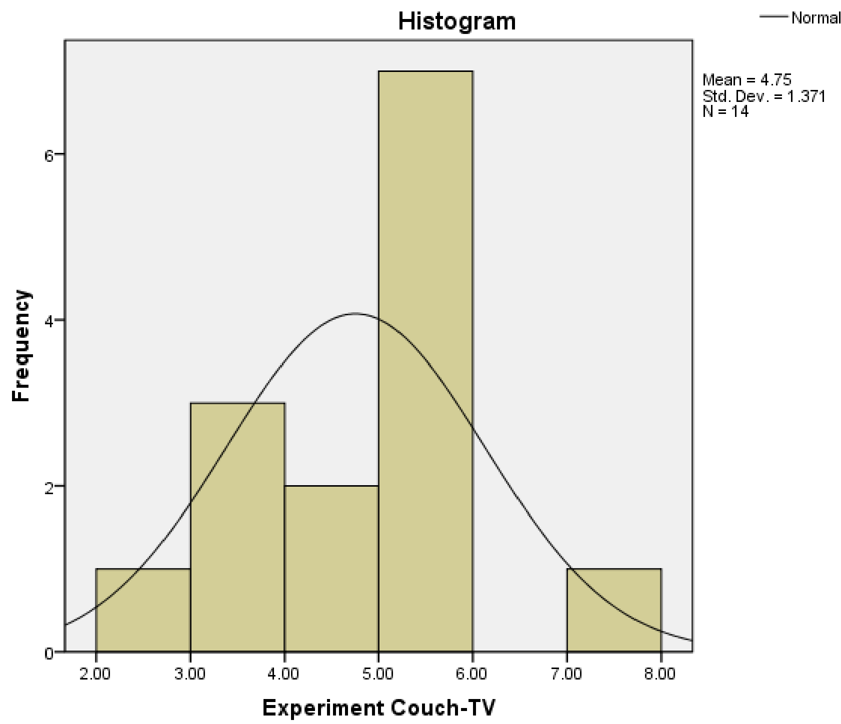


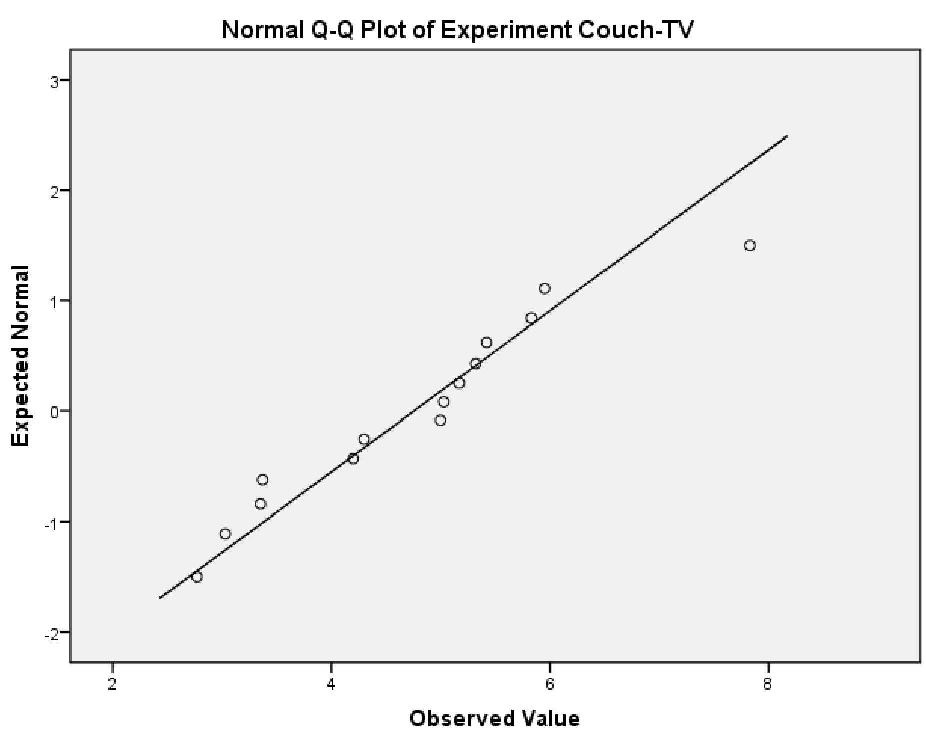
Baseline (Pre-Treatment) Couch-TV



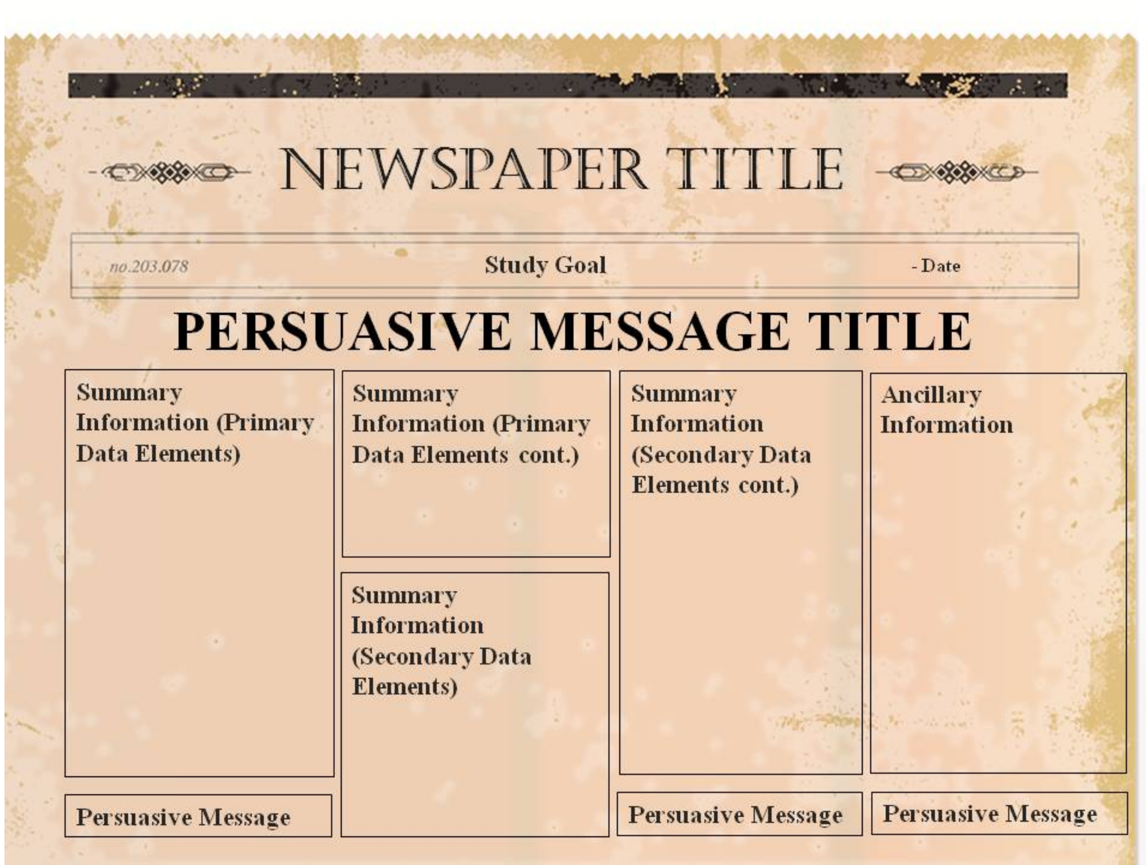


Experiment (Post-Treatment) Couch-TV





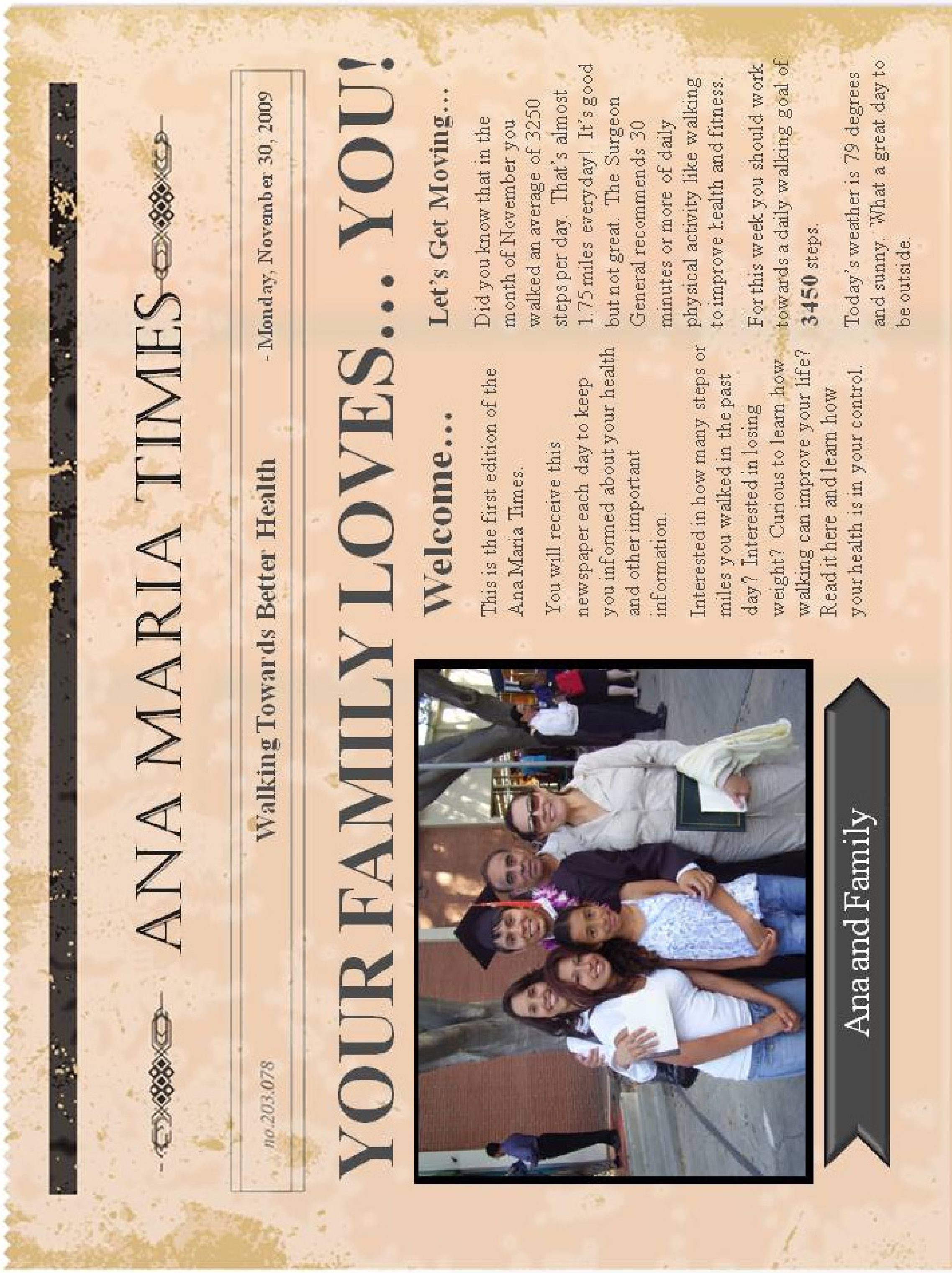
APPENDIX K: PERSUASIVE MESSAGE STRUCTURE



Key Points:

1. Newspaper title was based on the study participants name: *Ana Maria Times*
2. Study goal was clearly identified: *Walking Towards Better Health*
3. Persuasive message title was changed daily and selected based on the intended message strategy—e.g., praise or guilt
4. Summary information (primary data elements) was added and included a summary of the prior day's walking activity (e.g., total walking steps, calories burned, and distance traversed)
5. Summary information (secondary data elements) was added and typically included a summary of living pattern factors and medically-validated reasons for physical activity engagement
6. Ancillary information was added and typically included the daily weather forecast, announcements of events occurring in the study participants community, and other information that encouraged the study participant to read a message
7. Persuasive messages were embedded throughout the newspaper and each was selected based on the intended message strategy—e.g., praise or guilt. Textual and visual cues were selected and used to reinforce the message theme

APPENDIX L: DAILY PERSUASIVE MESSAGE DATA



ANA MARIA TIMES

no.203.078

Walking Towards Better Health - Monday, November 30, 2009

YOUR FAMILY LOVES… YOU!

Ana and Family

Welcome…

This is the first edition of the Ana Maria Times.

You will receive this newspaper each day to keep you informed about your health and other important information.

Interested in how many steps or miles you walked in the past day? Interested in losing weight? Curious to learn how walking can improve your life? Read it here and learn how your health is in your control.

Let's Get Moving…

Did you know that in the month of November you walked an average of 3250 steps per day. That's almost 1.75 miles everyday! It's good but not great. The Surgeon General recommends 30 minutes or more of daily physical activity like walking to improve health and fitness.

For this week you should work towards a daily walking goal of **3450** steps.

Today's weather is 79 degrees and sunny. What a great day to be outside.

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Tuesday, December 1, 2009

YOU LOOKED AMAZING…

Happy Walker… You?

Wow, what a day!

Yesterday you walked **5017** steps for a distance of 2.69 miles.

Your outside the home activities allowed you to be very physically active yesterday. What activities can you get involved with today to allow you to walk more?

Keep up the great work.

To help you reach your weekly goal of at least **3450** steps, you need to walk 3320 steps today

Walking is good…

for your bones. Research shows that women who walk approximately one mile each day have higher whole body bone density than women who walk shorter distances, and walking is also effective in slowing the rate of bone loss from the legs.

Today's weather is 73 degrees and mostly sunny. Take a light jacket when you are outside.

Quote for the day

"A good life defers wrinkles"

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Wednesday, December 2, 2009

ANA MARIA'S NEWEST GRANDCHILD

Get up and Walk

Dakota is home…

Dakota joined the family on Sunday and she is glad to be in a loving home.

When asked how she felt, Dakota said: "This house beats the kennel where I use to live". She also said: "I can't wait to meet my grandmother".

Keep on the path.

Yesterday, you were outside the home for over five hours—Great job being active. You got over seven hours of sleep and you limited your TV watching to three hours. You need to have time to relax but don't let too much time slip by when you can be active. A simple walk to the trash can help you to walk more and to meet your weekly goal of 3450 steps. For today, set a goal of walking over **3350** steps.

Today's weather is 71 degrees and mostly sunny.

Quote for the day:

"You cannot escape the responsibility of tomorrow by evading it today."

ANA MARIA TIMES

no.203.078 | Walking Towards Better Health | - Thursday, December 3, 2009

ON THE PATH TO A GREAT WEEK

Family Cheers for Grandma

A weeks best…

Yesterday you walked 5939 steps for a distance of 3.18 miles. That is your second biggest day of walking in over one month and your highest for the week. **Keep up the great work!**

Keep on the path.

Yesterday, you were outside your home for over four hours in activities that allowed you to be more active. What can you do today to help you reach your weekly goal of **3450** steps?

Walking helps to prevent type 2 diabetes.

The Diabetes Prevention Program showed that walking 150 minutes per week and losing just 7% of your body weight (7-10 pounds) can reduce your risk of diabetes by 58%.

Today's weather is 72 degrees and partly cloudy.

Quote for the day:

"There art two cardinal sins from which all others spring. Impatience and Laziness."

Franz Kafka

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Monday, December 7, 2009

ON YOUR WAY TO BETTER HEALTH

A great first week

Last week you walked an average of 5393 steps or 2.9 miles each day that you were at home. Did you know that you walked more last week than any time last month? **You are fantastic. Keep up the great work!**

New week, new goal

For this week you should work towards a daily walking goal of **3650** steps. Keep up last weeks progress and you will easily beat this goal.

If you start to feel pain in your knee, stop or slow down your daily walks.

Today's Weather

59 degrees with rain and wind. Stay inside but stay active. Perhaps you can get involved in one or more of today's events?

Today's Events

Chair Exercise—10 AM

Arts and Craft—11 AM

Movie—1.00 PM

Quote for the day

"Whatever thy hand findest to do, do it with all thy heart."

Jesus Christ

"We are proud of our grandma"

ANA MARIA TIMES

no.203.078 Walking Towards Better Health - Tuesday, December 8, 2009

GREAT JOB…3894 STEPS YESTERDAY

Bad weather didn't stop you…

Yesterday you walked 3894 steps for a distance of 2.08 miles. While the weather was cold and rainy, you managed to beat the daily goal by 244 steps. **Great Job!**

Sleep is important

Lack of sleep has been associated with worsening of blood pressure and cholesterol, all risk factors for heart disease and stroke. Your heart will be healthier if you get between 7 and 9 hours of sleep each night.

For this month, you are averaging over 7 hours of sleep a night. If you find that you are tired in the day, perhaps a brief 30 minute nap can help? **Sleep well to have energy for your daily activities.**

Did you know?

Exercise such as brisk walking for three hours a week — or just half an hour a day — is associated with a 30% to 40% lower risk of heart disease in women. **Walking is good for the heart and soul.**

Family Affairs

Valerie went job hunting yesterday
Camille has church choir practice tonight.
Brenda is working on a paper for school.
Dakota and Burble will stay inside today and play.

Today's Weather

58 degrees and sunny. Cold but with a jacket, a nice day for a walk to help you meet your daily goal of **3650** steps.

Today's Events

Bible Study—12:30 & 6 PM

Bible verse for the day

"My son, keep my words, and lay up my commandments with thee."

Proverbs 7:1

ANA MARIA TIMES

no.203.078 — **Walking Towards Better Health** — Wednesday, December 9, 2009

ANOTHER GREAT DAY…5810 STEPS!

You kept moving…

Yesterday you walked **5810** steps for a distance of 3.11 miles. **Great job** in exceeding your daily walking goal.

Your weekly goal is 3650 daily steps. With efforts like yesterday, you can easily beat this goal.

Curious of when you were most active yesterday? The following chart shows that you walked the most at 9 am, 1 pm, and 3 pm.

Yesterday's activities allowed you burned an extra 150 calories? See how walking can help you to lower your weight?

Keep up the fantastic efforts and make today "**Another Great Day!**"

Remember When?

Let's take a walk down memory lane. Do you remember when…

A gallon of gas was 27 cents?

A loaf of bread cost 14 cents?

You Bet Your Life was a popular TV show?

Tutti-Frutti was a popular song.

All About Eve won six Oscars.

Did you figure it out? **All happened in the 1950's.**

Today's Weather

62 degrees and mostly sunny.

Today's Events

Bible Study—10 AM & 6 PM

Bingo—12:30 PM

Thought for the Day

"It's amazing to see all the wonderfully amazing things that can happen in a day in which you participate."

Steve Maraboli

Keep walking towards better health.

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Thursday, December 10, 2009

YOU BEAT YOUR GOAL…GREAT JOB!

Yesterday …

You walked an average of **5439** steps or 2.91 miles .

Your daily walking this week has been above the weekly goal of 3650 steps. **Keep up the great job and great walking!**

Today's Weather

Today: Sun and clouds mixed. Slight chance of a rain shower. High 64F.

Tonight: A few showers early becoming steady overnight. Low 43F.

Today's Events

Chair Exercise—10 AM

Tai Chi—11 AM

Yoga—2:00 PM

Quote for the day

"We must accept that this creative pulse within us is God's creative pulse itself"
Joseph Pearce

"I can't walk as far as grandma"

ANA MARIA TIMES

no.203.078 | Walking Towards Better Health | - Friday, December 11, 2009

RAIN HITS SOUTHERN CALIFORNIA

Steady rain is expected today and will decrease over the weekend. If you remain inside, look for ways to stay physically active.

Yesterday you walked an average of **4889** steps or 2.61 miles.

Today's Weather

Today: Considerable cloudiness with occasional rain showers. High near 65F.

Tonight: Rain showers early will evolve into a more steady rain overnight. Low 49F.

Today's Events

Bible Study—10 AM and 1 PM

Movie—5:30 PM

Today in History

Man landed on the moon for the last time during the Apollo 17 mission.

Rainy Day in Paris

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** -Saturday, December 12, 2009

ANOTHER RAINY DAY…

Steady rain is expected again today. If you remain inside, look for ways to stay physically active. Don't let a little rain stop you from hitting your weekly goal of **3650** daily steps.

Today's Weather

Today: Cloudy with showers. High 67F.

Tonight: Cloudy with periods of rain. Low near 50F. Rainfall around a half an inch.

Today's Events

None on the calender.

Quote for the Day

"Yesterday's the past, tomorrow's the future, but today is a gift. That's why it's called the present."

Bill Keane

Watching A Rainy Day

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Sunday, December 13, 2009

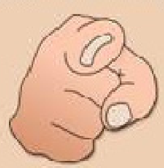
BAD WEATHER SLOWED YOU DOWN…

Yesterday …

You walked a total of **2847** steps or 1.52 miles .

While you didn't hit this weeks daily walking goal of 3650, the rainy weather didn't stop you from being physically active. Your aerobic, or low impact exercises, was excellent.

Today is another day. Get outside and get walking. Don't let yesterday slow you down from meeting your walking goals.



Today's Weather

Today: Rain showers this morning with some sunshine during the afternoon hours. High 64F.

Tonight: A few clouds. Low 44F. Winds light and variable.

Today's Events

Church Service—9:30 &11:30 AM

Kareoke—2:00 PM

Quote for the day

"The road to a friend's house is never long."

Danish Proverb

"I walked more than grandma…"

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Monday, December 14, 2009

DON'T GIVE UP ON YOUR HEALTH

Last week...

You walked an average of 5379 steps or 2.9 miles for each of the three highest days that you walked. You missed your walking routine twice in the week. Why, bad weather?

New week, new goal

For this week you should work towards a daily walking goal of **5435** steps. This is higher than last week's goal but you can do it. You typically walk over 5000 steps per day when it's sunny outside. No rain is expected this week!

Don't give up on your health.

Today's Weather

Today: Some clouds this morning will give way to generally sunny skies for the afternoon. High 67F.

Tonight: Mainly clear. Low 41F. Winds light and variable.

Today's Events

Bible Study—12:30 & 6:00 PM

Quote for the day

"There is no such thing in anyone's life as an unimportant day."

Alexander Woollcott

"What's under the tree for you?"

ANA MARIA TIMES

no.203.078 — **Walking Towards Better Health** — Tuesday, December 15, 2009

YOU ARE A CHAMPION…

Yesterday you walked 6217 steps or 3.33 miles. Wow, you beat your daily goal by almost 800 steps. You did fantastic. **Keep up the great job** in reaching this weeks goal of 5430 daily steps.

Did you Know?

Walking reduces the risk of breast cancer. Women who performed the equivalent of one hour and 15 minutes to two and a half hours per week of brisk walking had an 18% decreased risk of breast cancer compared with inactive women.

Today's Weather

Today: Partly cloudy. High 73F. Winds light and variable.

Tonight: Partly cloudy skies. Low 43F.

Today's Events

Bible Study—12:30 & 6:00 PM

Family Affairs

Valerie is job hunting at McDonald's today.
Camille has choir practice at church tonight.
Brenda is working late tonight for work.

"We are so proud of you"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** -Friday, December 18, 2009

WELCOME HOME…

Don't let the time away from home keep you from your outstanding physical activity progress.

Last Tuesday, and the last day you were at home, you walked **6090** steps or 3.26 miles. **Great job** in beating your weekly goal of 5430 steps per day.

Walking is a great way to be physically active. Did you know that doctors regularly say that walking is a great way to exercise and improve health?

Keep walking towards better health.

Today's Weather

Today: Sunny to partly cloudy Warm. High around 80F.

Tonight: Some passing clouds. Low around 45F.

Today's Events

Bible Study—10:00 AM & 6:00 PM

Movie Night—5:30 PM

Thought for the Day

"A journey of a thousand miles begins with a single step."

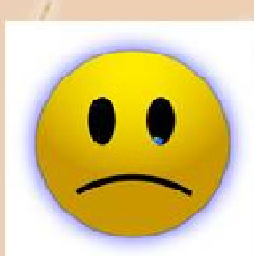
~Lao Tzu

"Dos hermosas señoras"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Sunday, December 20, 2009

ONE GOOD DAY MAKES UP FOR TWO



Two Bad Days..?

Yesterday you walked **3819** steps for a distance of 2.04 miles and the day before yesterday you walked **5237** steps for a distance of 2.81 miles. Good but under your weekly goal of 5430 steps. **Can you meet your goal today?**

Sleep is important

Lack of sleep has been associated with premature aging, reduced mental function, and the reduction on your immune system.

Yesterday you sleep almost 8 hours but your sleep was interrupted for over one hour in the early morning. If you find that you are tired in the day, perhaps a brief 30 minute nap can help? **Sleep is important. It gives you energy for your daily activities.**

Did you know?

The National Sleep Foundation reports that "exercise in the afternoon can help deepen shut eye and cut the time it takes for you to fall into dreamland." This is another reason to keep up with your walking goals.

Family Affairs

Valerie and **Camille** spent the day with a friend.
Brenda finished her final exam for school.
Dakota and Burble took advantage of the warm day to play outside.

Today's Weather

Today: Partly cloudy. Warm. High near 80F.

Tonight: Considerable cloudiness. Low 47F.

Today's Events

Church Service—9:30 & 11:30 AM

Santa's Workshop 2 PM

Bible verse for the day

"Therefore, my brothers, I want you to know that through Jesus the forgiveness of sins is proclaimed to you."

Acts 13:38-39

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | -Monday, December 21, 2009

A GREAT THIRD WEEK…

Last week…

You walked an average of 5848 steps or 3.1 miles for each of the three highest days that you walked and 4878 steps for all days in the week combined. **Great Job! You beat the goal for the week.**

New week, new goal

For this week you should work towards a daily walking goal of **5500** steps. **You can do it.**

Since you will be going to Brenda's on Wednesday, make these next three days your **BEST** walking days.

Today's Weather

Today: A mix of clouds and sun during the morning will give way to cloudy skies this afternoon. High 71F.

Tonight: Cloudy skies with a few showers after midnight. Low 46F.

Today's Events

Chair Exercise—10:00 AM

Movie—1:00 PM

Quote for the day

"A kind word can attract even the snake from his nest."

Arabian Proverb

"Christmas is Coming"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Tuesday, December 22, 2009

YOUR BEST DAY… 

Yesterday…

You walked the most of any day this month. You walked **6735** steps or **3.61** miles. You also walked off an extra 211 calories . **FANTASTIC JOB!**

Today is a new day

Walking like you did yesterday will beat the daily walking goal of **5500** steps. **You can do it.**

Rain is expected in the morning. If you cannot walk outside, perhaps you can find inside activities to keep you moving.

Today's Weather

Today: A few sprinkles possible early. A mix of clouds and sun with gusty winds. High 63F.

Tonight: Generally clear. Low 36F.

Today's Events

Bible Study—12:30 & 6:00 PM

Quote for the day

"Trust in the LORD with all your heart, and lean not on your own understanding. In all your ways acknowledge Him and he shall direct your path."
Proverbs3:5-6

"Rain doesn't stop me"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Wednesday, December 23, 2009

TODAY IS A NEW DAY TO DO BETTER

Yesterday…

You walked **5371** steps or **2.88** miles. Not bad for a day with slight rain but under the goal of 5500 daily steps.

One more day before you go to Brenda's for Christmas. Today is your best day to walk and to be active. **You can do it.**

Did you know that

walking improves physical function. Research shows that walking improves fitness and physical function and prevents physical disability in older persons.

Today's Weather

Today: Abundant sunshine. High around 65F. Winds at 10 to 20 mph.

Tonight: Generally clear. Low 38F

Today's Events

Bible Study—10:00 AM & 6:00 PM

BINGO—12:30 PM

Quote for the day

"Forgive all who have offended you, not for them, but for yourself."

Harriet Nelson

He knows if your naughty or nice

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Thursday, December 24, 2009

SANTA SAY'S YOU'VE BEEN NICE

You did great…

You walked almost **4** miles or **7300** steps yesterday.

Congratulations on beating the daily and weekly walking goal. You are amazing.

Today is Christmas Eve

and you will be spending the next few days at Brenda's. Enjoy your time with family and don't worry about being as physically active as you are at home. Next week will be a new week to walk.

Your Weather

Today: Partly cloudy skies. High 71F.

Tonight: Generally clear. Low 39F

Christmas Day: Sunny skies. High 73F

Quote for the day

"May the spirit of Christmas bring you peace, The gladness of Christmas give you hope, The warmth of Christmas grant you love."

Author Unknown

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Sunday, December 27, 2009

WELCOME HOME...

Just Fun Today...

Today is not about walking goals. It's not about knowing how many calories you've burnt. It's not about miles. **It's about having fun.**

With a nice sunny day, church service in the morning, and Kareoke at 2 PM, today is a day to be outside and to enjoy life.

Today's Weather

Today: Mostly sunny. High 69F.

Tonight: Mostly cloudy. Slight chance of a rain shower. Low 42F.

Today's Events

Church Service—9:30 & 11:30 AM

Kareoke—2:00 PM

Quote for the day

"Middle age is when your age starts to show around your middle."

Bob Hope

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Monday, December 28, 2009

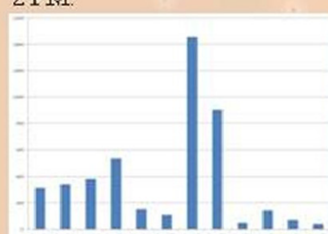
ANOTHER GREAT WEEK…!

You kept moving…

You walked an average of **6053** steps or **3.2** miles for each of the three highest days that you walked. **Great Job!**

Your weekly goal is to continue with 6000 daily steps. With efforts like last week, you can do it.

Curious of when you were most active yesterday? The following chart shows that you walked the most between 1 and 2 PM.



Yesterday's activities allowed you burned an extra 128 calories. See how walking can help you to lower your weight?

Keep up the fantastic efforts and make today "**Another Great Day!**"

Remember When?

Let's take a walk down memory lane. Do you remember when…

A gallon of gas was 35 cents?

24 oranges were 88 cents?

The Fugitive was a popular TV show?

Be My Baby was a popular song.

In the Heat of the Night won five Oscars.

Did you figure it out? **All happened in the 1960's.**

Today's Weather

Today: Cloudy skies. High near 70F.

Tonight: Low 41F.

Today's Events

Bible Study—12:30 & 6 PM

Thought for the Day

"It's amazing to see all the wonderfully amazing things that can happen in a day in which you participate."

Steve Maraboli

Keep walking towards better health.

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Tuesday, December 29, 2009

CLOSE BUT NO CIGAR

Yesterday…

You walked **5630** steps or **3.02** miles. You also walked off an extra 148 calories.

Today is a new day

Walking like you did yesterday will not beat this weeks goal of **6000** steps. **Pick it up**. You walked 6735 steps last Monday.

Did you get enough sleep last night? It appears that you slept close to six hours of interrupted sleep? Consider a nap today if you feel tired.

Today's Weather

Today: A few sprinkles possible early. Partly cloudy skies. High 68F.

Tonight: A few clouds. Low 41F.

Today's Events

Bible Study—12:30 & 6:00 PM

Quote for the day

"Ask your child what he wants for dinner only if he's buying."

Fran Lebowitz

"I didn't meet my goal"

ANA MARIA TIMES

no.203.078 | Walking Towards Better Health | - Wednesday, December 30, 2009

TWO DAYS UNDER THE GOAL

Yesterday…

You walked **4909** steps or **2.63** miles. The same day last week you walked 5371 steps or 2.88 miles. Today is your last day before going to Brenda's. **Make it a good day for walking.**

TV Time

Yesterday, you watched almost three hours of television. You need time to relax but don't let too much TV time keep you from moving. Get up and walk outside or in your apartment to remain active.

Did you Know?

Walking remains a top recommended and proven strategy by doctors for blood pressure control.

Today's Weather

Today: Mostly cloudy. A few showers developing during the afternoon. High near 65F.

Tonight: Low 44F.

Today's Events

Bible Study—10:00 AM & 6:00 PM

Bingo—12:30 PM

Sad little puppy

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Monday, January 04, 2010

A WEEK IN REVIEW

How did you do?

Last week's goal was 6000 steps and you walked an average of 5427 steps for all the days you were at home. Let's look at each day:

MONDAY
Steps: 5630
Miles: 3.02

TUESDAY
Steps: 4909
Miles: 2.63

WEDNESDAY
Steps: 5666
Miles: 3.04

THURSDAY & FRIDAY
(New Year's at Brenda's)
Steps: 3269 & 2300
Miles: 1.75 & 1.23

SATURDAY (Weeks High)
Steps: 6435
Miles: 3.45

SUNDAY
Steps: 4498
Miles: 2.41

You walked the least while at Brenda's and your best day was Saturday with 6435 steps.

You burned 4 times less calories while at Brenda's than when you were at home and active.

New Week, New Goal

For this week you should work towards a daily walking goal of **5600** steps. This is lower than last week's goal but still high enough to keep you moving towards better health. **You can do it.**

Today's Weather

Today: Sun and clouds mixed. Warm. High near 80F.

Tonight: Mainly clear skies. Low 43F.

Quote for the day

"We are often so caught up in our destination that we forget to appreciate the journey, especially the goodness of the people we meet along the way. Appreciation is a wonderful feeling, don't overlook it."

Unknown author

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Tuesday, January 05, 2010

UNDER THE WEEKLY GOAL

Yesterday…

You walked **5208** steps or **2.79** miles and you burned off an extra **152** calories. This was better than the day before but under the week's goal of 5600 steps.

TV Time

Yesterday, you watched almost four hours of television. You need time to relax but don't let too much TV time keep you from moving. Walk outside or in your apartment to remain active.

Blood Pressure & Weight (Last Reading)

Blood Pressure: **138/74**
Weight: **146.2 lbs**

Today's Weather

Today: Sunny. High 79F.

Tonight: A few clouds. Low 44F.

This week's weather is sunny and warm. **Great opportunity for walking**

Quote for the Day

"Everyone is entitled to be stupid, but some abuse the privilege." **Author Unknown**

"I missed my goal"

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | - Wednesday, January 06, 2010

GRANDMA ROCKS THE DAY

Yesterday…

You walked **5879** steps or **3.15** miles and you burned off an extra **172** calories. You beat the weekly goal. **Great Job. You did fantastic yesterday!**

Sleep & TV Time

Yesterday, you got 8.4 hours of sleep and you sat on the couch and watched TV for almost two hours.

Did you Know?

In Ireland, it's illegal to lie to your parents.

Today's Weather

Today: Partly cloudy. High 78F.

Tonight: Low 46F.

God's Word

"I have come as a light into the world, that whoever believes in Me should not abide in darkness." **(John 12:46 NKJV)**

"My grandma rocks"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Thursday, January 07, 2010

SAD CAT SAYS…

Yesterday…

You walked **4454** steps or **2.39** miles and you burned off an extra **126** calories. This was much lower than the day before. What happened? Make today a better day for walking and your health.

Sleep & TV Time

Yesterday, you got 7.9 hours of sleep and you sat on the couch and watched TV for over five hours.

Did you Know?

Famed Italian explorer Marco Polo never learned to swim.

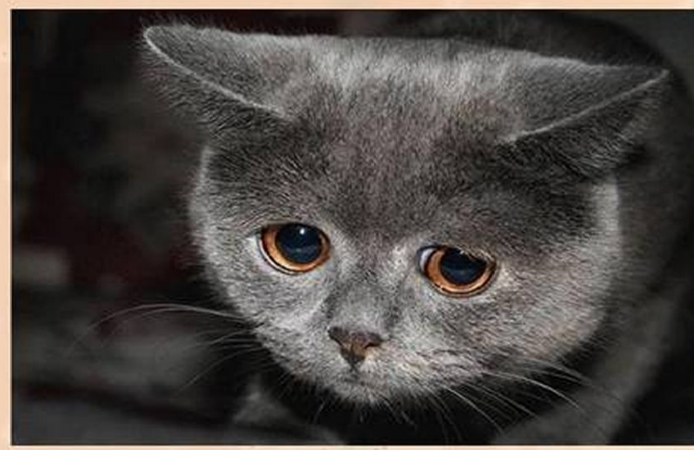
Today's Weather

Today: Partly cloudy skies. High 77F.

Tonight: Mostly clear. Low near 45F.

God's Word

"For we walk by faith, not by sight." **(2 Corinthians 5:7 NKJV)**



"I'm happy when you walk"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - **Friday, January 08, 2010**

HAPPY CAT SAYS…

Yesterday…

You walked **6168** steps or **3.30** miles and you burned off an extra **173** calories. You did wonderfully and your health will benefit from it.

Can you walk the same distance today? Meet your goal and tomorrow will be a day of your choice. No walking goal, just you.

Sleep & TV Time

Yesterday, you got 7.7 hours of sleep and you sat on the couch and watched TV for 4.1 hours.

Did you Know?

Blueberry jam removes tarnish from silver.

Today's Weather

Today: Partly to mostly cloudy. High 78F.

Tonight: Partly cloudy skies. Low around 45F.

God's Word

"And let the peace of God rule in your hearts, to which also you were called in one body; and be thankful."

(Colossians 3:15 NKJV)

"I purr loudly when you walk"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Saturday, January 09, 2010

YOU DESERVE A BREAK TODAY

You didn't meet your walking goal yesterday but for today…

Walk if you want to walk

Relax if you want to relax

Have fun if you want to have fun

You deserve it!

ANA MARIA TIMES

no.203.078 — **Walking Towards Better Health** — - Wednesday, January 13, 2010

WELCOME HOME…

Don't let the time away from home keep you from good health and physical activity.

Last Week, you walked an average of **5050** steps or **2.70** miles each day. **Great job** in keeping active.

For the remainder of this week, you set your walking goal. Let your knees guide you on how much you should walk. If you feel discomfort, decrease or stop your walking for the day.

Keep Healthy. Keep Walking.

Today's Weather

Today: Showers. High around 79F.

Tonight: Some passing clouds. Low around 47F.

Today's Events

Bible Study—10:00 AM & 6:00 PM

Hearing Doctor—10:00 AM

God's Word

"For You are my hope, O Lord GOD; You are my trust from my youth." **(Psalms 71:5 NKJV)**

"Dos hermosas señoras"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Thursday, January 14, 2010

OVER 5000 STEPS…

Yesterday you walked **5097** steps or **2.73** miles. Your walking helped you to burn off an extra 146 calories. **Viva Señorita** in keeping active.

Blood Pressure & Weight (Last Reading)

Blood Pressure: **138/72**
Weight: **146.2 lbs**

TV Time

Yesterday you sat on the couch and watched TV for 5.3 hours.

Today's Weather

Today: Windy with sunshine. High 76F.

Tonight: Mainly clear skies. Low 42F.

Today's Events

Chair Exercise—10:00 AM

Line Danching—5:30 PM

Did You Know?

The Atlantic ocean is slightly saltier than the Pacific Ocean.

"Viva Señorita"

ANA MARIA TIMES

no.203.078 Walking Towards Better Health - Friday, January 15, 2010

WALKNG IS GOOD…

Yesterday you walked **5262** steps or **2.82** miles. Your walking helped you to burn off an extra 150 calories. **Good work** in walking more yesterday than the day before.

Do You Know Your Eggs?

Can't remember if an egg is fresh or hard boiled? Just spin the egg. If it wobbles, it's raw. If it spins easily, it's hard boiled.

Also, a fresh egg will sink in water, a stale one will float.

Today's Weather

Today: Mainly sunny to start, then a few afternoon clouds. High 79F.

Tonight: Mainly cloudy. Low near 45F.

Today's Events

Movie Night—5:30 PM

"Wishing you a Happy Friday"

ANA MARIA TIMES

no.203.078 **Walking Towards Better Health** - Saturday, January 16, 2010

VIVA SENORITA

Yesterday…

You walked **6160** steps or **3.30** miles and you burned off an extra **170** calories. **Great Job!**

Sleep Times

Yesterday you slept 7.1 hours. If you find your energy is low today, take a quick nap. You need to feel good to walk good.

Blood Pressure & Weight (Last Reading)

Blood Pressure: 138/72
Weight: 146.2 lbs

Today's Weather

Today: Partly to mostly cloudy. High 74F.

Tonight: Partly cloudy. Low 43F.

Today and tomorrow are your two best days to walk before the rain arrives on Monday.

Quote for the Day

"You don't get anything clean without getting something else dirty." **Cecil Baxter**

ANA MARIA TIMES

no.203.078 | **Walking Towards Better Health** | -Sunday, January 17, 2010

ANA'S AMAZING JOURNEY

Via Con Dios…

Today is the last edition of the "Ana Maria Times". The study has come to an end and your participation is greatly appreciated. THANK YOU.

Where did you begin?

Before the study began, you walked an average of **3200** steps or **1.74** miles and you burned an average of **80** extra calories each day.

Your average blood pressure was **141/75** and your weight was **146.2** lbs.

Where are you today?

Your average daily walking steps are **5100** or **2.75** miles. Your increased walking helps you to burn an average of **140** extra calories each day.

Your average blood pressure was high in December at **155/75** but you greatly improved it in January. Now it averages **131/74.**

Your weight is stable at **146** lbs.

Pride and You

You need to be proud in your accomplishments. **Great Job!**

Your family loves you and wants you to continue "walking towards better health"

APPENDIX M: LOG BOOK EXAMPLE

Purpose: Used to determine the study participant's perception of their daily time spent in common waking hour living and home utilization activities. The log augmented and supported the interpretation of the data collected from the Behavior Modification Sensor System.

Outcomes: Completion of a daily log sheet by the study participant supported an understanding of the following parameters (from the user's perception):

1. General daily living activities
    a. Wake up time
    b. Bed time
        i. Wake up time and bed time allowed calculation of total sleep time
    c. Activities outside the home
    d. TV usage
    e. Eating routine
    f. Hygiene pattern (e.g., shower/bath)
2. Ranking of time spent in each room inside and activities outside the home.

Example: One sheet was created for each day in the baseline period.

Activity Log
Sunday, November 1, 2009

November						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

2 ○ 9 ◑ 16 ● 24 ◐

Instructions: For each hour below, place a check mark ("√") under each activity that you completed. If the activity was "Misc." or an activity outside the home (e.g., "Outside Activity"), please write the name of the activity in the designated space.

Daily Activities Table											
Time	Wake Up	Breakfast	Lunch	Dinner	Snack	Shower/Bath	Sleep	TV	Misc.	Outside Activity	Misc. or Outside Activity Name
5 AM											
6 AM											
7 AM											
8 AM											
9 AM											
10 AM											
11 AM											
12 PM											
1 PM											
2 PM											
3 PM											
4 PM											
5 PM											
6 PM											
7 PM											
8 PM											
9 PM											
10 PM											
11 PM											
12 PM											
1 AM											
2 AM											
3 AM											
4 AM											

Instructions: For each category below, rank your waking time spent in each room or outside the home using a 1 to 6 scale (e.g., 1 = most time, 6 = least time). An *example* is provided as a reference.

Daily Living Table						
Ranking of Time Spent Inside and Outside the Home during Waking Hours	**Living Room**	**Bedroom**	**Dining Room**	**Bath Room**	**Kitchen**	**Outside Home**
Example:	1	6	5	4	3	2

APPENDIX N: DAILY LIVING PATTERN DATA

Baseline-Day 1 (11/2/2009)

Date:	Monday, November 02, 2009			Week	1			Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:06	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:44	0:56:13	0:56:06	0:02:42	0:00:20	0:00:00	0:00:00	0:05:13	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:01:09	0:56:15	0:55:58	0:02:07	0:00:28	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:01:26	0:57:06	0:56:20	0:01:15	0:00:12	0:00:00	0:00:00	0:04:55	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:15:06	0:05:16	0:34:32	0:33:39	0:03:52	0:01:13	0:00:00	0:00:00	0:00:00	0:00:07	0:00:10	0:00:05	0	0	Breakfest
7:00:00	0:17:34	0:03:27	0:15:16	0:11:17	0:17:32	0:06:10	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	68	0	
8:00:00	0:16:13	0:08:19	0:13:40	0:03:06	0:11:30	0:06:28	0:03:49	0:00:00	0:00:00	0:00:00	0:00:00	0:00:10	273	0	
9:00:00	0:00:00	0:00:40	0:00:56	0:00:00	0:02:04	0:27:49	0:28:30	0:25:07	0:00:00	0:00:00	0:00:00	0:00:00	530	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	174	0	
11:00:00	0:02:47	0:23:19	0:00:14	0:00:00	0:06:57	0:17:25	0:09:17	0:11:32	0:00:00	0:00:00	0:00:03	0:00:41	639	0	Lunch
12:00:00	0:00:00	0:09:22	0:05:31	0:00:00	0:03:04	0:06:49	0:35:13	0:00:00	0:00:00	0:00:00	0:00:00	0:00:03	556	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	104	0	
14:00:00	0:00:00	0:07:35	0:01:37	0:00:00	0:12:08	0:04:00	0:34:39	0:00:00	0:00:00	0:00:00	0:00:08	0:00:07	1095	0	
15:00:00	0:18:11	0:01:30	0:06:00	0:00:00	0:02:01	0:32:17	0:00:00	0:28:04	0:00:00	0:00:00	0:00:00	0:00:00	112	0	
16:00:00	0:00:00	0:12:17	0:00:00	0:00:00	0:00:25	0:47:17	0:00:00	0:46:58	0:00:00	0:00:00	0:00:04	0:00:08	37	0	
17:00:00	0:00:06	0:10:05	0:00:11	0:00:00	0:01:06	0:48:31	0:00:00	0:44:03	0:00:00	0:00:03	0:00:04	0:00:09	83	0	Dinner
18:00:00	0:00:00	0:02:22	0:00:00	0:00:00	0:00:25	0:57:12	0:00:00	0:54:24	0:00:00	0:00:00	0:00:00	0:00:22	66	0	
19:00:00	0:00:00	0:15:28	0:02:28	0:00:00	0:07:31	0:18:25	0:16:07	0:09:22	0:00:00	0:00:00	0:00:00	0:00:05	303	0	
20:00:00	0:00:00	0:01:19	0:27:23	0:26:24	0:01:26	0:29:51	0:00:00	0:28:37	0:03:54	0:00:00	0:00:08	0:00:00	46	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:09:57**	**1:44:18**	**10:37:14**	**10:02:42**	**1:16:11**	**5:04:29**	**4:07:33**	**4:08:07**	**1:14:01**	**0:00:10**	**0:00:37**	**0:01:50**	**4086**	**0**	

TOTAL	Steps:	**4086**		**SLEEP**	Total Hrs:	**0:00:00**					**Met?**		**WEATHER**	**NA**	
	Aerobic:	**0**			Interupted:	**Y**		**GOAL**	Weekly:	**NA**	**NA**				
	Miles:	**2.19**							Strategy:	**NA**					
	Calories:	**110**													

Baseline-Day 2 (11/3/2009)

Date:	Tuesday, November 03, 2009			Week	1		Home	Y						
	Room Presence						Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:44:00	0:43:55	0:02:29	0:13:30	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:17	0:59:25	0:59:20	0:00:00	0:00:17	0:00:00	0:00:00	0:46:14	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:38	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:02:14	0:33:56	0:17:07	0:02:32	0:21:17	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	0:00:00	230	0	
7:00:00	0:27:19	0:10:39	0:01:18	0:00:00	0:09:57	0:10:46	0:00:00	0:00:00	0:00:00	0:00:04	0:00:10	0:00:06	188	0	Breakfest
8:00:00	0:00:00	0:03:14	0:01:28	0:00:00	0:08:00	0:35:09	0:12:08	0:32:09	0:00:00	0:00:00	0:00:00	0:00:00	234	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	78	0	
10:00:00	0:00:21	0:14:38	0:01:47	0:00:00	0:03:02	0:09:09	0:31:02	0:05:16	0:00:00	0:00:07	0:00:03	0:00:14	273	0	
11:00:00	0:00:00	0:28:28	0:00:47	0:00:00	0:05:46	0:24:58	0:00:00	0:23:37	0:00:00	0:00:00	0:00:00	0:00:07	190	0	
12:00:00	0:00:02	0:19:16	0:00:48	0:00:00	0:10:09	0:29:44	0:00:00	0:10:33	0:00:00	0:00:00	0:00:11	0:02:26	398	0	Lunch
13:00:00	0:00:00	0:04:13	0:00:36	0:00:00	0:04:38	0:32:24	0:18:08	0:28:40	0:00:00	0:00:00	0:00:00	0:00:00	355	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	3199	1714	
15:00:00	0:00:58	0:15:57	0:02:02	0:00:00	0:09:31	0:27:07	0:04:24	0:17:38	0:00:00	0:00:00	0:00:00	0:00:09	411	0	
16:00:00	0:00:00	0:07:52	0:01:11	0:00:00	0:05:17	0:45:39	0:00:00	0:32:09	0:00:00	0:00:02	0:08:47	0:00:26	174	0	Dinner
17:00:00	0:04:52	0:00:04	0:01:37	0:00:00	0:03:35	0:24:10	0:25:41	0:17:38	0:00:00	0:00:00	0:00:00	0:00:00	186	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
19:00:00	0:00:00	0:04:53	0:00:58	0:00:00	0:02:35	0:24:11	0:27:22	0:21:42	0:00:00	0:00:00	0:00:06	0:00:10	140	0	
20:00:00	0:00:00	0:00:18	0:04:40	0:00:00	0:18:03	0:23:20	0:13:38	0:05:30	0:01:10	0:00:00	0:00:00	0:00:00	52	0	
21:00:00	0:00:00	0:00:00	0:52:55	0:52:45	0:04:56	0:02:08	0:00:00	0:00:00	0:26:03	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	0:33:32	1:52:03	9:27:22	8:53:01	1:30:30	6:23:48	4:12:21	3:14:52	1:14:05	0:00:13	0:09:19	0:03:38	6108	1714	

TOTAL	Steps:	6108		SLEEP	Total Hrs:	8:46:07				Met?		WEATHER	NA	
	Aerobic:	1714			Interupted:	Y	GOAL	Weekly:	NA	NA				
	Miles:	3.27						Strategy:	NA					
	Calories:	180												

Baseline Day 3 (11/4/2009)

Date:	Wednesday, November 04, 2009			Week	1		Home	Y						

	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:57:13	0:57:07	0:02:00	0:00:46	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:22:24	0:03:05	0:22:09	0:20:24	0:10:39	0:01:42	0:00:00	0:00:00	0:00:00	0:00:00	0:00:03	0:00:00	0	0	
7:00:00	0:28:54	0:00:52	0:01:15	0:00:22	0:21:18	0:07:40	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:27:54	0:01:04	0:23:33	0:14:42	0:05:07	0:02:21	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	166	0	
9:00:00	0:37:05	0:14:04	0:00:38	0:00:00	0:05:57	0:02:15	0:00:00	0:00:04	0:00:00	0:00:05	0:00:02	0:00:08	108	0	Breakfest
10:00:00	0:00:00	0:00:52	0:10:06	0:00:00	0:00:32	0:48:29	0:00:00	0:45:22	0:00:00	0:00:02	0:00:02	0:00:06	174	0	
11:00:00	0:07:17	0:13:26	0:18:10	0:00:00	0:13:48	0:07:18	0:00:00	0:02:52	0:26:41	0:03:43	0:00:30	0:00:24	300	0	
12:00:00	0:09:37	0:03:03	0:00:58	0:00:00	0:00:24	0:45:57	0:00:00	0:45:07	0:00:00	0:00:00	0:00:00	0:00:00	96	0	
13:00:00	0:00:00	0:00:27	0:00:10	0:00:00	0:03:19	0:56:03	0:00:00	0:55:24	0:00:00	0:00:00	0:00:00	0:00:12	25	0	
14:00:00	0:00:00	0:00:08	0:00:00	0:00:00	0:03:36	0:56:15	0:00:00	0:55:33	0:00:00	0:00:00	0:00:00	0:00:00	12	0	
15:00:00	0:00:00	0:02:13	0:00:00	0:00:00	0:02:31	0:50:07	0:05:08	0:48:13	0:00:00	0:00:08	0:00:02	0:00:12	547	0	Lunch
16:00:00	0:00:00	0:08:41	0:00:00	0:00:00	0:02:08	0:49:10	0:00:00	0:47:37	0:00:00	0:00:00	0:00:23	0:00:12	32	0	
17:00:00	0:00:00	0:28:25	0:00:00	0:00:00	0:00:15	0:31:19	0:00:00	0:30:11	0:00:00	0:00:02	0:00:10	0:00:25	55	0	Dinner
18:00:00	0:09:06	0:08:21	0:02:29	0:00:00	0:01:01	0:39:02	0:00:00	0:29:30	0:00:00	0:00:00	0:00:00	0:00:00	89	0	
19:00:00	0:00:00	0:11:30	0:02:14	0:00:00	0:12:56	0:33:19	0:00:00	0:28:20	0:00:00	0:00:00	0:00:00	0:00:21	65	0	
20:00:00	0:00:00	0:00:15	0:04:37	0:01:24	0:05:23	0:49:44	0:00:00	0:28:00	0:03:41	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:00:00	0:56:51	0:56:38	0:02:49	0:00:19	0:00:00	0:00:00	0:55:15	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:22:17**	**1:36:26**	**10:20:14**	**9:30:28**	**1:33:43**	**8:01:48**	**0:05:08**	**6:56:13**	**1:25:37**	**0:04:00**	**0:01:12**	**0:02:00**	**1669**	**0**	

TOTAL	Steps:	**1669**		**SLEEP**	Total Hrs:	**8:51:20**				Met?		**WEATHER**	**NA**
	Aerobic:	**0**			Interupted:	**Y**	**GOAL**	Weekly:	**NA**	**NA**			
	Miles:	**0.89**						Strategy:	**NA**				
	Calories:	**34**											

Baseline Day 4 (11/5/2009)

Date:	Thursday, November 05, 2009				Week	1		Home	Y	Partial Data. Power out from 15:00-20:00					
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:56	0:59:56	0:00:00	0:00:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:57:34	0:57:28	0:02:09	0:00:16	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:09:10	0:01:20	0:47:17	0:46:07	0:01:42	0:00:30	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:52:07	0:01:50	0:00:00	0:00:00	0:05:23	0:00:39	0:00:00	0:00:00	0:00:00	0:00:16	0:00:06	0:00:00	61	0	
6:00:00	0:00:00	0:12:58	0:00:00	0:00:00	0:02:03	0:44:58	0:00:00	0:44:12	0:00:00	0:00:02	0:00:05	0:00:46	103	0	Breakfest
7:00:00	0:01:19	0:03:11	0:01:07	0:00:00	0:26:10	0:28:12	0:00:00	0:26:58	0:00:00	0:00:00	0:00:03	0:00:15	101	0	
8:00:00	0:00:00	0:15:28	0:21:25	0:00:00	0:14:35	0:05:40	0:02:51	0:00:00	0:24:59	0:00:00	0:00:00	0:00:00	374	0	
9:00:00	0:00:00	0:12:11	0:01:09	0:00:00	0:06:44	0:04:54	0:35:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	593	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	148	0	
11:00:00	0:00:00	0:01:09	0:00:26	0:00:00	0:04:50	0:34:00	0:19:34	0:29:43	0:00:00	0:00:00	0:00:00	0:00:05	508	0	
12:00:00	0:11:44	0:14:50	0:00:10	0:00:00	0:10:46	0:22:29	0:00:00	0:17:33	0:00:00	0:00:00	0:00:16	0:00:25	252	0	Lunch
13:00:00	0:00:00	0:00:44	0:02:12	0:00:00	0:04:35	0:40:01	0:12:27	0:36:57	0:00:00	0:00:00	0:00:00	0:00:00	303	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	215	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:41	0:00:18	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	300	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	115	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	36	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	25	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	236	0	
20:00:00	0:00:13	0:00:12	0:15:46	0:14:03	0:04:04	0:39:44	0:00:00	0:00:00	0:20:55	0:00:00	0:00:00	0:00:00	167	0	
21:00:00	0:02:20	0:00:00	0:53:09	0:52:11	0:03:12	0:01:18	0:00:00	0:00:00	0:21:59	0:00:00	0:00:00	0:00:00	23	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:06:53	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:16:53**	**1:03:53**	**8:20:07**	**7:49:41**	**1:26:13**	**4:42:25**	**3:10:09**	**2:35:23**	**1:14:46**	**0:00:18**	**0:00:30**	**0:01:31**	**3560**	**0**	
TOTAL	Steps:	**3560**		**SLEEP**	Total Hrs:	**6:48:25**					**Met?**		**WEATHER**	**NA**	
	Aerobic:	**0**			Interupted:	**Y**		**GOAL**	Weekly:	**NA**	**NA**				
	Miles:	**1.91**							Strategy:	**NA**					
	Calories:	**86**													

Baseline Day 5 (11/6/2009)

Date:	Friday, November 06, 2009			Week	1		Home	P							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	1:00:03	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:16:37	0:00:22	0:38:15	0:37:27	0:03:53	0:00:52	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	22	0	
5:00:00	0:29:26	0:00:50	0:00:54	0:00:00	0:00:10	0:28:39	0:00:00	0:27:17	0:00:00	0:00:02	0:00:02	0:00:00	52	0	
6:00:00	0:00:00	0:03:07	0:15:06	0:00:00	0:18:04	0:23:42	0:00:00	0:23:09	0:10:36	0:00:03	0:00:18	0:00:03	44	0	
7:00:00	0:24:09	0:14:11	0:10:23	0:00:00	0:00:54	0:10:22	0:00:00	0:02:57	0:18:33	0:00:04	0:00:21	0:00:09	399	0	Breakfest
8:00:00	0:32:07	0:03:33	0:00:19	0:00:00	0:07:44	0:13:51	0:02:25	0:11:06	0:00:00	0:00:00	0:00:00	0:00:00	273	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	282	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
11:00:00	0:00:00	0:01:18	0:00:00	0:00:00	0:02:13	0:23:03	0:33:25	0:21:43	0:00:00	0:00:00	0:00:00	0:00:00	373	0	
12:00:00	0:05:11	0:13:47	0:01:29	0:00:00	0:02:23	0:37:09	0:00:00	0:27:28	0:00:00	0:00:00	0:00:00	0:01:04	222	0	Lunch
13:00:00	0:00:00	0:10:11	0:05:30	0:00:00	0:02:48	0:41:30	0:00:00	0:40:14	0:00:00	0:00:00	0:00:00	0:00:05	91	0	
14:00:00	0:00:00	0:04:43	0:05:25	0:00:00	0:04:17	0:43:08	0:02:26	0:38:37	0:00:00	0:00:00	0:00:04	0:00:00	110	0	
15:00:00	0:00:00	0:06:35	0:00:23	0:00:00	0:02:14	0:50:47	0:00:00	0:48:58	0:00:00	0:00:00	0:00:00	0:00:10	56	0	Dinner
16:00:00	0:00:00	0:02:44	0:00:13	0:00:00	0:04:42	0:33:29	0:18:51	0:32:19	0:00:00	0:00:00	0:00:02	0:00:00	372	0	
17:00:00	0:00:00	0:01:01	0:00:00	0:00:00	0:00:00	0:02:24	0:56:34	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	253	0	
18:00:00	0:00:00	0:06:33	0:03:26	0:00:00	0:06:35	0:43:25	0:00:00	0:38:27	0:00:00	0:00:00	0:00:00	0:00:00	205	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:48:30	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	109	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	201	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:47:30**	**1:08:55**	**5:21:23**	**4:37:23**	**0:55:57**	**5:52:21**	**8:42:05**	**5:12:15**	**0:29:09**	**0:00:09**	**0:00:47**	**0:01:31**	**3064**	**0**	
TOTAL	Steps:	3064		SLEEP	Total Hrs:	6:30:34					Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	N		GOAL	Weekly:	NA	NA				
	Miles:	1.64							Strategy:	NA					
	Calories:	62													

Baseline Day 6 (11/7/2009)

Date:	Saturday, November 07, 2009			Week	1		Home	N						
	Room Presence						Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	216	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	99	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	372	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	476	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	597	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	524	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	195	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	286	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	499	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	677	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	542	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	162	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	43	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	213	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**4901**	**0**	

TOTAL	Steps:	4901		SLEEP	Total Hrs:	NA				Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	NA	GOAL	Weekly:	NA	NA				
	Miles:	2.62						Strategy:	NA					
	Calories:	107												

Baseline Day 7 (11/8/2009)

Date:	Sunday, November 08, 2009			Week	1		Home	N							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	51	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	25	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	34	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	96	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	137	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	185	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	209	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	143	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	145	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	220	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	362	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	526	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	608	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	11	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**2752**	**0**	

TOTAL	Steps:	2752		SLEEP	Total Hrs:	NA				Met?		WEATHER	NA
	Aerobic:	0			Interupted:	NA	GOAL	Weekly:	NA	NA			
	Miles:	1.47						Strategy:	NA				
	Calories:	57											

Baseline Day 8 (11/9/2009)

Date:	Monday, November 09, 2009				Week	2		Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	124	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	47	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	269	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	161	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	599	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	202	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	119	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	207	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	616	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	233	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	192	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	244	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	153	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	152	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	184	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	158	0	
21:00:00	0:00:00	0:02:28	0:16:14	0:00:00	0:00:54	0:04:08	0:36:15	0:00:00	0:01:42	0:00:00	0:00:00	0:00:00	58	0	
22:00:00	0:00:00	0:05:34	0:39:13	0:33:36	0:06:04	0:09:08	0:00:00	0:05:14	0:42:51	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:46	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:08:02**	**1:55:26**	**1:33:35**	**0:06:58**	**0:13:16**	**21:35:54**	**0:05:14**	**0:45:19**	**0:00:00**	**0:00:00**	**0:00:00**	**3718**	**0**	
TOTAL	Steps:	3718		SLEEP	Total Hrs:	0:00:00					Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	NA		GOAL	Weekly:	NA	NA				
	Miles:	1.99							Strategy:	NA					
	Calories:	65													

Baseline Day 9 (11/10/2009)

Date:	Tuesday, November 10, 2009			Week	2		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:58	0:59:58	0:00:00	0:00:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:22:24	0:06:03	0:17:28	0:15:00	0:11:12	0:02:52	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:22	0:06:05	0:27:34	0:00:00	0:17:40	0:08:18	0:00:00	0:00:00	0:00:00	0:00:02	0:00:07	0:00:07	375	0	Breakfest
9:00:00	0:05:56	0:04:05	0:05:16	0:00:00	0:01:43	0:06:27	0:36:32	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	446	0	
10:00:00	0:02:45	0:04:40	0:02:04	0:00:00	0:00:00	0:36:35	0:13:55	0:35:36	0:00:00	0:00:05	0:00:06	0:00:00	345	0	
11:00:00	0:00:00	0:00:26	0:00:00	0:00:00	0:03:03	0:56:30	0:00:00	0:54:33	0:00:00	0:00:00	0:00:00	0:00:00	111	0	
12:00:00	0:33:37	0:10:35	0:00:07	0:00:00	0:00:06	0:15:34	0:00:00	0:14:15	0:00:00	0:00:00	0:00:00	0:00:47	137	0	Lunch
13:00:00	0:32:46	0:08:47	0:07:26	0:00:00	0:06:48	0:04:12	0:00:00	0:00:00	0:00:00	0:00:00	0:00:07	0:00:00	154	0	
14:00:00	0:01:38	0:00:39	0:01:12	0:00:00	0:03:21	0:01:06	0:52:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	410	0	
15:00:00	0:32:14	0:17:18	0:00:20	0:00:00	0:06:17	0:03:50	0:00:00	0:00:00	0:00:00	0:00:00	0:00:05	0:00:22	62	0	Dinner
16:00:00	0:38:32	0:15:13	0:01:30	0:00:00	0:02:11	0:02:33	0:00:00	0:00:00	0:00:00	0:00:03	0:00:00	0:00:15	96	0	
17:00:00	0:02:34	0:05:23	0:00:39	0:00:00	0:02:47	0:27:53	0:20:43	0:22:04	0:00:00	0:00:00	0:00:04	0:00:03	153	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
19:00:00	0:00:00	0:03:03	0:01:17	0:00:00	0:04:25	0:34:57	0:16:17	0:29:45	0:00:00	0:00:05	0:00:11	0:00:24	222	0	
20:00:00	0:00:00	0:03:47	0:00:21	0:00:00	0:09:44	0:46:07	0:00:00	0:39:11	0:00:00	0:00:00	0:00:00	0:00:00	166	0	
21:00:00	0:00:00	0:00:10	0:20:59	0:19:21	0:09:26	0:29:24	0:00:00	0:28:03	0:24:29	0:00:00	0:00:00	0:00:00	22	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:08:54	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:52:48**	**1:26:14**	**10:26:03**	**9:34:11**	**1:18:43**	**4:36:19**	**3:19:29**	**3:43:27**	**0:33:23**	**0:00:15**	**0:00:40**	**0:01:58**	**2699**	**0**	

TOTAL	Steps:	2699		SLEEP	Total Hrs:	8:14:10					Met?		WEATHER	NA
	Aerobic:	0			Interupted:	N		GOAL	Weekly:	NA	NA			
	Miles:	1.44							Strategy:	NA				
	Calories:	49												

Baseline Day 10 (11/11/2009)

Date:	Wednesday, November 11, 2009			Week	2		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:55	0:59:55	0:00:00	0:00:04	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:24:06	0:01:08	0:18:44	0:13:00	0:13:22	0:02:39	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:06:18	0:06:02	0:15:02	0:00:00	0:29:40	0:02:57	0:00:00	0:00:00	0:00:00	0:00:00	0:01:37	0:00:06	206	0	Breakfest
9:00:00	0:16:14	0:02:32	0:05:09	0:00:00	0:04:24	0:11:23	0:20:17	0:05:56	0:00:00	0:00:00	0:00:00	0:00:02	255	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	653	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	644	0	
12:00:00	0:08:26	0:12:13	0:05:52	0:00:00	0:04:09	0:06:16	0:23:03	0:00:00	0:00:00	0:00:00	0:00:03	0:01:00	1548	0	Lunch
13:00:00	0:52:18	0:03:48	0:00:00	0:00:00	0:02:16	0:01:37	0:00:00	0:00:00	0:00:00	0:00:00	0:00:15	0:00:00	59	0	
14:00:00	0:42:11	0:00:46	0:05:06	0:00:00	0:04:07	0:07:49	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	23	0	
15:00:00	0:00:00	0:01:09	0:00:00	0:00:00	0:07:39	0:51:11	0:00:00	0:48:37	0:00:00	0:00:00	0:00:00	0:00:19	0	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:13:47	0:46:12	0:00:00	0:45:58	0:00:00	0:00:00	0:00:00	0:00:00	42	0	
17:00:00	0:05:56	0:07:35	0:12:33	0:00:00	0:01:44	0:32:11	0:00:00	0:30:28	0:00:00	0:00:05	0:00:06	0:00:11	155	0	Dinner
18:00:00	0:01:06	0:10:37	0:00:00	0:00:00	0:00:00	0:48:16	0:00:00	0:47:33	0:00:00	0:00:00	0:00:03	0:00:05	110	0	
19:00:00	0:01:49	0:00:45	0:01:42	0:00:00	0:10:15	0:45:28	0:00:00	0:44:49	0:00:00	0:00:00	0:00:00	0:00:00	26	0	
20:00:00	0:00:00	0:00:00	0:00:22	0:00:00	0:02:19	0:57:18	0:00:00	0:55:08	0:00:00	0:00:00	0:00:00	0:00:00	14	0	
21:00:00	0:00:14	0:02:24	0:38:33	0:35:31	0:07:52	0:10:56	0:00:00	0:09:54	0:12:37	0:00:00	0:00:00	0:00:24	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:38:38**	**0:48:59**	**10:42:50**	**9:48:18**	**1:41:34**	**5:24:17**	**2:43:18**	**4:48:23**	**0:12:37**	**0:00:05**	**0:02:04**	**0:02:07**	**3735**	**0**	

TOTAL	Steps:	3735		SLEEP	Total Hrs:	9:04:07					Met?		WEATHER	NA
	Aerobic:	0			Interupted:	N		GOAL	Weekly:	NA	NA			
	Miles:	2.00							Strategy:	NA				
	Calories:	102												

Baseline Day 11 (11/12/2009)

Date:	Thursday, November 12, 2009			Week	2		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:31	0:45:00	0:43:35	0:04:06	0:10:22	0:00:00	0:09:15	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:36	0:00:00	0:00:00	0:01:10	0:58:13	0:00:00	0:57:10	0:00:00	0:00:00	0:00:00	0:00:00	75	0	
4:00:00	0:00:00	0:00:00	0:35:38	0:35:32	0:01:48	0:22:33	0:00:00	0:22:13	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:18:50	0:00:03	0:14:18	0:11:57	0:22:56	0:03:52	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	106	0	
8:00:00	0:16:23	0:05:08	0:25:48	0:00:00	0:03:45	0:08:55	0:00:00	0:00:00	0:22:49	0:00:07	0:00:06	0:00:16	180	0	Breakfest
9:00:00	0:30:24	0:00:15	0:01:17	0:00:00	0:04:58	0:01:38	0:21:27	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	813	0	
10:00:00	0:02:53	0:13:28	0:02:00	0:00:00	0:15:45	0:21:49	0:04:04	0:14:58	0:00:00	0:00:05	0:00:04	0:00:08	305	0	
11:00:00	0:00:43	0:16:19	0:01:29	0:00:00	0:01:41	0:39:47	0:00:00	0:38:04	0:00:00	0:00:00	0:00:12	0:00:15	121	0	
12:00:00	0:08:30	0:30:07	0:00:00	0:00:00	0:14:26	0:06:56	0:00:00	0:04:41	0:00:00	0:00:15	0:00:19	0:00:11	694	0	Lunch
13:00:00	0:00:00	0:01:08	0:00:18	0:00:00	0:02:01	0:48:44	0:07:48	0:45:11	0:00:00	0:00:00	0:00:00	0:00:02	276	0	
14:00:00	0:00:00	0:00:03	0:00:00	0:00:00	0:02:15	0:00:23	0:57:18	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	245	0	
15:00:00	0:00:54	0:16:48	0:00:00	0:00:00	0:01:57	0:40:20	0:00:00	0:36:59	0:00:00	0:00:00	0:01:55	0:00:45	177	0	Dinner
16:00:00	0:08:09	0:05:16	0:00:33	0:00:00	0:03:12	0:42:49	0:00:00	0:39:46	0:00:00	0:00:00	0:00:00	0:00:32	46	0	
17:00:00	0:23:00	0:00:44	0:00:00	0:00:00	0:04:18	0:31:57	0:00:00	0:29:47	0:00:00	0:00:00	0:00:00	0:00:00	97	0	
18:00:00	0:00:00	0:04:19	0:00:00	0:00:00	0:00:37	0:55:03	0:00:00	0:53:40	0:00:00	0:00:00	0:00:00	0:00:00	61	0	
19:00:00	0:06:21	0:11:02	0:00:07	0:00:00	0:04:15	0:38:14	0:00:00	0:34:34	0:00:00	0:00:00	0:00:10	0:00:00	19	0	
20:00:00	0:03:48	0:09:14	0:00:00	0:00:00	0:01:29	0:45:28	0:00:00	0:38:08	0:00:00	0:00:00	0:00:00	0:00:00	65	0	
21:00:00	0:05:12	0:00:45	0:05:56	0:04:20	0:10:01	0:38:05	0:00:00	0:35:45	0:10:05	0:00:00	0:00:00	0:00:00	118	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:03:18	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:05:07**	**1:55:46**	**8:12:16**	**7:35:16**	**1:40:40**	**8:35:10**	**1:30:37**	**7:40:11**	**0:36:12**	**0:00:27**	**0:02:46**	**0:02:09**	**3398**	**0**	

TOTAL	Steps:	3398		SLEEP	Total Hrs:	7:58:26				Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	Y	GOAL	Weekly:	NA	NA				
	Miles:	1.82						Strategy:	NA					
	Calories:	71												

Baseline Day 12 (11/13/2009)

Date:	Friday, November 13, 2009			Week	2		Home	P						
	Room Presence						Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:57:36	0:57:30	0:02:09	0:00:14	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:50	0:59:50	0:00:00	0:00:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:50	0:59:50	0:00:00	0:00:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:50	0:59:50	0:00:00	0:00:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:28	0:51:44	0:49:14	0:07:09	0:00:38	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:01:04	0:10:14	0:21:16	0:00:00	0:12:39	0:14:46	0:00:00	0:11:18	0:00:00	0:00:00	0:00:00	0:00:00	250	0	
6:00:00	0:00:00	0:07:42	0:00:26	0:00:00	0:02:44	0:49:07	0:00:00	0:47:25	0:00:00	0:00:00	0:00:13	0:00:20	99	0	Breakfest
7:00:00	0:05:29	0:03:04	0:01:09	0:00:00	0:04:51	0:28:04	0:17:22	0:25:02	0:00:00	0:00:00	0:00:00	0:00:00	111	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	215	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	46	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	283	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	205	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	365	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	355	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	210	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	68	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	480	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	207	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	212	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	195	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	115	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:06:33**	**0:21:28**	**5:11:41**	**4:46:14**	**0:29:32**	**1:33:16**	**16:17:06**	**1:23:45**	**0:00:00**	**0:00:00**	**0:00:13**	**0:00:20**	**3416**	**0**	

TOTAL	Steps:	3416		SLEEP	Total Hrs:	6:43:30				Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	NA	NA			
	Miles:	1.83							Strategy:	NA				
	Calories:	43												

Baseline 13 (11/14/2009)

Date:	Saturday, November 14, 2009			Week	2		Home	P							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	286	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	569	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	261	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	140	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	238	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	256	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	145	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	92	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	169	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	413	0	
19:00:00	0:00:07	0:07:23	0:00:09	0:00:00	0:00:04	0:22:49	0:29:27	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	452	0	
20:00:00	0:05:22	0:04:00	0:05:13	0:00:00	0:05:39	0:39:45	0:00:00	0:34:24	0:00:00	0:00:00	0:00:00	0:00:00	306	0	
21:00:00	0:00:00	0:00:16	0:55:36	0:54:04	0:01:35	0:02:32	0:00:00	0:00:00	0:23:14	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:05:29**	**0:11:39**	**3:00:56**	**2:54:02**	**0:07:18**	**1:05:06**	**19:29:08**	**0:34:24**	**0:23:14**	**0:00:00**	**0:00:00**	**0:00:00**	**3327**	**0**	
TOTAL	Steps:	3327		SLEEP	Total Hrs:	NA					Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	NA		GOAL	Weekly:	NA	NA				
	Miles:	1.78							Strategy:	NA					
	Calories:	61													

Baseline Day 14 (11/15/2009)

Date: Sunday, November 15, 2009 | Week 2 | Home Y

	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:58	0:59:58	0:00:00	0:00:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:04:24	0:01:27	0:33:49	0:11:31	0:19:02	0:01:17	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	71	0	
8:00:00	0:41:04	0:10:55	0:05:52	0:00:00	0:01:06	0:01:02	0:00:00	0:00:00	0:00:00	0:00:04	0:00:03	0:00:14	132	0	Breakfest
9:00:00	0:36:52	0:00:03	0:01:10	0:00:00	0:06:20	0:00:21	0:15:13	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	343	0	
10:00:00	0:02:01	0:04:16	0:01:00	0:00:00	0:00:32	0:00:42	0:51:28	0:00:00	0:00:00	0:00:04	0:00:06	0:00:08	413	0	
11:00:00	0:39:46	0:05:53	0:01:15	0:00:00	0:00:00	0:01:05	0:12:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	217	0	
12:00:00	0:01:40	0:15:14	0:00:19	0:00:00	0:00:00	0:33:16	0:09:30	0:32:42	0:00:00	0:00:00	0:00:02	0:00:31	501	0	Lunch
13:00:00	0:00:00	0:03:25	0:04:15	0:00:00	0:05:35	0:28:54	0:17:50	0:27:17	0:00:00	0:00:00	0:00:00	0:00:05	1059	0	
14:00:00	0:00:00	0:00:30	0:00:20	0:00:00	0:06:47	0:52:22	0:00:00	0:49:18	0:00:00	0:00:00	0:00:00	0:00:00	279	0	
15:00:00	0:00:00	0:18:08	0:00:00	0:00:00	0:05:29	0:36:22	0:00:00	0:34:10	0:00:00	0:00:00	0:02:31	0:00:39	107	0	
16:00:00	0:00:00	0:03:30	0:00:33	0:00:00	0:03:48	0:52:08	0:00:00	0:50:18	0:00:00	0:00:02	0:00:29	0:00:11	108	0	Dinner
17:00:00	0:00:00	0:00:00	0:01:00	0:00:00	0:00:13	0:34:08	0:24:38	0:33:07	0:00:00	0:00:00	0:00:00	0:00:00	123	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	44	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
20:00:00	0:00:00	0:00:06	0:02:50	0:00:00	0:01:36	0:01:40	0:53:47	0:00:17	0:00:00	0:00:00	0:00:00	0:00:00	189	0	
21:00:00	0:00:02	0:03:21	0:11:52	0:04:07	0:12:58	0:31:46	0:00:00	0:24:30	0:07:32	0:00:00	0:00:00	0:00:00	155	0	
22:00:00	0:00:00	0:00:00	0:59:35	0:58:37	0:00:13	0:00:11	0:00:00	0:00:00	0:08:50	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:57:48	0:57:38	0:01:42	0:00:29	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:05:49**	**1:06:48**	**10:01:30**	**9:11:45**	**1:05:21**	**4:35:44**	**5:04:24**	**4:11:39**	**0:16:22**	**0:00:10**	**0:03:11**	**0:01:48**	**3741**	**0**	

TOTAL	Steps:	3741	SLEEP	Total Hrs:	9:39:34			Met?	WEATHER	NA
	Aerobic:	0		Interupted:	N	GOAL	Weekly:	NA	NA		
	Miles:	2.00					Strategy:	NA			
	Calories:	102									

Baseline Day 15 (11/16/2009)

Date:	Monday, November 16, 2009			Week	3		Home	Y							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:58	0:59:58	0:00:00	0:00:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:48	0:55:07	0:54:48	0:01:28	0:02:36	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	8	0	
5:00:00	0:00:00	0:02:38	0:37:22	0:37:13	0:02:52	0:17:07	0:00:00	0:15:54	0:00:00	0:00:06	0:00:06	0:00:03	78	0	
6:00:00	0:17:19	0:00:32	0:02:05	0:00:00	0:04:22	0:35:41	0:00:00	0:33:48	0:00:00	0:00:00	0:00:00	0:00:00	7	0	
7:00:00	0:00:05	0:12:44	0:18:05	0:00:00	0:24:25	0:04:40	0:00:00	0:00:00	0:24:22	0:00:07	0:00:07	0:00:04	180	0	Breakfest
8:00:00	0:14:31	0:15:21	0:00:19	0:00:00	0:08:08	0:21:40	0:00:00	0:03:56	0:00:00	0:00:00	0:00:00	0:00:00	963	0	
9:00:00	0:06:26	0:09:32	0:04:13	0:00:00	0:06:34	0:14:35	0:18:39	0:10:54	0:06:02	0:00:00	0:00:00	0:00:00	103	0	
10:00:00	0:07:50	0:06:35	0:01:11	0:00:00	0:06:40	0:17:38	0:20:05	0:14:54	0:00:00	0:00:00	0:00:00	0:00:00	549	0	
11:00:00	0:00:00	0:00:00	0:00:02	0:00:00	0:00:00	0:03:14	0:56:43	0:02:06	0:00:00	0:00:00	0:00:00	0:00:00	620	0	
12:00:00	0:01:44	0:14:49	0:00:46	0:00:00	0:03:27	0:18:34	0:20:39	0:00:00	0:00:00	0:00:05	0:00:00	0:00:04	526	0	Lunch
13:00:00	0:10:15	0:01:47	0:00:20	0:00:00	0:01:17	0:46:20	0:00:00	0:44:35	0:00:00	0:00:00	0:00:07	0:00:00	27	0	
14:00:00	0:06:42	0:10:19	0:00:00	0:00:00	0:01:13	0:41:45	0:00:00	0:37:29	0:00:00	0:00:00	0:00:00	0:00:00	18	0	
15:00:00	0:21:51	0:04:52	0:00:00	0:00:00	0:02:36	0:30:40	0:00:00	0:29:26	0:00:00	0:00:00	0:00:13	0:00:00	26	0	
16:00:00	0:07:50	0:11:38	0:03:21	0:00:00	0:04:21	0:32:49	0:00:00	0:27:18	0:00:00	0:00:00	0:00:00	0:00:33	39	0	Dinner
17:00:00	0:17:33	0:03:44	0:00:00	0:00:00	0:00:00	0:38:42	0:00:00	0:28:10	0:00:00	0:00:00	0:00:00	0:00:00	19	0	
18:00:00	0:08:19	0:00:16	0:00:00	0:00:00	0:00:00	0:51:24	0:00:00	0:48:57	0:00:00	0:00:00	0:00:00	0:00:09	8	0	
19:00:00	0:40:04	0:03:04	0:03:02	0:00:00	0:02:18	0:11:31	0:00:00	0:06:56	0:00:00	0:00:00	0:00:00	0:00:00	136	0	
20:00:00	0:34:15	0:00:28	0:02:48	0:00:00	0:01:43	0:20:45	0:00:00	0:14:59	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:02:50	0:02:01	0:25:25	0:23:21	0:08:36	0:21:07	0:00:00	0:14:40	0:32:01	0:00:00	0:00:00	0:00:03	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	3:17:34	1:41:08	8:33:59	7:55:15	1:20:00	7:10:49	1:56:06	5:34:02	1:02:25	0:00:18	0:00:33	0:00:56	3307	0	
TOTAL	Steps:	3307		SLEEP	Total Hrs:	6:10:07					Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	NA	NA				
	Miles:	1.77							Strategy:	NA					
	Calories:	80													

Baseline Day 16 (11/17/2009)

Date:	Tuesday, November 17, 2009			Week	3		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:57:40	0:56:28	0:01:58	0:00:21	0:00:00	0:00:00	0:04:03	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:40:05	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:15:09	0:01:11	0:24:54	0:23:53	0:02:52	0:15:53	0:00:00	0:10:51	0:00:00	0:00:00	0:00:00	0:00:00	7	0	
5:00:00	0:10:49	0:00:00	0:28:20	0:27:17	0:00:00	0:20:50	0:00:00	0:18:51	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:59	0:54:25	0:54:18	0:03:57	0:00:38	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:08:20	0:32:54	0:00:00	0:16:28	0:02:17	0:00:00	0:00:00	0:00:00	0:00:06	0:00:04	0:00:08	70	0	Breakfest
8:00:00	0:00:48	0:06:21	0:22:44	0:00:00	0:16:35	0:13:20	0:00:11	0:04:11	0:00:00	0:00:00	0:00:00	0:00:00	177	0	
9:00:00	0:02:22	0:02:10	0:00:32	0:00:00	0:02:01	0:05:15	0:47:39	0:04:49	0:00:00	0:00:00	0:00:00	0:00:00	828	0	
10:00:00	0:00:00	0:05:43	0:00:00	0:00:00	0:01:21	0:01:06	0:51:49	0:00:00	0:00:00	0:00:00	0:00:13	0:00:44	401	0	
11:00:00	0:00:00	0:10:27	0:00:38	0:00:00	0:00:21	0:28:42	0:19:51	0:25:56	0:00:00	0:00:00	0:00:13	0:01:01	569	0	
12:00:00	0:04:52	0:29:03	0:00:11	0:00:00	0:02:03	0:08:32	0:15:18	0:05:55	0:00:00	0:00:00	0:00:17	0:00:34	87	0	Lunch
13:00:00	0:04:52	0:21:52	0:00:00	0:00:00	0:02:22	0:30:53	0:00:00	0:27:10	0:00:00	0:00:00	0:00:26	0:00:13	154	0	
14:00:00	0:02:12	0:05:04	0:02:05	0:00:00	0:05:59	0:20:44	0:23:55	0:17:55	0:00:00	0:00:00	0:00:00	0:00:00	609	0	
15:00:00	0:07:42	0:11:42	0:00:00	0:00:00	0:09:58	0:30:37	0:00:00	0:24:25	0:00:00	0:00:00	0:00:00	0:00:09	131	0	
16:00:00	0:00:50	0:03:14	0:00:00	0:00:00	0:00:00	0:55:55	0:00:00	0:53:46	0:00:00	0:00:08	0:00:10	0:00:03	52	0	Dinner
17:00:00	0:00:53	0:09:21	0:00:00	0:00:00	0:03:22	0:28:09	0:18:14	0:26:25	0:00:00	0:00:07	0:00:00	0:00:03	0	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
19:00:00	0:01:29	0:16:32	0:00:39	0:00:00	0:02:27	0:10:11	0:28:41	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	104	0	
20:00:00	0:05:39	0:04:05	0:00:00	0:00:00	0:10:13	0:40:02	0:00:00	0:36:24	0:00:00	0:00:00	0:00:00	0:00:11	134	0	
21:00:00	0:03:19	0:00:43	0:23:56	0:23:43	0:03:14	0:28:47	0:00:00	0:25:18	0:27:09	0:00:00	0:00:00	0:00:00	17	0	
22:00:00	0:00:00	0:00:00	0:58:13	0:58:02	0:01:22	0:00:24	0:00:00	0:00:00	0:01:32	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:00:56**	**2:16:47**	**9:07:07**	**8:03:37**	**1:26:33**	**5:42:36**	**4:25:37**	**4:41:56**	**1:12:49**	**0:00:21**	**0:01:23**	**0:03:06**	**3340**	**0**	

TOTAL	Steps:	3340		SLEEP	Total Hrs:	6:57:58					Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	NA	NA				
	Miles:	1.79							Strategy:	NA					
	Calories:	81													

Baseline Day 17 (11/18/2009)

Date:	Wednesday, November 18, 2009				Week	3		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:55:27	0:55:02	0:03:46	0:00:46	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:08:10	0:08:06	0:02:24	0:00:00	0:27:32	0:13:47	0:00:00	0:03:51	0:09:17	0:00:03	0:00:09	0:00:13	96	0	Breakfest
9:00:00	0:00:00	0:14:59	0:20:29	0:00:00	0:07:33	0:03:48	0:13:10	0:00:00	0:16:57	0:00:00	0:00:09	0:00:07	430	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	7	0	
11:00:00	0:03:21	0:03:20	0:00:48	0:00:00	0:02:49	0:18:24	0:31:17	0:13:19	0:00:00	0:00:03	0:00:07	0:00:03	828	0	
12:00:00	0:01:17	0:28:51	0:00:34	0:00:00	0:05:18	0:23:59	0:00:00	0:20:46	0:00:00	0:00:00	0:00:10	0:00:30	162	0	Lunch
13:00:00	0:12:29	0:02:09	0:01:58	0:00:00	0:22:36	0:20:47	0:00:00	0:10:10	0:00:00	0:00:00	0:00:00	0:00:06	599	0	
14:00:00	0:03:15	0:00:51	0:00:20	0:00:00	0:09:06	0:46:27	0:00:00	0:38:02	0:00:00	0:00:00	0:00:00	0:00:00	81	0	
15:00:00	0:08:11	0:12:11	0:00:00	0:00:00	0:05:26	0:34:11	0:00:00	0:28:55	0:00:00	0:00:00	0:00:08	0:00:20	77	0	Dinner
16:00:00	0:04:44	0:12:20	0:00:24	0:00:00	0:01:08	0:41:23	0:00:00	0:31:30	0:00:00	0:00:00	0:02:19	0:00:00	54	0	
17:00:00	0:06:05	0:04:19	0:00:00	0:00:00	0:02:12	0:47:23	0:00:00	0:38:10	0:00:00	0:00:00	0:00:00	0:00:00	15	0	
18:00:00	0:03:29	0:01:33	0:00:00	0:00:00	0:02:48	0:52:09	0:00:00	0:50:17	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
19:00:00	0:02:09	0:00:00	0:00:00	0:00:00	0:03:23	0:54:27	0:00:00	0:51:15	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
20:00:00	0:00:00	0:00:00	0:06:09	0:06:09	0:00:00	0:53:50	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	19	0	
21:00:00	0:00:00	0:15:59	0:02:15	0:00:00	0:10:06	0:31:39	0:00:00	0:25:31	0:00:00	0:00:00	0:00:07	0:00:08	36	0	
22:00:00	0:00:00	0:00:40	0:47:55	0:46:37	0:01:41	0:09:43	0:00:00	0:08:00	0:22:53	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	0:53:10	1:45:18	10:18:33	9:47:38	1:45:24	7:32:45	1:44:26	6:19:45	0:49:07	0:00:06	0:03:09	0:01:27	2404	0	

TOTAL	Steps:	2404		SLEEP	Total Hrs:	9:57:35				Met?		WEATHER	NA
	Aerobic:	0			Interupted:	Y	GOAL	Weekly:	NA	NA			
	Miles:	1.29						Strategy:	NA				
	Calories:	59											

Baseline Day 18 (11/19/2009)

Date:	Thursday, November 19, 2009				Week	3		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:54	0:59:54	0:00:00	0:00:05	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:57:29	0:57:23	0:02:01	0:00:29	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:49	0:54:47	0:51:48	0:03:04	0:01:19	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:30:04	0:00:28	0:10:46	0:00:00	0:12:14	0:06:27	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	13	0	
8:00:00	0:07:44	0:09:55	0:25:42	0:00:00	0:14:01	0:02:37	0:00:00	0:00:00	0:00:00	0:00:03	0:00:03	0:00:10	162	0	Breakfest
9:00:00	0:10:33	0:06:01	0:02:11	0:00:00	0:07:01	0:10:42	0:23:31	0:00:00	0:00:00	0:00:00	0:00:09	0:00:00	666	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	91	0	
11:00:00	0:07:18	0:03:09	0:00:16	0:00:00	0:03:09	0:23:40	0:22:27	0:19:59	0:00:00	0:00:00	0:00:00	0:00:06	464	0	
12:00:00	0:06:27	0:29:08	0:00:00	0:00:00	0:09:18	0:15:06	0:00:00	0:07:55	0:00:00	0:00:03	0:00:00	0:00:05	489	0	Lunch
13:00:00	0:11:46	0:00:53	0:00:34	0:00:00	0:04:48	0:32:48	0:09:10	0:27:15	0:00:00	0:00:00	0:00:09	0:00:00	249	0	
14:00:00	0:00:00	0:01:21	0:00:26	0:00:00	0:00:00	0:00:25	0:57:47	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	307	0	
15:00:00	0:11:34	0:04:19	0:00:10	0:00:00	0:03:24	0:40:32	0:00:00	0:37:09	0:00:00	0:00:04	0:00:08	0:00:07	50	0	
16:00:00	0:04:39	0:14:19	0:00:00	0:00:00	0:01:27	0:39:34	0:00:00	0:36:44	0:00:00	0:00:05	0:00:05	0:00:23	10	0	Dinner
17:00:00	0:00:00	0:00:15	0:01:02	0:00:00	0:03:06	0:55:36	0:00:00	0:53:30	0:00:00	0:00:00	0:00:00	0:00:00	41	0	
18:00:00	0:08:04	0:00:19	0:00:00	0:00:00	0:02:53	0:48:43	0:00:00	0:47:30	0:00:00	0:00:00	0:00:00	0:00:12	8	0	
19:00:00	0:03:38	0:05:58	0:02:18	0:00:00	0:02:39	0:45:26	0:00:00	0:43:53	0:00:00	0:00:00	0:00:00	0:00:00	14	0	
20:00:00	0:00:00	0:01:25	0:48:12	0:43:17	0:02:38	0:07:44	0:00:00	0:06:31	0:26:20	0:00:00	0:00:00	0:00:00	114	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:41:47**	**1:18:19**	**11:23:40**	**10:32:15**	**1:11:43**	**5:31:13**	**2:52:54**	**4:40:26**	**0:26:20**	**0:00:15**	**0:00:34**	**0:01:03**	**2678**	**0**	

TOTAL	Steps:	2678		**SLEEP**	Total Hrs:	8:17:06					Met?		**WEATHER**	NA
	Aerobic:	0			Interupted:	Y		**GOAL**	Weekly:	NA	NA			
	Miles:	1.43							Strategy:	NA				
	Calories:	65												

Baseline Day 19 (11/20/2009)

Date:	Friday, November 20, 2009				Week	3		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:56	0:59:56	0:00:00	0:00:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:55:24	0:50:26	0:03:51	0:00:44	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	7	0	
5:00:00	0:04:46	0:13:10	0:30:03	0:29:58	0:00:00	0:12:00	0:00:00	0:10:25	0:00:00	0:00:00	0:00:00	0:00:04	109	0	
6:00:00	0:02:38	0:17:32	0:02:51	0:00:00	0:17:23	0:19:35	0:00:00	0:16:15	0:00:00	0:00:00	0:01:13	0:00:23	63	0	Breakfest
7:00:00	0:07:09	0:13:10	0:23:11	0:16:18	0:13:41	0:02:48	0:00:00	0:00:00	0:27:31	0:00:00	0:00:03	0:00:07	135	0	
8:00:00	0:29:07	0:03:46	0:03:54	0:00:00	0:00:00	0:23:12	0:00:00	0:19:26	0:00:00	0:00:00	0:00:10	0:00:12	64	0	
9:00:00	0:07:07	0:00:13	0:00:00	0:00:00	0:08:58	0:43:41	0:00:00	0:38:13	0:00:00	0:00:00	0:00:00	0:00:00	83	0	
10:00:00	0:00:00	0:00:40	0:00:00	0:00:00	0:00:00	0:07:22	0:51:57	0:05:57	0:00:00	0:00:00	0:00:00	0:00:00	150	0	
11:00:00	0:20:59	0:01:43	0:01:51	0:00:00	0:04:21	0:31:05	0:00:00	0:23:39	0:00:00	0:00:00	0:00:00	0:00:00	516	0	
12:00:00	0:03:07	0:02:11	0:00:58	0:00:00	0:04:13	0:02:53	0:46:37	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	609	0	
13:00:00	0:00:00	0:00:00	0:05:01	0:00:00	0:02:43	0:00:26	0:51:49	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	219	0	
14:00:00	0:07:38	0:06:50	0:01:24	0:00:00	0:01:55	0:42:12	0:00:00	0:28:32	0:00:00	0:00:10	0:00:04	0:00:13	55	0	Lunch
15:00:00	0:07:48	0:04:01	0:01:32	0:00:00	0:01:57	0:44:41	0:00:00	0:33:52	0:00:00	0:00:00	0:00:05	0:00:00	81	0	
16:00:00	0:03:57	0:05:15	0:00:47	0:00:00	0:01:56	0:48:04	0:00:00	0:41:55	0:00:00	0:00:00	0:00:00	0:00:12	130	0	Dinner
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:01:57	0:58:02	0:01:33	0:00:00	0:00:00	0:00:00	0:00:00	271	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	149	0	
19:00:00	0:09:30	0:02:01	0:00:18	0:00:00	0:00:00	0:27:22	0:20:48	0:21:21	0:00:00	0:00:00	0:00:00	0:00:04	252	0	
20:00:00	0:08:53	0:00:41	0:00:00	0:00:00	0:00:12	0:50:13	0:00:00	0:46:33	0:00:00	0:00:00	0:00:00	0:00:00	28	0	
21:00:00	0:01:41	0:01:17	0:05:33	0:00:00	0:22:08	0:29:20	0:00:00	0:25:54	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:01:04	0:40:22	0:39:20	0:04:17	0:14:16	0:00:00	0:12:15	0:17:26	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:54:20	1:13:34	7:53:01	7:15:54	1:27:35	6:41:54	4:49:12	5:25:50	0:44:57	0:00:10	0:01:35	0:01:15	2921	0	
TOTAL	Steps:	2921		SLEEP	Total Hrs:	8:43:55					Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	NA	NA				
	Miles:	1.56							Strategy:	NA					
	Calories:	77													

Baseline Day 20 (11/21/2009)

Date:	Saturday, November 21, 2009			Week	3		Home	P							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:56:20	0:55:52	0:03:16	0:00:23	0:00:00	0:00:00	0:08:04	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:31:14	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:08:58	0:01:34	0:21:02	0:05:03	0:23:47	0:04:38	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	79	0	
8:00:00	0:00:04	0:04:15	0:00:59	0:00:00	0:00:00	0:03:46	0:50:55	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	463	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	234	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	217	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	155	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	207	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	789	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	543	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	110	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1008	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	711	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	993	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	53	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	54	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:09:02**	**0:05:49**	**7:18:13**	**7:00:47**	**0:27:03**	**0:08:49**	**15:50:40**	**0:00:00**	**0:39:18**	**0:00:00**	**0:00:00**	**0:00:00**	**5616**	**0**	

TOTAL	Steps:	5616		SLEEP	Total Hrs:	7:47:36				Met?		WEATHER	NA
	Aerobic:	0			Interupted:	Y	GOAL	Weekly:	NA	NA			
	Miles:	3.01						Strategy:	NA				
	Calories:	151											

Baseline Day 21 (11/22/2009)

Date:	Sunday, November 22, 2009			Week	3			Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	327	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	426	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	429	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	173	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	217	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	105	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	152	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	101	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	41	0	
20:00:00	0:02:45	0:00:36	0:03:50	0:00:00	0:01:26	0:00:00	0:48:12	0:00:00	0:00:00	0:00:00	0:00:00	0:00:01	277	0	
21:00:00	0:00:27	0:10:55	0:07:55	0:00:00	0:07:56	0:32:46	0:00:00	0:29:19	0:00:00	0:00:00	0:00:04	0:00:02	0	0	
22:00:00	0:05:09	0:03:01	0:05:46	0:00:00	0:03:29	0:42:34	0:00:00	0:37:26	0:00:00	0:00:00	0:00:00	0:00:07	0	0	
23:00:00	0:00:00	0:01:28	0:57:25	0:56:18	0:00:00	0:01:06	0:00:00	0:00:00	0:36:44	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:08:21**	**0:16:00**	**1:14:56**	**0:56:18**	**0:12:51**	**1:16:26**	**20:47:52**	**1:06:45**	**0:36:44**	**0:00:00**	**0:00:04**	**0:00:10**	**2248**	**0**	
TOTAL	Steps:	**2248**		**SLEEP**	Total Hrs:	**NA**					**Met?**		**WEATHER**	**NA**	
	Aerobic:	**0**			Interupted:	**NA**		**GOAL**	Weekly:	**NA**	**NA**				
	Miles:	**1.20**							Strategy:	**NA**					
	Calories:	**35**													

Baseline Day 22 (11/23/2009)

Date:	Monday, November 23, 2009				Week	4		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:57:20	0:57:08	0:02:07	0:00:32	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:18:49	0:00:15	0:38:16	0:29:23	0:01:12	0:01:27	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:25:59	0:01:03	0:08:32	0:06:58	0:20:25	0:04:00	0:00:00	0:00:08	0:00:00	0:00:00	0:00:00	0:00:00	21	0	
8:00:00	0:24:36	0:10:04	0:19:01	0:00:00	0:01:12	0:05:06	0:00:00	0:00:00	0:17:12	0:00:00	0:00:00	0:00:03	110	0	Breakfest
9:00:00	0:00:00	0:15:16	0:00:57	0:00:00	0:00:35	0:18:05	0:25:06	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	766	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	104	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	231	0	
12:00:00	0:00:00	0:19:41	0:01:06	0:00:00	0:10:36	0:09:38	0:18:58	0:00:00	0:00:00	0:00:00	0:00:00	0:00:20	995	0	Lunch
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	62	0	
14:00:00	0:09:02	0:04:36	0:00:00	0:00:00	0:03:22	0:00:40	0:42:19	0:00:00	0:00:00	0:00:00	0:01:26	0:00:03	346	0	
15:00:00	0:09:15	0:18:39	0:00:00	0:00:00	0:03:33	0:28:32	0:00:00	0:25:15	0:00:00	0:00:00	0:00:28	0:00:09	162	0	
16:00:00	0:08:09	0:12:06	0:00:00	0:00:00	0:03:08	0:36:36	0:00:00	0:34:30	0:00:00	0:00:00	0:00:07	0:00:28	74	0	Dinner
17:00:00	0:14:09	0:07:23	0:01:44	0:00:00	0:01:57	0:34:46	0:00:00	0:32:26	0:00:00	0:00:00	0:00:04	0:00:00	52	0	
18:00:00	0:04:52	0:02:13	0:01:19	0:00:00	0:02:10	0:49:25	0:00:00	0:47:10	0:00:00	0:00:00	0:00:00	0:00:04	95	0	
19:00:00	0:02:07	0:19:28	0:01:18	0:00:00	0:05:01	0:32:05	0:00:00	0:28:45	0:00:00	0:00:00	0:00:00	0:00:00	200	0	
20:00:00	0:02:03	0:05:02	0:02:42	0:00:00	0:06:54	0:43:18	0:00:00	0:40:10	0:00:00	0:00:00	0:00:00	0:00:00	41	0	
21:00:00	0:01:00	0:02:21	0:22:14	0:20:56	0:06:53	0:27:31	0:00:00	0:24:13	0:13:01	0:00:00	0:00:00	0:00:08	7	0	
22:00:00	0:00:00	0:00:00	0:57:37	0:57:29	0:01:58	0:00:24	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:00:01**	**1:58:07**	**9:31:58**	**8:51:46**	**1:11:03**	**4:52:07**	**4:26:20**	**3:52:37**	**0:30:13**	**0:00:00**	**0:02:05**	**0:01:15**	**3266**	**0**	

TOTAL	Steps:	3266		SLEEP	Total Hrs:	6:56:54					Met?		WEATHER	NA
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	NA	NA			
	Miles:	1.75							Strategy:	NA				
	Calories:	79												

Baseline Day 23 (11/24/2009)

Date:	Tuesday, November 24, 2009			Week	4			Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:56	0:59:56	0:00:00	0:00:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:58:08	0:58:03	0:01:40	0:00:11	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:58:51	0:57:52	0:00:58	0:00:10	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:12:52	0:00:33	0:40:41	0:38:15	0:04:15	0:01:38	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:35:11	0:06:01	0:00:55	0:00:00	0:00:00	0:17:52	0:00:00	0:16:04	0:00:00	0:00:00	0:00:00	0:00:00	97	0	
6:00:00	0:01:00	0:03:16	0:02:06	0:00:00	0:25:10	0:28:27	0:00:00	0:25:54	0:00:00	0:00:00	0:00:04	0:00:07	37	0	
7:00:00	0:23:12	0:15:22	0:15:04	0:00:00	0:04:58	0:01:23	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:12	69	0	
8:00:00	0:59:31	0:00:00	0:00:00	0:00:00	0:00:11	0:00:17	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
9:00:00	0:11:05	0:14:18	0:00:26	0:00:00	0:08:36	0:20:56	0:04:38	0:16:30	0:00:00	0:00:00	0:00:12	0:00:04	432	0	Breakfest
10:00:00	0:29:01	0:03:47	0:00:00	0:00:00	0:00:00	0:27:11	0:00:00	0:21:30	0:00:00	0:00:00	0:01:15	0:00:00	173	0	
11:00:00	0:05:41	0:02:05	0:01:01	0:00:00	0:12:02	0:39:10	0:00:00	0:36:56	0:00:00	0:00:00	0:00:00	0:00:00	155	0	
12:00:00	0:30:32	0:00:27	0:02:29	0:00:00	0:07:30	0:19:01	0:00:00	0:15:46	0:00:00	0:00:00	0:00:00	0:00:00	45	0	
13:00:00	0:16:27	0:02:09	0:02:00	0:00:00	0:02:04	0:37:19	0:00:00	0:33:53	0:00:00	0:00:00	0:00:00	0:00:00	259	0	
14:00:00	0:13:47	0:17:22	0:00:00	0:00:00	0:00:00	0:28:50	0:00:00	0:28:08	0:00:00	0:00:00	0:00:05	0:00:07	163	0	Lunch
15:00:00	0:00:00	0:24:30	0:00:00	0:00:00	0:00:00	0:35:29	0:00:00	0:35:17	0:00:00	0:00:00	0:00:00	0:00:20	41	0	
16:00:00	0:00:00	0:00:19	0:00:00	0:00:00	0:01:50	0:57:50	0:00:00	0:56:54	0:00:00	0:00:00	0:00:00	0:00:00	25	0	
17:00:00	0:06:36	0:09:29	0:02:55	0:00:00	0:01:03	0:39:56	0:00:00	0:39:04	0:00:00	0:00:08	0:00:06	0:00:11	168	0	Dinner
18:00:00	0:06:53	0:00:07	0:00:31	0:00:00	0:03:22	0:49:06	0:00:00	0:40:50	0:00:00	0:00:00	0:00:00	0:00:00	90	0	
19:00:00	0:14:38	0:00:55	0:00:32	0:00:00	0:00:00	0:43:54	0:00:00	0:37:01	0:00:00	0:00:00	0:00:16	0:00:00	91	0	
20:00:00	0:00:48	0:06:38	0:00:40	0:00:00	0:01:51	0:50:02	0:00:00	0:46:21	0:00:00	0:00:00	0:00:00	0:00:00	39	0	
21:00:00	0:00:08	0:00:28	0:41:59	0:40:05	0:03:06	0:14:18	0:00:00	0:09:53	0:48:33	0:00:00	0:00:00	0:00:00	8	0	
22:00:00	0:00:00	0:01:17	0:56:22	0:56:11	0:01:17	0:01:03	0:00:00	0:00:00	0:40:26	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**4:27:22**	**1:49:03**	**7:44:34**	**7:10:20**	**1:19:53**	**8:34:06**	**0:04:38**	**7:40:01**	**1:28:59**	**0:00:08**	**0:01:58**	**0:01:01**	**1892**	**0**	
TOTAL	Steps:	1892		SLEEP	Total Hrs:	7:10:27					Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	NA	NA				
	Miles:	1.01							Strategy:	NA					
	Calories:	34													

Baseline Day 24 (11/25/2009)

Date:	Wednesday, November 25, 2009			Week	4			Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:18:21	0:00:25	0:30:29	0:28:21	0:08:08	0:02:36	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:28:20	0:13:55	0:03:10	0:00:00	0:05:53	0:08:41	0:00:00	0:00:00	0:12:17	0:00:00	0:00:00	0:00:00	131	0	
9:00:00	0:10:31	0:15:55	0:00:22	0:00:00	0:03:03	0:30:08	0:00:00	0:22:18	0:00:00	0:00:00	0:00:07	0:00:14	711	0	Breakfest
10:00:00	0:17:09	0:03:01	0:00:00	0:00:00	0:07:08	0:32:41	0:00:00	0:29:27	0:00:00	0:00:00	0:00:00	0:00:00	91	0	
11:00:00	0:13:51	0:00:00	0:00:00	0:00:00	0:00:43	0:45:25	0:00:00	0:43:34	0:00:00	0:00:00	0:00:00	0:00:00	109	0	
12:00:00	0:13:13	0:08:11	0:09:44	0:00:00	0:02:00	0:21:02	0:05:49	0:15:16	0:00:00	0:00:00	0:00:00	0:00:25	487	0	
13:00:00	0:01:54	0:11:02	0:12:30	0:00:00	0:03:34	0:30:59	0:00:00	0:24:23	0:00:00	0:00:00	0:00:06	0:00:00	184	0	Lunch
14:00:00	0:01:53	0:01:20	0:00:31	0:00:00	0:03:34	0:23:03	0:29:38	0:18:44	0:00:00	0:00:00	0:00:00	0:00:00	198	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	687	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	369	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	189	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	87	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	114	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	175	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	19	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:45:12**	**0:53:49**	**7:56:37**	**7:28:12**	**0:34:03**	**3:14:37**	**9:35:18**	**2:33:42**	**0:12:17**	**0:00:00**	**0:00:13**	**0:00:39**	**3551**	**0**	

TOTAL	Steps:	3551		SLEEP	Total Hrs:	8:48:04				Met?		WEATHER	NA
	Aerobic:	0			Interupted:	Y	GOAL	Weekly:	NA	NA			
	Miles:	1.90						Strategy:	NA				
	Calories:	81											

Baseline Day 25 (11/26/2009)

Date:	Thursday, November 26, 2009			Week	4		Home	N							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	210	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	257	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	227	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	94	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	118	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	117	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	119	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	85	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	50	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	49	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**1326**	**0**	
TOTAL	Steps:	1326		SLEEP	Total Hrs:	NA					Met?		WEATHER	NA	
	Aerobic:	0			Interupted:	NA		GOAL	Weekly:	NA	NA				
	Miles:	0.71							Strategy:	NA					
	Calories:	29													

Experiment Day 1 (11/30/2009)

Date:	Monday, November 30, 2009			Week	1		Home	Y							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:02	0:00:19	0:54:48	0:53:36	0:04:00	0:00:50	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:27:50	0:02:03	0:02:07	0:00:00	0:00:34	0:27:25	0:00:00	0:00:00	0:00:00	0:00:00	0:00:05	0:00:00	57	0	
6:00:00	0:00:07	0:18:40	0:01:42	0:00:00	0:20:12	0:19:18	0:00:00	0:17:50	0:00:00	0:00:00	0:00:04	0:00:10	41	0	
7:00:00	0:07:16	0:11:37	0:22:44	0:00:00	0:04:42	0:13:40	0:00:00	0:00:00	0:00:00	0:00:00	0:00:04	0:00:08	204	0	Breakfest
8:00:00	0:44:12	0:01:01	0:02:30	0:00:00	0:03:08	0:01:51	0:07:17	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	469	0	
9:00:00	0:13:46	0:00:00	0:02:04	0:01:15	0:02:11	0:41:58	0:00:00	0:00:00	0:00:00	0:00:07	0:00:10	0:00:13	586	0	
10:00:00	0:03:06	0:02:17	0:00:00	0:00:00	0:00:38	0:23:34	0:30:24	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	165	0	
11:00:00	0:00:00	0:00:00	0:00:59	0:00:00	0:01:55	0:01:24	0:55:41	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	684	0	
12:00:00	0:05:49	0:16:37	0:01:13	0:00:00	0:03:15	0:10:50	0:22:15	0:00:00	0:00:00	0:00:01	0:02:18	0:00:49	873	0	Lunch
13:00:00	0:00:24	0:03:59	0:01:31	0:00:00	0:18:24	0:35:41	0:00:00	0:00:00	0:00:00	0:00:00	0:00:10	0:00:05	61	0	
14:00:00	0:00:40	0:09:24	0:01:21	0:00:00	0:20:09	0:28:25	0:00:00	0:07:41	0:00:00	0:00:00	0:00:00	0:01:04	144	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:02:27	0:57:32	0:00:00	0:57:17	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
16:00:00	0:12:41	0:08:55	0:18:02	0:01:23	0:01:25	0:18:56	0:00:00	0:15:24	0:00:00	0:00:03	0:00:02	0:00:19	1533	1315	Dinner
17:00:00	0:01:24	0:01:01	0:01:18	0:00:00	0:00:45	0:55:31	0:00:00	0:51:04	0:00:00	0:00:00	0:00:00	0:00:12	87	0	
18:00:00	0:03:46	0:00:43	0:00:54	0:00:00	0:05:12	0:49:24	0:00:00	0:44:48	0:00:00	0:00:00	0:00:00	0:00:00	46	0	
19:00:00	0:00:00	0:00:03	0:00:00	0:00:00	0:00:00	0:59:56	0:00:00	0:59:11	0:00:00	0:00:00	0:00:00	0:00:03	9	0	
20:00:00	0:00:00	0:01:24	0:00:00	0:00:00	0:00:00	0:58:35	0:00:00	0:55:56	0:00:00	0:00:06	0:00:06	0:00:07	15	0	
21:00:00	0:00:02	0:04:39	0:41:29	0:35:13	0:09:08	0:04:41	0:00:00	0:01:19	0:35:37	0:00:00	0:00:00	0:00:00	43	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	2:01:05	1:22:42	8:32:36	7:31:21	1:38:05	8:29:31	1:55:37	5:10:30	0:35:37	0:00:17	0:02:59	0:03:10	5017	1315	

TOTAL	Steps:	5017		SLEEP	Total Hrs:	6:53:39				Met?		WEATHER	77/S
	Aerobic:	1315			Interupted:	Y	GOAL	Weekly:	3445	Y			
	Miles:	2.69						Strategy:	Guilt				
	Calories:	148											

Experiment Day 2 (12/1/2009)

Date:	Tuesday, December 01, 2009			Week	1		Home	Y						
	Room Presence						Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:54:46	0:54:46	0:00:00	0:05:13	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:56:39	0:56:34	0:00:00	0:03:20	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:43:06	0:02:23	0:00:02	0:00:00	0:09:43	0:04:45	0:00:00	0:00:00	0:00:00	0:00:00	0:00:19	0:00:00	88	0	Breakfest
8:00:00	0:11:44	0:06:13	0:19:47	0:00:00	0:09:52	0:12:23	0:00:00	0:00:00	0:00:00	0:00:00	0:00:06	0:00:09	170	0	
9:00:00	0:19:23	0:03:50	0:02:14	0:00:00	0:05:29	0:12:00	0:17:03	0:02:30	0:00:00	0:00:00	0:00:00	0:00:00	433	0	
10:00:00	0:01:13	0:00:16	0:00:45	0:00:00	0:02:32	0:55:13	0:00:00	0:07:49	0:00:00	0:00:00	0:00:00	0:00:00	107	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	443	0	
12:00:00	0:01:23	0:01:19	0:00:04	0:00:00	0:00:00	0:57:13	0:00:00	0:00:00	0:00:00	0:00:00	0:00:13	0:00:01	231	0	
13:00:00	0:10:30	0:02:35	0:03:14	0:00:00	0:12:50	0:30:50	0:00:00	0:12:42	0:00:00	0:00:00	0:00:00	0:00:00	495	0	
14:00:00	0:00:00	0:00:21	0:00:48	0:00:00	0:00:29	0:58:21	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	259	0	
15:00:00	0:07:43	0:31:08	0:01:16	0:00:00	0:05:00	0:03:40	0:11:12	0:00:27	0:00:00	0:00:04	0:00:16	0:01:08	1312	1157	Lunch
16:00:00	0:01:17	0:01:18	0:01:08	0:00:00	0:03:22	0:51:46	0:01:08	0:49:37	0:00:00	0:00:00	0:00:00	0:00:13	170	74	
17:00:00	0:00:35	0:01:21	0:29:42	0:00:00	0:03:42	0:24:39	0:00:00	0:22:53	0:00:00	0:00:00	0:00:00	0:00:00	151	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	94	0	
19:00:00	0:01:00	0:07:56	0:00:09	0:00:00	0:03:19	0:47:35	0:00:00	0:40:18	0:00:00	0:00:00	0:00:59	0:00:07	213	0	Dinner
20:00:00	0:00:53	0:03:20	0:02:17	0:00:00	0:05:56	0:47:33	0:00:00	0:46:07	0:00:00	0:00:00	0:00:02	0:00:00	18	0	
21:00:00	0:00:00	0:00:37	0:50:54	0:46:47	0:07:57	0:00:31	0:00:00	0:00:00	0:24:02	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:38:47	1:02:37	10:43:38	9:38:00	1:10:11	8:55:00	0:29:23	3:02:23	0:24:02	0:00:04	0:01:55	0:01:38	4184	1231	

TOTAL	Steps:	4184		SLEEP	Total Hrs:	9:12:16					Met?		WEATHER	69/S
	Aerobic:	1231			Interupted:	N		GOAL	Weekly:	3445	Y			
	Miles:	2.24							Strategy:	Praise				
	Calories:	109												

Experiment Day 3 (12/2/2009)

Date:	Wednesday, December 02, 2009			Week	1		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:58	0:59:58	0:00:00	0:00:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:06:59	0:00:22	0:47:14	0:46:35	0:03:55	0:01:29	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:27:47	0:02:58	0:00:33	0:00:00	0:00:37	0:28:04	0:00:00	0:08:59	0:00:00	0:00:00	0:00:11	0:00:00	111	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	35	0	
7:00:00	0:00:26	0:01:03	0:22:00	0:01:21	0:06:44	0:29:46	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	252	0	
8:00:00	0:16:32	0:05:01	0:03:05	0:00:29	0:06:45	0:12:54	0:15:42	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1760	1507	
9:00:00	0:18:14	0:10:11	0:00:59	0:00:00	0:05:32	0:25:03	0:00:00	0:20:46	0:00:00	0:00:18	0:00:32	0:00:14	918	0	Breakfest
10:00:00	0:01:24	0:10:58	0:00:00	0:00:00	0:02:22	0:45:15	0:00:00	0:44:25	0:00:00	0:00:00	0:01:23	0:00:19	36	0	
11:00:00	0:06:34	0:04:11	0:01:14	0:00:00	0:04:43	0:43:17	0:00:00	0:09:19	0:00:00	0:00:00	0:00:00	0:00:10	204	0	
12:00:00	0:02:20	0:00:00	0:01:13	0:00:00	0:00:00	0:01:39	0:54:47	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	495	0	
13:00:00	0:05:46	0:09:38	0:02:03	0:00:00	0:03:44	0:30:15	0:08:33	0:27:50	0:00:00	0:00:00	0:00:09	0:00:08	329	0	Lunch
14:00:00	0:00:38	0:05:52	0:00:00	0:00:00	0:00:00	0:53:29	0:00:00	0:52:59	0:00:00	0:00:00	0:00:00	0:00:22	19	0	
15:00:00	0:12:08	0:01:33	0:01:38	0:00:00	0:01:50	0:27:58	0:14:52	0:26:00	0:00:00	0:00:00	0:00:00	0:00:00	1446	1292	
16:00:00	0:13:11	0:07:04	0:01:17	0:00:00	0:05:03	0:33:24	0:00:00	0:27:40	0:00:00	0:00:04	0:00:06	0:00:13	173	0	Dinner
17:00:00	0:00:54	0:02:59	0:00:00	0:00:00	0:02:55	0:53:11	0:00:00	0:45:44	0:00:00	0:00:03	0:00:09	0:00:12	56	0	
18:00:00	0:00:00	0:00:40	0:00:00	0:00:00	0:00:00	0:59:19	0:00:00	0:58:36	0:00:00	0:00:00	0:00:00	0:00:05	30	0	
19:00:00	0:00:04	0:04:10	0:16:15	0:14:13	0:02:26	0:37:04	0:00:00	0:34:42	0:16:17	0:00:00	0:00:00	0:00:05	75	0	
20:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:04	0:00:00	0:57:49	0:57:29	0:01:36	0:00:30	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:10:08	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:53:01	1:06:40	9:35:12	8:59:59	0:48:12	9:02:37	1:33:54	5:57:00	2:26:23	0:00:25	0:02:30	0:01:48	5939	2799	

TOTAL	Steps:	5939		SLEEP	Total Hrs:	7:21:49					Met?		WEATHER	62/S	
	Aerobic:	2799			Interupted:	N		GOAL	Weekly:	3445	Y				
	Miles:	3.18							Strategy:	Neutral					
	Calories:	182													

Experiment Day 4 (12/3/2009)

Date:	Thursday, December 03, 2009				Week	1		Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:57:51	0:57:45	0:01:57	0:00:11	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:28:51	0:00:32	0:08:05	0:08:04	0:02:17	0:20:14	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:19:14	0:01:36	0:00:33	0:00:00	0:01:35	0:37:01	0:00:00	0:12:06	0:00:00	0:00:09	0:00:07	0:00:04	67	0	Breakfest
5:00:00	0:01:44	0:00:37	0:01:46	0:01:39	0:00:00	0:55:52	0:00:00	0:53:52	0:00:00	0:00:00	0:00:00	0:00:03	47	0	
6:00:00	0:01:32	0:00:20	0:57:42	0:57:40	0:00:08	0:00:17	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	18	0	
7:00:00	0:00:05	0:01:15	0:36:50	0:33:28	0:20:11	0:01:38	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	12	0	
8:00:00	0:18:09	0:00:26	0:18:46	0:14:49	0:03:52	0:18:46	0:00:00	0:00:00	0:10:32	0:00:00	0:00:00	0:00:00	156	0	
9:00:00	0:00:32	0:00:23	0:00:35	0:00:00	0:00:56	0:01:25	0:56:08	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1444	1152	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	211	0	
11:00:00	0:00:00	0:00:32	0:01:10	0:00:00	0:02:01	0:40:39	0:15:37	0:34:26	0:00:00	0:00:00	0:00:00	0:00:04	566	0	
12:00:00	0:16:01	0:17:48	0:03:32	0:00:00	0:09:00	0:13:38	0:00:00	0:04:41	0:00:00	0:00:00	0:09:07	0:00:11	591	0	Lunch
13:00:00	0:17:23	0:03:46	0:03:23	0:00:00	0:09:59	0:18:17	0:07:11	0:06:28	0:00:00	0:00:00	0:00:00	0:00:00	195	0	
14:00:00	0:00:00	0:00:10	0:00:53	0:00:39	0:00:00	0:00:29	0:58:27	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	317	317	
15:00:00	0:11:18	0:12:06	0:03:57	0:00:11	0:11:02	0:08:21	0:13:15	0:00:00	0:00:00	0:00:00	0:00:05	0:00:06	1451	946	
16:00:00	0:11:41	0:15:37	0:06:14	0:00:00	0:07:48	0:18:39	0:00:00	0:14:09	0:00:00	0:02:44	0:00:18	0:00:10	283	0	Dinner
17:00:00	0:00:57	0:03:28	0:03:30	0:00:00	0:00:42	0:51:22	0:00:00	0:42:24	0:00:00	0:00:00	0:00:13	0:00:04	98	0	
18:00:00	0:11:14	0:00:46	0:01:26	0:00:00	0:00:00	0:14:05	0:32:28	0:09:53	0:00:00	0:00:00	0:00:00	0:00:01	343	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	182	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	218	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	235	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:18:41**	**0:59:22**	**5:26:11**	**4:54:13**	**1:11:28**	**5:00:54**	**9:03:00**	**2:57:59**	**0:10:32**	**0:02:53**	**0:09:50**	**0:00:43**	**6434**	**2415**	
TOTAL	Steps:	6434		**SLEEP**	Total Hrs:	6:26:48					Met?		**WEATHER**	67/S	
	Aerobic:	2415			Interupted:	Y		**GOAL**	Weekly:	3445	Y				
	Miles:	3.45							Strategy:	Praise					
	Calories:	174													

Experiment Day 5 (12/4/2009)

Date:	Friday, December 04, 2009			Week	1		Home	N							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	56	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	100	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	142	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	205	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	168	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	195	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	518	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	253	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	248	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	45	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	186	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	30	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	144	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	104	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	76	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	79	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	61	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**2610**	**0**	
TOTAL	Steps:	**2610**		**SLEEP**	Total Hrs:	**NA**					**Met?**		**WEATHER**	**71/S**	
	Aerobic:	**0**			Interupted:	**NA**		**GOAL**	Weekly:	**NA**	**NA**				
	Miles:	**1.40**							Strategy:		**NA**				
	Calories:	**35**													

Experiment Day 6 (12/5/2009)

Date:	Saturday, December 05, 2009			Week	1		Home	N							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	73	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	112	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	233	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	308	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	203	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	265	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	49	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	297	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	69	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	118	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	288	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	132	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	219	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**2366**	**0**	
TOTAL	Steps:	**2366**		**SLEEP**	Total Hrs:	**NA**					**Met?**		**WEATHER**	**60/PC**	
	Aerobic:	**0**			Interupted:	**NA**		**GOAL**	Weekly:	**NA**	**NA**				
	Miles:	**1.26**							Strategy:	**NA**					
	Calories:	**36**													

Experiment Day 7 (12/6/2009)

Date:	Sunday, December 06, 2009			Week	1		Home	P							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	123	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	59	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	409	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	340	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	175	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	166	0	
14:00:00	0:00:00	0:00:00	0:00:49	0:00:00	0:02:40	0:17:03	0:39:27	0:00:00	0:00:00	0:00:00	0:00:03	0:00:17	371	0	
15:00:00	0:00:00	0:00:00	0:05:11	0:00:00	0:06:42	0:48:06	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	0:00:09	401	0	
16:00:00	0:21:13	0:02:31	0:01:31	0:00:00	0:00:44	0:34:00	0:00:00	0:08:00	0:00:00	0:00:00	0:00:00	0:00:00	204	0	
17:00:00	0:57:13	0:00:15	0:01:36	0:00:00	0:00:00	0:00:55	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	103	0	
18:00:00	0:24:06	0:04:49	0:00:50	0:00:00	0:02:08	0:28:06	0:00:00	0:25:36	0:00:00	0:00:00	0:00:00	0:00:01	122	0	Dinner
19:00:00	0:04:29	0:01:39	0:03:16	0:00:00	0:02:13	0:48:22	0:00:00	0:44:20	0:00:00	0:00:00	0:00:00	0:00:00	164	0	
20:00:00	0:04:08	0:01:27	0:00:00	0:00:00	0:04:34	0:49:50	0:00:00	0:47:50	0:00:00	0:00:00	0:00:00	0:00:08	92	0	
21:00:00	0:34:58	0:01:13	0:00:18	0:00:00	0:00:00	0:23:30	0:00:00	0:22:24	0:00:00	0:00:00	0:00:00	0:00:03	61	0	
22:00:00	0:01:12	0:00:00	0:17:46	0:13:59	0:03:14	0:37:47	0:00:00	0:37:10	0:19:27	0:00:00	0:00:00	0:00:00	17	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:01:13	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:27:19**	**0:11:54**	**1:31:16**	**1:13:58**	**0:22:15**	**4:47:39**	**14:39:13**	**3:05:20**	**0:20:40**	**0:00:00**	**0:00:05**	**0:00:38**	**2807**	**0**	

TOTAL	Steps:	**2807**		**SLEEP**	Total Hrs:	**NA**					**Met?**		**WEATHER**	**55/R**	
	Aerobic:	**0**			Interupted:	**NA**		**GOAL**	Weekly:	**3445**	**N**				
	Miles:	**1.50**							Strategy:	**NA**					
	Calories:	**35**													

Experiment Day 8 (12/7/2009)

Date:	Monday, December 07, 2009			Week	2			Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:58	0:59:58	0:00:00	0:00:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:00	0:59:00	0:00:00	0:00:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:29	0:56:53	0:56:44	0:02:00	0:00:37	0:00:00	0:00:00	0:00:11	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:29	0:59:03	0:58:04	0:00:00	0:00:27	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:27:14	0:00:00	0:28:17	0:28:11	0:02:27	0:02:01	0:00:00	0:00:00	0:27:17	0:00:00	0:00:00	0:00:00	18	0	
5:00:00	0:00:24	0:00:00	0:59:26	0:58:53	0:00:00	0:00:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:11	0:51:28	0:49:51	0:07:57	0:00:23	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:07:52	0:06:45	0:25:29	0:01:23	0:12:19	0:07:34	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	188	0	
9:00:00	0:02:11	0:01:44	0:02:44	0:00:00	0:00:29	0:13:49	0:39:02	0:00:00	0:00:00	0:00:00	0:00:23	0:00:03	691	0	Breakfest
10:00:00	0:01:12	0:00:12	0:02:47	0:00:00	0:03:58	0:01:20	0:50:30	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	825	0	
11:00:00	0:21:40	0:00:29	0:00:53	0:00:00	0:00:00	0:24:21	0:12:36	0:22:03	0:00:00	0:00:00	0:00:00	0:00:00	460	0	
12:00:00	0:12:04	0:09:34	0:05:05	0:00:00	0:13:39	0:15:25	0:04:12	0:06:36	0:00:00	0:00:10	0:00:21	0:00:35	557	0	Lunch
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	118	0	
14:00:00	0:00:16	0:00:09	0:01:56	0:00:47	0:00:00	0:00:16	0:57:22	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	466	0	
15:00:00	0:28:18	0:13:03	0:03:02	0:00:00	0:05:03	0:10:33	0:00:00	0:00:00	0:00:00	0:00:00	0:00:17	0:00:00	245	0	
16:00:00	0:08:39	0:07:06	0:01:00	0:00:00	0:01:11	0:42:03	0:00:00	0:31:00	0:00:00	0:00:05	0:00:11	0:00:11	118	0	Dinner
17:00:00	0:00:00	0:18:58	0:00:00	0:00:00	0:00:00	0:41:01	0:00:00	0:40:06	0:00:00	0:00:00	0:00:10	0:00:18	11	0	
18:00:00	0:00:38	0:02:31	0:01:17	0:00:00	0:02:33	0:53:00	0:00:00	0:51:32	0:00:00	0:00:00	0:00:03	0:00:00	96	0	
19:00:00	0:00:26	0:05:18	0:00:01	0:00:00	0:02:21	0:51:53	0:00:00	0:50:31	0:00:00	0:00:00	0:00:00	0:00:00	86	0	
20:00:00	0:01:15	0:01:01	0:00:00	0:00:00	0:00:00	0:57:43	0:00:00	0:56:45	0:00:00	0:00:00	0:00:00	0:00:00	15	0	
21:00:00	0:00:00	0:00:07	0:53:32	0:44:41	0:05:31	0:00:49	0:00:00	0:00:00	0:25:26	0:00:00	0:00:05	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:52:09**	**1:08:06**	**10:51:48**	**9:57:29**	**0:59:28**	**5:24:24**	**3:43:41**	**4:18:33**	**1:52:53**	**0:00:15**	**0:01:30**	**0:01:09**	**3894**	**0**	

TOTAL	Steps:	3894		**SLEEP**	Total Hrs:	6:43:36				Met?		**WEATHER**	50/R/W	
	Aerobic:	0			Interupted:	Y		**GOAL**	Weekly:	3650	Y			
	Miles:	2.08							Strategy:	Praise				
	Calories:	96												

Experiment Day 9 (12/8/2009)

Date:	Tuesday, December 08, 2009			Week	2		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:56	0:59:56	0:00:00	0:00:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:10:48	0:00:45	0:43:19	0:42:23	0:04:38	0:00:29	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	15	0	
6:00:00	0:37:37	0:02:38	0:04:15	0:00:00	0:03:45	0:11:44	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	53	0	
7:00:00	0:09:20	0:00:34	0:26:57	0:00:51	0:06:10	0:16:58	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	143	0	
8:00:00	0:46:35	0:10:37	0:00:40	0:00:00	0:01:16	0:00:51	0:00:00	0:00:00	0:00:00	0:00:00	0:00:04	0:00:00	111	0	
9:00:00	0:33:54	0:08:47	0:02:43	0:00:00	0:04:16	0:05:11	0:05:08	0:00:00	0:00:00	0:00:02	0:00:02	0:00:00	1339	0	Breakfest
10:00:00	0:06:05	0:03:06	0:00:15	0:00:00	0:02:56	0:47:37	0:00:00	0:44:24	0:00:00	0:00:00	0:00:00	0:00:00	178	0	
11:00:00	0:28:06	0:00:59	0:01:16	0:00:00	0:00:35	0:29:03	0:00:00	0:27:26	0:00:00	0:00:00	0:00:00	0:00:08	157	0	
12:00:00	0:22:19	0:08:15	0:01:12	0:00:00	0:17:18	0:10:55	0:00:00	0:08:36	0:00:00	0:00:03	0:00:10	0:00:14	154	0	Lunch
13:00:00	0:03:01	0:00:27	0:04:01	0:00:00	0:02:48	0:23:29	0:26:13	0:18:34	0:00:00	0:00:00	0:00:00	0:00:00	1106	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	187	0	
15:00:00	0:07:35	0:02:32	0:07:05	0:00:00	0:05:43	0:21:27	0:15:37	0:18:51	0:00:00	0:00:00	0:00:00	0:00:03	1600	1299	
16:00:00	0:01:17	0:08:45	0:00:20	0:00:00	0:04:05	0:45:32	0:00:00	0:29:19	0:00:00	0:00:04	0:00:43	0:00:36	118	0	Dinner
17:00:00	0:00:00	0:00:29	0:01:24	0:00:00	0:05:10	0:21:25	0:31:31	0:19:06	0:00:00	0:00:00	0:00:00	0:00:10	280	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
19:00:00	0:01:19	0:02:22	0:01:27	0:00:50	0:03:20	0:23:30	0:28:01	0:21:15	0:00:00	0:00:03	0:00:02	0:00:00	166	0	
20:00:00	0:00:00	0:04:35	0:03:23	0:00:25	0:13:11	0:38:50	0:00:00	0:35:05	0:00:00	0:00:00	0:00:00	0:00:00	129	0	
21:00:00	0:00:14	0:00:25	0:23:52	0:21:33	0:03:03	0:32:25	0:00:00	0:30:14	0:12:20	0:00:00	0:00:00	0:00:00	74	0	
22:00:00	0:00:00	0:00:00	0:55:59	0:55:59	0:00:00	0:04:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:55:59	0:55:59	0:00:00	0:04:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**3:28:10**	**0:55:16**	**8:53:59**	**7:57:52**	**1:18:14**	**5:37:29**	**3:46:28**	**4:12:50**	**0:12:20**	**0:00:12**	**0:01:01**	**0:01:11**	**5810**	**1299**	

TOTAL	Steps:	5810		SLEEP	Total Hrs:	8:15:40					Met?		WEATHER	52/S
	Aerobic:	1299			Interupted:	N		GOAL	Weekly:	3650	Y			
	Miles:	3.11							Strategy:	Praise				
	Calories:	150												

Experiment Day 10 (12/9/2009)

Date:	Wednesday, December 09, 2009			Week	2			Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	68	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	285	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	629	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1327	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	823	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	422	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	216	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	191	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	457	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	530	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	159	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	37	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	108	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	163	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	24	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**5439**	**0**	

TOTAL	Steps:	5439		SLEEP	Total Hrs:	8:38:32					Met?		WEATHER	57/MS
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	3650	Y			
	Miles:	2.91							Strategy:	Praise				
	Calories:	134												

Experiment Day 11 (12/10/2009)

Date:	Thursday, December 10, 2009			Week	2		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:57:37	0:57:32	0:02:13	0:00:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:12	0:02:14	0:29:42	0:11:17	0:26:23	0:01:28	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	108	0	
7:00:00	0:40:31	0:01:07	0:04:45	0:01:10	0:11:57	0:01:39	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	57	0	
8:00:00	0:46:43	0:05:33	0:04:09	0:00:00	0:01:09	0:02:25	0:00:00	0:00:00	0:00:00	0:00:00	0:00:11	0:00:03	109	0	Breakfest
9:00:00	0:00:00	0:00:00	0:00:28	0:00:00	0:01:02	0:00:05	0:58:24	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	591	0	
10:00:00	0:02:53	0:18:51	0:00:42	0:00:00	0:03:26	0:29:07	0:05:00	0:22:43	0:00:00	0:00:00	0:00:36	0:01:46	186	0	
11:00:00	0:00:51	0:08:55	0:00:51	0:00:00	0:02:58	0:13:05	0:33:19	0:12:34	0:00:00	0:00:00	0:00:00	0:00:04	707	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	14	0	
13:00:00	0:01:38	0:07:53	0:00:27	0:00:00	0:02:08	0:21:26	0:26:27	0:00:00	0:00:00	0:00:00	0:00:04	0:00:19	272	0	Lunch
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	310	0	
15:00:00	0:02:59	0:02:56	0:05:21	0:00:40	0:03:19	0:05:12	0:40:12	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1542	1293	
16:00:00	0:17:31	0:19:51	0:00:00	0:00:00	0:11:32	0:11:05	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	174	0	
17:00:00	0:24:35	0:08:44	0:02:00	0:00:34	0:02:56	0:21:44	0:00:00	0:17:39	0:00:00	0:00:00	0:00:24	0:00:39	601	0	Dinner
18:00:00	0:30:35	0:00:00	0:02:31	0:00:00	0:02:16	0:24:37	0:00:00	0:19:56	0:00:00	0:00:00	0:00:00	0:00:00	118	0	
19:00:00	0:05:25	0:01:49	0:01:46	0:01:34	0:04:27	0:46:32	0:00:00	0:41:28	0:00:00	0:00:03	0:00:13	0:00:05	100	0	
20:00:00	0:00:10	0:00:57	0:03:09	0:00:40	0:00:48	0:54:55	0:00:00	0:48:59	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:06:32	0:35:22	0:34:35	0:12:07	0:05:58	0:00:00	0:03:39	0:43:56	0:00:00	0:00:00	0:00:24	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	2:54:03	1:25:22	9:28:41	8:47:53	1:28:41	3:59:29	4:43:20	2:46:58	0:43:56	0:00:03	0:01:28	0:03:20	4889	1293	
TOTAL	Steps:	4889		SLEEP	Total Hrs:	NA					Met?		WEATHER	60/MS	
	Aerobic:	1293			Interupted:	Y		GOAL	Weekly:	3650	Y				
	Miles:	2.62							Strategy:	Praise					
	Calories:	126													

Experiment Day 12 (12/11/2009)

Date:	Friday, December 11, 2009				Week	2		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:12	0:00:00	0:57:13	0:57:02	0:02:20	0:00:14	0:00:00	0:00:00	0:19:44	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:40	0:01:23	0:54:39	0:54:24	0:00:23	0:02:54	0:00:00	0:00:56	0:57:17	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:05:06	0:02:13	0:00:29	0:00:00	0:09:00	0:43:11	0:00:00	0:14:21	0:00:00	0:00:00	0:00:00	0:00:16	36	0	
6:00:00	0:11:46	0:00:00	0:45:17	0:44:43	0:02:21	0:00:35	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	25	0	
7:00:00	0:00:00	0:00:00	0:49:15	0:47:41	0:10:08	0:00:36	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:23:17	0:01:54	0:27:15	0:25:30	0:05:24	0:02:09	0:00:00	0:00:00	0:23:02	0:00:00	0:00:02	0:00:08	213	0	Breakfest
9:00:00	0:26:31	0:08:42	0:00:36	0:00:00	0:03:34	0:01:34	0:19:02	0:00:00	0:00:00	0:00:00	0:01:05	0:00:00	627	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
11:00:00	0:00:46	0:00:00	0:01:33	0:00:00	0:01:46	0:12:24	0:43:30	0:09:55	0:00:00	0:00:00	0:00:00	0:00:00	1255	941	
12:00:00	0:05:03	0:10:44	0:03:55	0:00:00	0:02:46	0:37:31	0:00:00	0:02:27	0:00:00	0:00:00	0:00:11	0:00:42	168	0	Lunch
13:00:00	0:09:53	0:20:45	0:00:22	0:00:00	0:10:04	0:18:55	0:00:00	0:17:25	0:00:00	0:00:00	0:00:23	0:00:00	79	0	
14:00:00	0:04:26	0:02:00	0:01:45	0:00:00	0:02:17	0:49:31	0:00:00	0:46:45	0:00:00	0:00:00	0:00:07	0:00:04	72	0	
15:00:00	0:02:46	0:01:58	0:00:30	0:00:00	0:01:41	0:53:04	0:00:00	0:49:18	0:00:00	0:00:00	0:00:00	0:00:03	90	0	
16:00:00	0:00:00	0:06:48	0:01:40	0:00:00	0:01:46	0:41:13	0:08:32	0:37:13	0:00:00	0:00:00	0:01:07	0:00:13	587	0	Dinner
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	29	0	
18:00:00	0:00:28	0:00:00	0:00:00	0:00:00	0:00:00	0:51:23	0:08:08	0:48:49	0:00:00	0:00:00	0:00:00	0:00:00	170	0	
19:00:00	0:02:45	0:01:42	0:03:54	0:01:02	0:16:17	0:35:21	0:00:00	0:29:03	0:00:00	0:00:00	0:00:00	0:00:23	143	0	
20:00:00	0:00:00	0:05:36	0:00:08	0:00:00	0:07:40	0:46:35	0:00:00	0:44:01	0:00:00	0:00:00	0:00:00	0:00:09	94	0	
21:00:00	0:00:07	0:00:00	0:55:49	0:53:34	0:00:00	0:04:03	0:00:00	0:02:31	0:19:33	0:00:00	0:00:00	0:00:00	27	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:33:46	1:03:45	10:04:15	9:43:51	1:17:27	6:41:13	3:19:10	5:02:44	1:59:36	0:00:00	0:02:55	0:01:58	3615	941	
TOTAL	Steps:	3615		SLEEP	Total Hrs:	7:14:12					Met?		WEATHER	58/R	
	Aerobic:	941			Interupted:	Y		GOAL	Weekly:	3650	N				
	Miles:	1.93							Strategy:	Neutral					
	Calories:	88													

Experiment Day 13 (12/12/2009)

Date:	Saturday, December 12, 2009				Week	2		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:56	0:59:56	0:00:00	0:00:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:57:19	0:57:09	0:02:11	0:00:29	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:25:02	0:00:50	0:19:26	0:18:35	0:04:40	0:10:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:20:06	0:06:06	0:00:00	0:00:00	0:05:22	0:28:25	0:00:00	0:21:38	0:00:00	0:00:00	0:00:10	0:00:34	90	0	
6:00:00	0:00:07	0:01:05	0:03:55	0:00:00	0:24:57	0:29:55	0:00:00	0:15:05	0:17:52	0:00:00	0:00:00	0:00:00	92	0	
7:00:00	0:59:13	0:00:00	0:00:00	0:00:00	0:00:29	0:00:17	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	95	0	
8:00:00	0:28:10	0:02:16	0:00:21	0:00:00	0:03:22	0:25:50	0:00:00	0:22:21	0:00:00	0:00:00	0:00:32	0:00:09	78	0	Breakfest
9:00:00	0:32:39	0:06:55	0:03:43	0:00:00	0:02:51	0:13:51	0:00:00	0:11:09	0:00:00	0:00:04	0:01:50	0:00:00	41	0	
10:00:00	0:00:00	0:02:28	0:01:06	0:00:00	0:04:11	0:50:19	0:01:55	0:47:56	0:00:00	0:00:00	0:00:00	0:00:06	579	0	
11:00:00	0:17:44	0:12:50	0:00:00	0:00:00	0:02:34	0:22:42	0:04:09	0:19:46	0:00:00	0:00:03	0:00:39	0:00:15	122	0	Lunch
12:00:00	0:15:44	0:05:09	0:00:00	0:00:00	0:05:24	0:33:42	0:00:00	0:32:29	0:00:00	0:00:00	0:00:00	0:00:00	56	0	
13:00:00	0:02:51	0:01:38	0:00:21	0:00:00	0:00:18	0:41:40	0:13:11	0:39:12	0:00:00	0:00:00	0:00:00	0:00:18	1430	1340	
14:00:00	0:00:18	0:01:28	0:00:00	0:00:00	0:02:06	0:56:07	0:00:00	0:55:29	0:00:00	0:00:00	0:00:00	0:00:00	9	0	
15:00:00	0:04:44	0:28:24	0:00:00	0:00:00	0:00:18	0:26:33	0:00:00	0:24:58	0:00:00	0:00:00	0:00:29	0:01:42	92	0	
16:00:00	0:10:03	0:16:19	0:00:29	0:00:00	0:03:07	0:30:01	0:00:00	0:26:21	0:00:00	0:00:00	0:00:10	0:00:22	66	0	Dinner
17:00:00	0:00:00	0:01:17	0:01:27	0:00:00	0:00:48	0:56:27	0:00:00	0:55:02	0:00:00	0:00:06	0:00:11	0:00:00	57	0	
18:00:00	0:00:00	0:01:03	0:00:00	0:00:00	0:00:00	0:58:56	0:00:00	0:58:43	0:00:00	0:00:00	0:00:02	0:00:06	8	0	
19:00:00	0:04:02	0:01:08	0:01:36	0:00:00	0:08:47	0:44:26	0:00:00	0:40:24	0:01:20	0:00:00	0:00:00	0:00:00	32	0	
20:00:00	0:00:00	0:00:00	0:56:58	0:56:50	0:00:29	0:02:32	0:00:00	0:00:00	0:21:42	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:57:38	0:57:33	0:02:05	0:00:16	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	3:40:43	1:28:56	8:24:11	8:09:59	1:13:59	8:52:32	0:19:15	7:50:33	0:40:54	0:00:13	0:04:03	0:03:32	2847	1340	
TOTAL	Steps:	2847		SLEEP	Total Hrs:	6:52:35					Met?		WEATHER	60/R	
	Aerobic:	1340			Interupted:	Y		GOAL	Weekly:	3650	N				
	Miles:	1.52							Strategy:	Neutral					
	Calories:	74													

Experiment Day 14 (12/13/2009)

Date:	Sunday, December 13, 2009			Week	2		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:01:27	0:32:15	0:30:47	0:02:26	0:23:51	0:00:00	0:21:52	0:00:00	0:00:00	0:00:00	0:00:07	0	0	
1:00:00	0:00:00	0:00:57	0:12:19	0:11:19	0:01:58	0:44:45	0:00:00	0:43:20	0:14:00	0:00:00	0:00:00	0:00:19	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:24:52	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:05:41	0:02:01	0:26:29	0:14:46	0:20:47	0:05:01	0:00:00	0:00:00	0:15:07	0:00:00	0:00:00	0:00:00	241	0	
8:00:00	0:40:48	0:12:49	0:01:14	0:00:41	0:04:07	0:01:01	0:00:00	0:00:00	0:00:00	0:00:04	0:00:25	0:00:18	58	0	Breakfest
9:00:00	0:08:18	0:00:34	0:00:32	0:00:00	0:00:21	0:00:23	0:49:51	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	524	0	
10:00:00	0:16:50	0:01:06	0:03:15	0:00:00	0:00:00	0:00:38	0:38:10	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	411	0	
11:00:00	0:27:27	0:15:27	0:02:51	0:00:00	0:04:04	0:10:10	0:00:00	0:00:26	0:00:00	0:00:10	0:00:17	0:01:27	169	0	Lunch
12:00:00	0:06:15	0:06:04	0:01:15	0:00:00	0:04:30	0:41:55	0:00:00	0:40:29	0:00:00	0:00:01	0:00:21	0:00:00	30	0	
13:00:00	0:01:03	0:00:14	0:01:32	0:00:00	0:02:04	0:09:42	0:45:24	0:09:17	0:00:00	0:00:00	0:00:00	0:00:00	492	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	119	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	128	0	
16:00:00	0:00:00	0:08:15	0:01:10	0:00:00	0:03:04	0:12:39	0:34:51	0:09:54	0:00:00	0:00:03	0:00:07	0:00:17	521	0	Dinner
17:00:00	0:16:30	0:05:48	0:01:43	0:00:00	0:01:06	0:34:52	0:00:00	0:29:42	0:00:00	0:00:07	0:00:08	0:00:04	87	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:38	0:59:21	0:00:00	0:58:14	0:00:00	0:00:00	0:00:00	0:00:00	63	0	
19:00:00	0:01:53	0:06:16	0:01:07	0:00:00	0:05:29	0:45:14	0:00:00	0:39:53	0:00:00	0:00:00	0:00:06	0:00:09	162	0	
20:00:00	0:00:00	0:00:11	0:00:00	0:00:00	0:03:43	0:56:05	0:00:00	0:55:30	0:00:00	0:00:00	0:00:00	0:00:00	53	0	
21:00:00	0:00:00	0:00:50	0:41:35	0:37:37	0:04:57	0:12:37	0:00:00	0:10:57	0:22:01	0:00:00	0:00:00	0:00:00	84	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:04:45**	**1:01:59**	**9:07:10**	**8:35:03**	**0:59:14**	**5:58:14**	**4:48:14**	**5:19:34**	**1:16:00**	**0:00:25**	**0:01:24**	**0:02:41**	**3142**	**0**	

TOTAL	Steps:	3142		**SLEEP**	Total Hrs:	8:24:59				Met?		**WEATHER**	60/C	
	Aerobic:	0			Interupted:	Y	**GOAL**	Weekly:	3650	N				
	Miles:	1.68						Strategy:	Guilt					
	Calories:	80												

Experiment Day 15 (12/14/2009)

Date:	Monday, December 14, 2009			Week	3		Home	Y-PD	Data NA 8:00 AM -12:00 PM						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:57:41	0:57:11	0:01:55	0:00:23	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:05	0:00:00	0:57:53	0:57:45	0:01:42	0:00:19	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:05	0:01:09	0:36:07	0:24:15	0:20:11	0:02:27	0:00:00	0:00:00	0:10:29	0:00:00	0:00:00	0:00:00	88	0	
6:00:00	0:46:43	0:04:06	0:06:48	0:00:00	0:01:09	0:01:13	0:00:00	0:00:00	0:03:11	0:00:00	0:00:00	0:00:00	87	0	
7:00:00	0:06:46	0:08:42	0:05:17	0:00:39	0:10:55	0:28:19	0:00:00	0:24:42	0:00:00	0:00:00	0:00:09	0:00:14	228	0	Breakfest
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:04:42	0:00:00	0:00:00	0:00:00	0:00:00	430	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	737	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	327	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	519	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	969	0	
13:00:00	0:18:52	0:15:48	0:02:52	0:00:00	0:02:37	0:19:50	0:00:00	0:00:00	0:00:00	0:00:06	0:00:57	0:00:31	179	0	
14:00:00	0:02:35	0:04:50	0:03:16	0:00:00	0:06:19	0:33:12	0:09:47	0:23:07	0:00:00	0:00:00	0:00:00	0:00:05	853	0	
15:00:00	0:18:02	0:01:02	0:01:47	0:00:00	0:02:17	0:23:27	0:13:24	0:20:53	0:00:00	0:00:00	0:00:00	0:00:00	1425	1305	
16:00:00	0:01:34	0:11:54	0:00:51	0:00:00	0:05:19	0:40:21	0:00:00	0:38:17	0:00:00	0:00:06	0:06:54	0:00:35	96	0	Dinner
17:00:00	0:14:35	0:02:16	0:00:00	0:00:00	0:01:27	0:41:41	0:00:00	0:39:58	0:00:00	0:00:09	0:00:26	0:00:00	41	0	
18:00:00	0:00:00	0:04:23	0:00:00	0:00:00	0:02:38	0:52:58	0:00:00	0:47:19	0:00:00	0:00:05	0:00:06	0:00:00	111	0	
19:00:00	0:19:50	0:01:14	0:03:59	0:00:00	0:00:01	0:34:55	0:00:00	0:29:12	0:00:00	0:00:00	0:00:00	0:00:04	127	0	
20:00:00	0:01:53	0:02:08	0:10:10	0:05:58	0:07:35	0:38:13	0:00:00	0:36:49	0:12:37	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:00:00	0:58:14	0:55:13	0:01:34	0:00:11	0:00:00	0:00:00	0:02:56	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:58:19	0:58:12	0:01:33	0:00:07	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	2:11:00	0:57:32	9:03:10	8:19:09	1:07:12	5:17:36	0:23:11	4:24:59	0:29:13	0:00:26	0:08:32	0:01:29	6217	1305	

TOTAL	Steps:	6217		SLEEP	Total Hrs:	8:02:57					Met?		WEATHER	62/S
	Aerobic:	1305			Interupted:	Y		GOAL	Weekly:	5430	Y			
	Miles:	3.33							Strategy:	Guilt				
	Calories:	177												

Experiment Day 16 (12/15/2009)

Date:	Tuesday, December 15, 2009			Week	3			Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:13	0:00:00	0:57:41	0:57:35	0:02:03	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:01:22	0:37:18	0:31:56	0:20:50	0:00:29	0:00:00	0:00:00	0:01:46	0:00:00	0:00:00	0:00:00	35	0	
6:00:00	0:38:37	0:01:23	0:16:39	0:11:39	0:02:34	0:00:46	0:00:00	0:00:00	0:19:02	0:00:00	0:00:00	0:00:00	93	0	
7:00:00	0:31:51	0:07:32	0:06:05	0:00:00	0:08:53	0:02:34	0:03:04	0:00:00	0:00:00	0:00:00	0:00:05	0:00:04	411	340	Breakfest
8:00:00	0:40:37	0:04:24	0:01:25	0:00:00	0:02:20	0:01:58	0:09:15	0:00:00	0:00:00	0:00:00	0:00:07	0:00:06	1093	903	
9:00:00	0:24:38	0:01:20	0:00:07	0:00:00	0:03:33	0:02:53	0:27:28	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	75	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	229	0	
11:00:00	0:01:55	0:01:04	0:00:00	0:00:00	0:00:00	0:00:15	0:56:45	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	470	0	
12:00:00	0:01:11	0:07:44	0:03:25	0:00:00	0:13:35	0:05:42	0:28:22	0:00:00	0:00:00	0:00:00	0:00:24	0:01:04	1482	0	Lunch
13:00:00	0:00:00	0:04:24	0:05:41	0:00:00	0:26:49	0:23:05	0:00:00	0:19:44	0:00:00	0:00:00	0:00:00	0:00:00	137	0	
14:00:00	0:02:33	0:02:54	0:02:41	0:00:00	0:07:07	0:36:15	0:08:29	0:20:32	0:00:00	0:00:00	0:00:00	0:00:06	777	0	
15:00:00	0:00:24	0:00:18	0:02:40	0:00:00	0:04:40	0:51:57	0:00:00	0:49:07	0:00:00	0:00:00	0:00:00	0:00:00	69	0	
16:00:00	0:05:20	0:00:46	0:09:13	0:00:00	0:03:13	0:41:27	0:00:00	0:35:10	0:00:00	0:00:00	0:00:00	0:00:10	290	0	
17:00:00	0:05:05	0:06:11	0:02:18	0:00:00	0:00:00	0:46:25	0:00:00	0:42:55	0:00:00	0:00:00	0:00:03	0:00:07	196	0	Dinner
18:00:00	0:04:00	0:00:14	0:00:26	0:00:00	0:02:04	0:00:38	0:52:37	0:00:00	0:00:00	0:00:00	0:00:00	0:00:01	161	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	249	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	180	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	126	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	5	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	12	0	
Sub Total	**2:36:24**	**0:39:36**	**6:25:33**	**5:41:04**	**1:37:41**	**3:34:28**	**9:05:54**	**2:47:28**	**0:20:48**	**0:00:00**	**0:00:39**	**0:01:38**	**6090**	**1243**	
TOTAL	Steps:	**6090**		**SLEEP**	Total Hrs:	**7:26:17**					**Met?**		**WEATHER**	**70/C**	
	Aerobic:	**1243**			Interupted:	**Y**		**GOAL**	Weekly:	**5430**	**Y**				
	Miles:	**3.26**							Strategy:	**Praise**					
	Calories:	**183**													

Experiment Day 17 (12/16/2009)

Date:	Wednesday, December 16, 2009			Week	3		Home	N							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	120	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	66	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	167	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	595	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	480	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	259	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	310	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	213	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	509	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	310	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	76	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	67	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	78	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	52	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**3302**	**0**	

TOTAL	Steps:	3302		SLEEP	Total Hrs:	NA				Met?		WEATHER	74/PC
	Aerobic:	0			Interupted:	NA	GOAL	Weekly:	NA	NA			
	Miles:	1.77						Strategy:	NA				
	Calories:	50											

Experiment Day 18 (12/17/2009)

Date:	Thursday, December 17, 2009			Week	3		Home	N							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	44	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	117	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	255	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	147	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	145	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	259	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	73	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	92	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	5	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	100	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	103	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	35	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	35	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**1410**	**0**	

TOTAL	Steps:	1410		SLEEP	Total Hrs:	NA					Met?		WEATHER	77/MS	
	Aerobic:	0			Interupted:	NA		GOAL	Weekly:	NA	NA				
	Miles:	0.75							Strategy:	NA					
	Calories:	12													

Experiment Day 19 (12/18/2009)

Date:	Friday, December 18, 2009				Week	3		Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	147	0	
7:00:00	0:09:39	0:03:06	0:03:38	0:00:00	0:08:52	0:02:07	0:32:37	0:00:00	0:00:00	0:00:00	0:00:41	0:00:00	495	0	
8:00:00	0:09:09	0:07:35	0:28:04	0:00:00	0:12:09	0:03:02	0:00:00	0:00:00	0:15:59	0:00:00	0:00:03	0:00:21	291	0	Breakfest
9:00:00	0:12:16	0:02:54	0:03:43	0:00:00	0:02:23	0:38:43	0:00:00	0:27:46	0:00:00	0:00:00	0:00:00	0:00:00	373	0	
10:00:00	0:01:58	0:04:36	0:00:00	0:00:00	0:03:31	0:49:54	0:00:00	0:47:31	0:00:00	0:00:00	0:00:06	0:00:07	21	0	
11:00:00	0:05:33	0:00:27	0:02:03	0:00:00	0:00:32	0:14:29	0:36:55	0:12:55	0:00:00	0:00:00	0:00:01	0:00:00	1686	1078	
12:00:00	0:18:42	0:18:11	0:06:08	0:00:00	0:05:31	0:11:27	0:00:00	0:08:01	0:00:00	0:00:00	0:00:37	0:00:29	149	0	
13:00:00	0:04:11	0:06:30	0:00:24	0:00:00	0:02:39	0:46:15	0:00:00	0:43:32	0:00:00	0:00:05	0:00:08	0:00:05	96	0	Lunch
14:00:00	0:00:00	0:02:25	0:00:00	0:00:00	0:03:23	0:54:11	0:00:00	0:53:01	0:00:00	0:00:00	0:00:39	0:00:00	26	0	
15:00:00	0:00:58	0:16:07	0:00:00	0:00:00	0:01:52	0:41:02	0:00:00	0:37:28	0:00:00	0:00:03	0:00:13	0:00:40	115	0	
16:00:00	0:00:00	0:00:56	0:02:14	0:00:00	0:01:59	0:23:25	0:31:25	0:21:11	0:00:00	0:00:00	0:00:00	0:00:02	1315	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	49	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
19:00:00	0:09:46	0:05:59	0:01:25	0:00:00	0:03:25	0:20:26	0:18:58	0:17:18	0:00:00	0:00:02	0:00:00	0:00:12	275	0	Dinner
20:00:00	0:05:41	0:03:10	0:00:43	0:00:00	0:00:33	0:49:52	0:00:00	0:48:42	0:00:00	0:00:00	0:00:00	0:00:00	79	0	
21:00:00	0:00:00	0:12:13	0:18:23	0:09:23	0:18:57	0:10:26	0:00:00	0:08:39	0:10:36	0:00:00	0:00:00	0:00:14	120	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:01:15	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:17:53	1:24:09	3:06:43	2:09:21	1:05:46	6:05:19	10:59:46	5:26:04	0:27:50	0:00:10	0:02:28	0:02:10	5237	1078	
TOTAL	Steps:	5237		SLEEP	Total Hrs:	NA					Met?		WEATHER	80/MS	
	Aerobic:	1078			Interupted:	N		GOAL	Weekly:	5430	N				
	Miles:	2.81							Strategy:	Praise					
	Calories:	157													

Experiment Day 20 (12/19/2009)

Date: Saturday, December 19, 2009 | Week 3 | Home Y

Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
	Room Presence							Room Activities					Walking		
0:00:00	0:00:41	0:00:00	0:54:48	0:53:24	0:01:55	0:02:35	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:06	0	0	
1:00:00	0:00:00	0:01:11	0:00:00	0:00:00	0:00:00	0:58:48	0:00:00	0:57:34	0:00:00	0:00:00	0:00:00	0:00:11	0	0	
2:00:00	0:00:00	0:00:00	0:53:01	0:52:56	0:01:48	0:05:10	0:00:00	0:04:55	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:19	0:00:00	0:59:16	0:58:14	0:00:00	0:00:24	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:55	0:59:52	0:00:00	0:00:04	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:36:13	0:02:06	0:08:02	0:00:00	0:12:22	0:01:16	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	156	0	
8:00:00	0:09:07	0:07:02	0:20:42	0:00:00	0:21:23	0:01:45	0:00:00	0:00:00	0:00:00	0:00:00	0:00:04	0:00:06	245	0	Breakfest
9:00:00	0:48:44	0:03:57	0:00:19	0:00:00	0:06:37	0:00:22	0:00:00	0:00:00	0:00:00	0:00:00	0:00:01	0:00:05	194	0	
10:00:00	0:14:48	0:15:59	0:01:07	0:00:00	0:04:26	0:13:54	0:09:45	0:08:24	0:00:00	0:00:00	0:00:00	0:00:13	893	0	
11:00:00	0:18:57	0:08:35	0:00:19	0:00:00	0:10:32	0:21:36	0:00:00	0:18:35	0:00:00	0:00:00	0:00:00	0:00:00	196	0	
12:00:00	0:04:54	0:10:54	0:01:27	0:00:00	0:05:28	0:37:16	0:00:00	0:29:30	0:00:00	0:00:00	0:00:17	0:00:44	102	0	Lunch
13:00:00	0:05:17	0:01:44	0:04:44	0:00:00	0:04:33	0:32:22	0:11:19	0:29:35	0:00:00	0:00:00	0:00:00	0:00:00	275	0	
14:00:00	0:00:00	0:00:00	0:00:08	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	893	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	10	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	200	0	
18:00:00	0:00:59	0:10:17	0:00:41	0:00:00	0:03:28	0:19:30	0:25:04	0:00:14	0:00:00	0:00:02	0:00:27	0:00:49	291	0	Dinner
19:00:00	0:03:14	0:03:29	0:03:10	0:00:00	0:12:02	0:38:04	0:00:00	0:35:08	0:00:00	0:00:00	0:00:23	0:00:00	170	0	
20:00:00	0:02:12	0:09:28	0:26:31	0:22:18	0:00:51	0:20:57	0:00:00	0:18:52	0:25:25	0:00:00	0:00:05	0:00:03	194	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:25:25**	**1:14:42**	**9:54:05**	**9:06:39**	**1:25:25**	**4:14:03**	**4:46:04**	**3:22:47**	**0:25:25**	**0:00:02**	**0:01:17**	**0:02:17**	**3819**	**0**	

TOTAL			SLEEP			GOAL				WEATHER	
	Steps:	3819		Total Hrs:	7:43:21				Met?		77/PC
	Aerobic:	0		Interupted:	Y		Weekly:	5430	N		
	Miles:	2.04					Strategy:	NA			
	Calories:	88									

Experiment Day 21 (12/20/2009)

Date:	Sunday, December 20, 2009			Week	3		Home	Y	Partial Data						
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:02	0:00:19	0:57:08	0:56:34	0:02:08	0:00:22	0:00:00	0:00:00	0:04:06	0:00:00	0:00:00	0:00:04	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:20:04	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:06	0:00:12	0:56:37	0:55:57	0:02:10	0:00:54	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:14	0:00:00	0:59:30	0:58:54	0:00:00	0:00:15	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:14	0:01:01	0:52:20	0:49:44	0:05:44	0:00:40	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:16	0:01:41	0:22:37	0:00:00	0:17:53	0:17:32	0:00:00	0:00:00	0:19:59	0:00:00	0:00:12	0:00:00	193	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	34	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	382	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	130	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	349	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	241	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	344	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	290	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	160	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	189	0	
16:00:00	0:01:16	0:08:09	0:01:06	0:00:00	0:00:09	0:49:19	0:00:00	0:24:06	0:00:00	0:00:00	0:00:00	0:00:11	145	0	
17:00:00	0:09:37	0:03:20	0:03:41	0:00:16	0:04:05	0:39:16	0:00:00	0:31:04	0:00:00	0:00:00	0:00:00	0:00:27	208	0	
18:00:00	0:07:06	0:01:27	0:01:07	0:00:00	0:05:46	0:44:33	0:00:00	0:35:48	0:00:00	0:00:00	0:00:00	0:00:00	181	0	
19:00:00	0:02:42	0:07:00	0:00:00	0:00:00	0:00:00	0:50:17	0:00:00	0:47:29	0:00:00	0:00:00	0:01:19	0:00:23	71	0	
20:00:00	0:02:31	0:02:01	0:24:58	0:22:13	0:09:00	0:21:29	0:00:00	0:19:48	0:35:39	0:00:00	0:00:45	0:00:00	112	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:04:05	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:57:57	0:57:51	0:01:52	0:00:10	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:24:04**	**0:25:10**	**9:36:57**	**9:01:25**	**0:48:47**	**3:44:47**	**0:00:00**	**2:38:15**	**1:23:53**	**0:00:00**	**0:02:16**	**0:01:05**	**3029**	**0**	
TOTAL	Steps:	3029		SLEEP	Total Hrs:	8:02:08					Met?		WEATHER	71/PC	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	5430	N				
	Miles:	1.62							Strategy:	Guilt					
	Calories:	68													

Experiment Day 22 (12/21/2009)

Date: Monday, December 21, 2009 | Week 4 | Home Y

Hour	Room Presence: Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Room Activities: Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Walking: Steps	Aerobic Steps	Meal
0:00:00	0:00:02	0:00:15	0:57:05	0:56:46	0:01:58	0:00:39	0:00:00	0:00:00	0:05:31	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:38:26	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:08	0:01:12	0:39:38	0:26:20	0:17:57	0:01:04	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	111	0	
6:00:00	0:51:13	0:00:36	0:02:40	0:01:03	0:04:47	0:00:43	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	53	0	
7:00:00	0:47:25	0:04:55	0:00:39	0:00:00	0:05:44	0:01:16	0:00:00	0:00:00	0:00:00	0:00:00	0:00:05	0:00:10	74	0	
8:00:00	0:13:53	0:02:25	0:04:34	0:00:00	0:05:19	0:28:38	0:05:10	0:19:51	0:00:00	0:00:00	0:00:00	0:00:00	731	0	
9:00:00	0:00:00	0:02:42	0:00:43	0:00:00	0:03:04	0:53:30	0:00:00	0:52:23	0:00:00	0:00:00	0:00:03	0:00:09	64	0	Breakfest
10:00:00	0:00:22	0:01:28	0:00:05	0:00:00	0:00:00	0:30:18	0:27:46	0:29:26	0:00:00	0:00:00	0:00:00	0:00:00	139	0	
11:00:00	0:00:17	0:00:00	0:04:03	0:00:00	0:02:31	0:00:09	0:52:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	459	0	
12:00:00	0:01:21	0:00:20	0:09:48	0:02:01	0:00:00	0:00:33	0:47:57	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	434	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	185	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	38	0	
15:00:00	0:02:02	0:07:09	0:01:22	0:00:00	0:00:13	0:03:33	0:45:40	0:00:00	0:00:00	0:01:24	0:00:00	0:00:54	3934	2911	
16:00:00	0:05:10	0:14:54	0:03:04	0:00:00	0:07:37	0:29:14	0:00:00	0:26:07	0:00:00	0:05:55	0:00:07	0:00:00	229	0	Dinner
17:00:00	0:00:59	0:04:54	0:00:08	0:00:00	0:02:43	0:51:15	0:00:00	0:45:31	0:00:00	0:00:00	0:00:00	0:00:02	107	0	
18:00:00	0:04:17	0:00:42	0:00:00	0:00:00	0:02:26	0:52:34	0:00:00	0:51:27	0:00:00	0:00:00	0:00:09	0:00:00	43	0	
19:00:00	0:00:00	0:02:25	0:00:21	0:00:00	0:00:10	0:57:03	0:00:00	0:56:10	0:00:00	0:00:17	0:00:03	0:00:20	83	0	
20:00:00	0:13:05	0:00:32	0:00:32	0:00:00	0:00:00	0:45:50	0:00:00	0:44:57	0:00:00	0:00:00	0:00:00	0:00:00	51	0	
21:00:00	0:00:07	0:00:21	0:48:29	0:44:49	0:10:07	0:00:55	0:00:00	0:00:00	0:17:08	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:20:21**	**0:44:50**	**8:53:05**	**8:10:53**	**1:04:36**	**5:57:14**	**4:59:30**	**5:25:52**	**1:01:05**	**0:07:36**	**0:00:27**	**0:01:35**	**6735**	**2911**	

TOTAL		SLEEP		GOAL			WEATHER	
Steps:	6735	Total Hrs:	7:26:49			Met?		63/C
Aerobic:	2911	Interupted:	Y	Weekly:	5500	Y		
Miles:	3.61			Strategy:	Praise			
Calories:	211							

Experiment Day 23 (12/22/2009)

Date:	Tuesday, December 22, 2009			Week	4		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:58	0:59:58	0:00:00	0:00:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:24	0:53:50	0:53:13	0:05:02	0:00:43	0:00:00	0:00:00	0:18:31	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:31:13	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:58:57	0:58:53	0:00:57	0:00:05	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:08	0:00:00	0:58:41	0:58:38	0:01:01	0:00:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:10	0:00:13	0:23:50	0:22:33	0:04:01	0:31:45	0:00:00	0:30:08	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:58	0:00:37	0:06:44	0:00:00	0:19:24	0:32:16	0:00:00	0:28:55	0:01:42	0:00:00	0:00:00	0:00:00	68	0	
7:00:00	0:09:03	0:06:23	0:12:17	0:00:00	0:01:36	0:30:40	0:00:00	0:00:00	0:18:26	0:00:00	0:00:04	0:00:19	143	0	Breakfest
8:00:00	0:34:42	0:01:30	0:03:38	0:00:00	0:09:47	0:10:22	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	186	0	
9:00:00	0:01:26	0:00:25	0:00:34	0:00:00	0:00:04	0:01:23	0:56:07	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	2013	1050	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
11:00:00	0:05:22	0:20:57	0:02:48	0:00:00	0:01:53	0:21:42	0:07:17	0:15:14	0:00:00	0:00:00	0:01:18	0:00:36	435	0	
12:00:00	0:24:03	0:19:39	0:01:33	0:00:00	0:02:36	0:09:36	0:02:32	0:00:00	0:00:00	0:00:06	0:00:42	0:00:38	333	0	Lunch
13:00:00	0:06:30	0:26:07	0:04:04	0:00:00	0:02:25	0:20:53	0:00:00	0:19:59	0:00:00	0:00:00	0:00:20	0:00:11	80	0	
14:00:00	0:00:24	0:14:10	0:00:00	0:00:00	0:02:09	0:43:16	0:00:00	0:41:40	0:00:00	0:00:02	0:00:31	0:00:22	85	0	
15:00:00	0:03:40	0:03:28	0:04:38	0:00:00	0:04:39	0:43:34	0:00:00	0:37:20	0:00:00	0:01:21	0:00:00	0:00:00	136	0	
16:00:00	0:02:27	0:00:55	0:00:00	0:00:00	0:01:00	0:00:34	0:55:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	723	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	465	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	34	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	229	0	
20:00:00	0:02:03	0:10:23	0:06:59	0:00:24	0:06:00	0:10:16	0:24:18	0:05:41	0:00:00	0:00:00	0:00:12	0:01:03	441	0	Dinner
21:00:00	0:00:00	0:01:02	0:29:08	0:27:33	0:03:52	0:25:57	0:00:00	0:22:51	0:15:56	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:57:46	0:57:40	0:02:07	0:00:06	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:30:56	1:46:13	8:25:23	7:38:50	1:08:33	4:43:18	6:25:13	3:21:48	1:25:48	0:01:29	0:03:07	0:03:11	5371	1050	

TOTAL	Steps:	5371		SLEEP	Total Hrs:	8:24:59					Met?		WEATHER	63/R/W	
	Aerobic:	1050			Interupted:	Y		GOAL	Weekly:	5500	N				
	Miles:	2.88							Strategy:	Praise					
	Calories:	138													

Experiment Day 24 (12/23/2009)

Date:	Wednesday, December 23, 2009			Week	4		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:01	0:00:37	0:38:47	0:36:51	0:19:54	0:00:40	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:27:24	0:00:50	0:21:42	0:00:00	0:08:53	0:01:10	0:00:00	0:00:00	0:20:53	0:00:00	0:00:00	0:00:00	121	0	
7:00:00	0:22:29	0:18:26	0:07:27	0:00:00	0:06:59	0:04:38	0:00:00	0:00:00	0:00:00	0:00:00	0:00:09	0:00:04	149	0	Breakfest
8:00:00	0:02:13	0:04:15	0:12:51	0:00:00	0:09:56	0:06:51	0:23:53	0:13:29	0:00:00	0:00:00	0:00:00	0:00:00	1664	1212	
9:00:00	0:04:53	0:05:47	0:01:47	0:00:00	0:03:33	0:00:56	0:43:03	0:04:03	0:00:00	0:00:00	0:00:09	0:00:06	3301	2785	
10:00:00	0:00:40	0:00:12	0:00:50	0:00:00	0:01:51	0:43:05	0:13:21	0:42:19	0:00:00	0:00:00	0:00:00	0:00:00	249	0	
11:00:00	0:02:02	0:11:23	0:02:19	0:00:00	0:00:00	0:02:04	0:42:11	0:00:00	0:00:00	0:00:00	0:01:47	0:00:24	390	0	
12:00:00	0:24:30	0:16:24	0:01:07	0:00:00	0:06:24	0:11:34	0:00:00	0:00:00	0:00:00	0:00:10	0:00:07	0:02:19	197	0	Lunch
13:00:00	0:04:31	0:10:36	0:05:08	0:00:00	0:06:45	0:26:51	0:06:08	0:21:43	0:00:00	0:00:01	0:00:02	0:00:00	870	0	
14:00:00	0:05:29	0:03:44	0:05:01	0:00:00	0:00:30	0:45:15	0:00:00	0:43:50	0:00:00	0:00:02	0:00:20	0:00:09	117	0	
15:00:00	0:02:59	0:02:43	0:04:23	0:00:00	0:02:44	0:47:10	0:00:00	0:46:37	0:00:00	0:00:00	0:00:00	0:00:00	33	0	
16:00:00	0:00:23	0:07:03	0:09:15	0:00:00	0:00:00	0:43:18	0:00:00	0:39:28	0:00:00	0:00:04	0:00:19	0:00:03	28	0	
17:00:00	0:15:34	0:10:11	0:00:00	0:00:00	0:04:48	0:29:26	0:00:00	0:26:35	0:00:00	0:00:04	0:00:07	0:00:34	109	0	Dinner
18:00:00	0:00:06	0:02:26	0:00:09	0:00:00	0:01:51	0:55:27	0:00:00	0:46:42	0:00:00	0:00:00	0:00:00	0:00:03	23	0	
19:00:00	0:43:41	0:01:10	0:02:51	0:00:00	0:02:16	0:10:01	0:00:00	0:08:18	0:00:00	0:00:00	0:00:00	0:00:10	49	0	
20:00:00	0:15:08	0:03:42	0:02:52	0:00:00	0:06:53	0:31:24	0:00:00	0:28:07	0:00:00	0:00:00	0:00:05	0:00:15	0	0	
21:00:00	0:00:04	0:04:33	0:20:53	0:20:38	0:03:41	0:30:48	0:00:00	0:29:18	0:19:17	0:00:00	0:24:03	0:00:02	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	2:52:07	1:44:02	9:17:15	7:57:22	1:26:58	6:30:38	2:08:36	5:50:29	0:40:10	0:00:21	0:27:08	0:04:09	7300	3997	
TOTAL	Steps:	7300		SLEEP	Total Hrs:	7:30:14					Met?		WEATHER	65/PC	
	Aerobic:	3997			Interupted:	N		GOAL	Weekly:	5500	Y				
	Miles:	3.91							Strategy:	Guilt					
	Calories:	233													

Experiment Day 25 (12/24/2009)

Date:	Thursday, December 24, 2009			Week	4		Home	P						
	Room Presence						Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:04	0:00:03	0:57:19	0:57:16	0:02:15	0:00:18	0:00:00	0:00:00	0:40:32	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:41	0:59:35	0:00:14	0:00:04	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:05	0:00:33	0:41:02	0:33:50	0:17:08	0:01:11	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:23:54	0:03:26	0:26:15	0:00:00	0:04:49	0:01:35	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	234	0	
8:00:00	0:15:35	0:08:07	0:08:54	0:00:00	0:06:21	0:21:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:34	0:00:07	896	0	Breakfest
9:00:00	0:04:21	0:05:51	0:00:31	0:00:00	0:06:08	0:39:39	0:03:29	0:32:02	0:00:00	0:00:00	0:00:00	0:00:03	301	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1079	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	557	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	289	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	136	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	144	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	544	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	538	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	268	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	223	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	319	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	25	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	352	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	129	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	116	0	
Sub Total	**0:43:59**	**0:18:00**	**7:13:38**	**6:30:37**	**0:36:55**	**1:03:49**	**14:03:15**	**0:32:02**	**0:40:32**	**0:00:00**	**0:00:34**	**0:00:10**	**6150**	**0**	

TOTAL	Steps:	6150		SLEEP	Total Hrs:	7:55:11					Met?		WEATHER	72/PC	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	5500	Y				
	Miles:	3.30							Strategy:	NA					
	Calories:	148													

Experiment Day 26 (12/25/2009)

Date:	Friday, December 25, 2009				Week	4		Home	N						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	90	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	74	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	100	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	7	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	159	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	102	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	21	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	52	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	122	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	70	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	206	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	59	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	218	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	85	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**1365**	**0**	

TOTAL	Steps:	1365		SLEEP	Total Hrs:	NA					Met?		WEATHER	70/S	
	Aerobic:	0			Interupted:	NA		GOAL	Weekly:	NA	NA				
	Miles:	0.73							Strategy:	NA					
	Calories:	20													

Experiment Day 27 (12/26/2009)

Date:	Saturday, December 26, 2009			Week	4		Home	P							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRM	Outside Home	Couch-TV	Bed-TV	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	589	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1246	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1080	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	381	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	108	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	76	0	
15:00:00	0:01:05	0:07:36	0:00:58	0:00:00	0:00:00	0:06:57	0:43:23	0:00:00	0:00:00	0:00:00	0:00:12	0:01:30	274	0	
16:00:00	0:05:46	0:11:16	0:10:51	0:00:00	0:11:36	0:20:30	0:00:00	0:00:00	0:00:00	0:00:00	0:00:04	0:00:00	664	0	
17:00:00	0:12:17	0:17:35	0:04:39	0:00:00	0:19:46	0:05:42	0:00:00	0:00:00	0:00:00	0:00:00	0:00:05	0:00:26	296	0	
18:00:00	0:00:05	0:05:04	0:02:55	0:00:00	0:09:32	0:42:23	0:00:00	0:39:10	0:00:00	0:00:11	0:00:09	0:00:16	171	0	Dinner
19:00:00	0:27:13	0:03:40	0:00:40	0:00:00	0:00:27	0:27:59	0:00:00	0:26:12	0:00:00	0:00:00	0:00:00	0:00:04	64	0	
20:00:00	0:06:04	0:02:57	0:47:51	0:40:56	0:01:49	0:01:18	0:00:00	0:00:00	0:52:32	0:00:00	0:00:00	0:00:00	43	0	
21:00:00	0:00:00	0:00:08	0:57:53	0:53:48	0:01:45	0:00:13	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:18:32	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:52:30**	**0:48:16**	**4:05:45**	**3:34:42**	**0:44:55**	**1:45:02**	**15:43:08**	**1:05:22**	**2:11:03**	**0:00:11**	**0:00:30**	**0:02:16**	**4992**	**0**	

TOTAL	Steps:	4992		SLEEP	Total Hrs:	NA				Met?		WEATHER	57/C	
	Aerobic:	0			Interupted:	NA	GOAL	Weekly:	5500	N				
	Miles:	2.67						Strategy:	NA					
	Calories:	138												

Experiment Day 28 (12/27/2009)

Date:	Sunday, December 27, 2009			Week	4		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:07	0:59:41	0:59:33	0:00:00	0:00:11	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:04:35	0:00:25	0:48:43	0:47:13	0:04:44	0:01:32	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:11:35	0:00:49	0:01:22	0:00:00	0:01:38	0:44:35	0:00:00	0:40:58	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:03	0:00:00	0:37:13	0:00:00	0:01:59	0:20:44	0:00:00	0:01:56	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:22	0:43:42	0:00:00	0:11:16	0:04:39	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:02:33	0:11:44	0:22:46	0:01:05	0:09:29	0:13:27	0:00:00	0:00:00	0:00:00	0:00:00	0:00:05	0:00:44	315	0	Breakfest
8:00:00	0:40:10	0:04:32	0:01:48	0:00:00	0:07:41	0:05:48	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	0:00:08	343	0	
9:00:00	0:03:52	0:00:45	0:01:01	0:00:00	0:05:07	0:49:14	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	384	0	
10:00:00	0:22:03	0:02:34	0:03:30	0:00:00	0:03:08	0:28:44	0:00:00	0:00:00	0:00:00	0:00:13	0:00:04	0:00:21	533	0	
11:00:00	0:36:36	0:14:26	0:04:19	0:00:00	0:01:16	0:03:22	0:00:00	0:00:00	0:00:00	0:10:19	0:00:02	0:00:22	154	0	Lunch
12:00:00	0:11:57	0:07:02	0:06:44	0:00:00	0:08:46	0:25:30	0:00:00	0:21:21	0:00:00	0:00:00	0:00:21	0:00:11	110	0	
13:00:00	0:00:00	0:03:12	0:11:04	0:00:00	0:07:27	0:38:16	0:00:00	0:22:52	0:00:00	0:00:00	0:00:00	0:00:03	1457	0	
14:00:00	0:00:00	0:01:26	0:17:00	0:00:00	0:00:47	0:40:46	0:00:00	0:33:11	0:00:00	0:00:00	0:00:02	0:00:00	904	0	
15:00:00	0:00:00	0:02:25	0:05:59	0:00:00	0:00:00	0:51:35	0:00:00	0:49:02	0:00:00	0:00:00	0:00:00	0:00:00	51	0	
16:00:00	0:08:24	0:17:00	0:00:15	0:00:00	0:01:33	0:32:47	0:00:00	0:29:05	0:00:00	0:00:14	0:00:07	0:01:18	144	0	Dinner
17:00:00	0:02:10	0:02:10	0:00:21	0:00:00	0:03:36	0:51:42	0:00:00	0:48:02	0:00:00	0:00:00	0:00:00	0:00:33	72	0	
18:00:00	0:00:00	0:01:31	0:06:03	0:00:00	0:00:35	0:51:50	0:00:00	0:49:30	0:00:00	0:00:00	0:00:15	0:00:11	40	0	
19:00:00	0:00:00	0:06:02	0:39:59	0:32:40	0:06:35	0:07:23	0:00:00	0:04:36	0:36:15	0:00:00	0:00:02	0:00:07	0	0	
20:00:00	0:00:00	0:02:57	0:55:11	0:53:58	0:01:26	0:00:25	0:00:00	0:00:00	0:58:44	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:23:58**	**1:19:29**	**11:06:36**	**8:14:24**	**1:17:03**	**7:52:30**	**0:00:00**	**5:00:33**	**1:34:59**	**0:10:46**	**0:01:00**	**0:03:58**	**4507**	**0**	

TOTAL	Steps:	4507		SLEEP	Total Hrs:	5:28:17					Met?		WEATHER	60/S	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	5500	N				
	Miles:	2.41							Strategy:	Neutral					
	Calories:	128													

Experiment Day 29 (12/28/2009)

Date:	Monday, December 28, 2009				Week	5		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:38	0:56:36	0:54:25	0:02:31	0:00:14	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:02	0:57:23	0:57:21	0:02:16	0:00:18	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:02:53	0:00:45	0:00:00	0:04:37	0:51:44	0:00:00	0:50:06	0:00:00	0:00:00	0:00:00	0:00:07	99	0	
6:00:00	0:00:00	0:00:00	0:30:44	0:30:03	0:00:09	0:29:06	0:00:00	0:26:49	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:08	0:41:52	0:39:24	0:17:07	0:00:52	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	17	0	
8:00:00	0:23:38	0:06:16	0:23:07	0:00:00	0:00:50	0:06:08	0:00:00	0:00:00	0:00:00	0:00:00	0:00:04	0:00:17	163	0	Breakfest
9:00:00	0:30:18	0:02:09	0:06:56	0:00:00	0:04:08	0:16:28	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1483	1257	
10:00:00	0:30:03	0:04:43	0:03:31	0:00:00	0:02:32	0:19:10	0:00:00	0:17:33	0:00:00	0:00:00	0:00:04	0:00:02	105	0	
11:00:00	0:01:13	0:04:59	0:00:13	0:00:00	0:02:37	0:50:57	0:00:00	0:49:26	0:00:00	0:00:00	0:00:00	0:00:02	68	0	
12:00:00	0:06:10	0:16:05	0:00:22	0:00:00	0:23:17	0:05:24	0:08:41	0:00:00	0:00:00	0:00:00	0:00:00	0:01:59	502	0	Lunch
13:00:00	0:04:18	0:01:47	0:00:07	0:00:00	0:02:07	0:51:40	0:00:00	0:03:43	0:00:00	0:00:00	0:00:00	0:00:05	682	0	
14:00:00	0:03:20	0:04:35	0:04:28	0:00:00	0:09:05	0:38:31	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	408	0	
15:00:00	0:01:28	0:10:15	0:02:13	0:00:00	0:15:51	0:21:48	0:08:24	0:16:21	0:00:00	0:00:00	0:00:00	0:00:11	1237	964	
16:00:00	0:10:27	0:26:31	0:01:40	0:00:00	0:03:32	0:11:41	0:06:08	0:06:39	0:00:00	0:00:04	0:02:41	0:01:06	605	356	Dinner
17:00:00	0:00:00	0:02:32	0:00:20	0:00:00	0:05:47	0:51:20	0:00:00	0:49:16	0:00:00	0:00:00	0:00:00	0:00:00	127	0	
18:00:00	0:12:22	0:07:26	0:02:00	0:00:00	0:00:59	0:37:12	0:00:00	0:34:37	0:00:00	0:00:00	0:00:03	0:00:04	32	0	
19:00:00	0:00:00	0:12:36	0:00:00	0:00:00	0:03:56	0:43:27	0:00:00	0:41:28	0:00:00	0:00:00	0:00:00	0:00:20	15	0	
20:00:00	0:20:26	0:01:21	0:03:27	0:00:00	0:03:16	0:31:29	0:00:00	0:29:34	0:00:00	0:00:00	0:00:00	0:00:06	39	0	
21:00:00	0:21:32	0:02:05	0:14:21	0:08:22	0:19:53	0:02:08	0:00:00	0:00:00	0:34:21	0:00:00	0:00:02	0:00:00	48	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:02:06	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:57:55	0:57:44	0:01:57	0:00:07	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	2:45:15	1:47:01	9:07:56	8:07:15	2:06:27	7:49:44	0:23:13	5:25:32	0:36:27	0:00:04	0:02:54	0:04:19	5630	2577	
TOTAL	Steps:	5630		SLEEP	Total Hrs:	7:53:05					Met?		WEATHER	67/C	
	Aerobic:	2577			Interupted:	Y		GOAL	Weekly:	6000	N				
	Miles:	3.02							Strategy:	Praise					
	Calories:	148													

Experiment Day 30 (12/29/2009)

Date:	Tuesday, December 29, 2009				Week	5		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:58:02	0:57:55	0:01:48	0:00:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:01:20	0:01:06	0:38:00	0:17:45	0:16:58	0:02:35	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	43	0	
8:00:00	0:42:30	0:01:46	0:09:31	0:00:29	0:04:48	0:01:24	0:00:00	0:00:00	0:00:00	0:00:06	0:00:00	0:00:07	170	0	Breakfest
9:00:00	0:38:20	0:10:11	0:01:17	0:00:00	0:07:36	0:02:35	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	0:00:10	219	0	
10:00:00	0:02:57	0:00:19	0:00:00	0:00:00	0:00:45	0:16:01	0:39:57	0:14:25	0:00:00	0:00:00	0:00:00	0:00:00	222	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	140	0	
12:00:00	0:12:19	0:12:52	0:03:25	0:00:00	0:07:12	0:21:13	0:02:58	0:00:00	0:00:00	0:00:06	0:00:09	0:00:20	1520	0	Lunch
13:00:00	0:40:27	0:04:36	0:02:14	0:00:00	0:01:16	0:00:00	0:46:31	0:07:47	0:00:00	0:00:04	0:00:03	0:00:00	344	0	
14:00:00	0:00:00	0:01:20	0:00:16	0:00:00	0:02:44	0:53:41	0:01:58	0:43:53	0:00:00	0:05:11	0:00:07	0:00:04	260	0	
15:00:00	0:07:43	0:00:40	0:23:59	0:20:08	0:04:50	0:08:31	0:14:16	0:00:00	0:45:10	0:00:00	0:00:00	0:00:00	1293	1138	
16:00:00	0:10:14	0:06:37	0:22:04	0:20:53	0:01:04	0:20:00	0:00:00	0:22:15	0:15:54	0:00:12	0:00:00	0:00:26	67	0	Dinner
17:00:00	0:00:03	0:00:19	0:00:00	0:00:00	0:02:06	0:39:15	0:18:16	0:35:22	0:00:00	0:00:00	0:00:00	0:00:00	136	0	
18:00:00	0:01:08	0:00:18	0:00:00	0:00:00	0:01:25	0:03:09	0:53:59	0:02:11	0:00:00	0:00:00	0:00:00	0:00:00	194	0	
19:00:00	0:28:06	0:11:11	0:02:09	0:00:00	0:00:00	0:18:33	0:00:00	0:02:25	0:00:00	0:00:01	0:00:00	0:00:00	233	0	
20:00:00	0:00:04	0:02:24	0:30:22	0:26:36	0:03:43	0:23:26	0:00:00	0:16:17	0:29:36	0:00:00	0:00:00	0:00:00	68	0	
21:00:00	0:00:00	0:00:00	0:57:58	0:57:56	0:01:54	0:00:07	0:00:00	0:00:00	0:32:33	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:58:11	0:58:01	0:01:40	0:00:08	0:00:00	0:00:00	0:17:20	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:52	0:58:58	0:58:47	0:00:00	0:00:09	0:00:00	0:00:00	0:28:44	0:00:00	0:00:00	0:00:11	0	0	
Sub Total	3:05:11	0:54:31	12:06:20	11:18:24	0:59:49	3:30:56	3:57:54	2:24:35	2:49:17	0:05:40	0:00:21	0:01:18	4909	1138	
TOTAL	Steps:	4909		SLEEP	Total Hrs:	9:13:38					Met?		WEATHER	63/PC	
	Aerobic:	1138			Interupted:	Y		GOAL	Weekly:	6000	N				
	Miles:	2.63							Strategy:	Guilt					
	Calories:	144													

Experiment Day 31 (12/30/2009)

Date:	Wednesday, December 30, 2009			Week	5			Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:14	0:57:03	0:55:05	0:02:24	0:00:18	0:00:00	0:00:00	0:00:44	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:40:35	0:00:16	0:05:31	0:05:17	0:11:40	0:01:57	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	36	0	
6:00:00	0:30:02	0:03:05	0:03:27	0:00:00	0:18:11	0:05:14	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	0:00:05	88	0	Breakfest
7:00:00	0:06:47	0:04:54	0:22:18	0:00:00	0:21:53	0:04:07	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:06	81	0	
8:00:00	0:25:00	0:01:33	0:03:36	0:00:00	0:11:38	0:02:04	0:16:08	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1505	1124	
9:00:00	0:01:12	0:06:14	0:00:55	0:00:00	0:13:58	0:37:40	0:00:00	0:27:46	0:00:00	0:00:00	0:00:13	0:00:01	629	0	
10:00:00	0:11:16	0:01:29	0:02:11	0:00:00	0:02:57	0:42:06	0:00:00	0:39:39	0:00:00	0:00:00	0:00:02	0:00:00	92	0	
11:00:00	0:22:29	0:12:49	0:01:11	0:00:00	0:04:02	0:19:28	0:00:00	0:17:16	0:00:00	0:01:00	0:00:34	0:00:22	139	0	Lunch
12:00:00	0:03:09	0:06:13	0:02:27	0:00:00	0:05:16	0:42:54	0:00:00	0:38:34	0:00:00	0:00:00	0:00:10	0:00:00	100	0	
13:00:00	0:00:09	0:00:54	0:01:26	0:00:00	0:03:08	0:54:22	0:00:00	0:52:39	0:00:00	0:00:00	0:00:00	0:00:00	53	0	
14:00:00	0:00:51	0:02:11	0:03:31	0:00:00	0:02:57	0:36:05	0:14:24	0:31:39	0:00:00	0:00:00	0:00:00	0:00:00	1460	0	
15:00:00	0:00:39	0:03:35	0:07:09	0:00:00	0:04:55	0:43:41	0:00:00	0:39:39	0:00:00	0:00:00	0:00:00	0:00:08	425	0	
16:00:00	0:05:37	0:03:27	0:05:15	0:00:00	0:02:39	0:43:01	0:00:00	0:41:25	0:00:00	0:00:00	0:00:00	0:00:00	90	0	
17:00:00	0:00:11	0:01:22	0:01:05	0:00:00	0:00:00	0:38:56	0:18:25	0:29:18	0:00:00	0:00:00	0:00:00	0:00:00	188	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	83	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	397	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	55	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	160	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	85	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**2:27:57**	**0:48:16**	**5:57:01**	**5:00:18**	**1:45:38**	**6:11:53**	**6:48:51**	**5:17:55**	**0:00:44**	**0:01:00**	**0:01:01**	**0:00:42**	**5666**	**1124**	

TOTAL	Steps:	5666		SLEEP	Total Hrs:	5:31:40					Met?		WEATHER	51/R
	Aerobic:	1124			Interupted:	Y		GOAL	Weekly:	6000	N			
	Miles:	3.04							Strategy:	Guilt				
	Calories:	143												

Experiment Day 32 (12/31/2009)

Date:	Thursday, December 31, 2009			Week	5			Home	N						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	64	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	119	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	210	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	310	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	418	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	284	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	146	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	116	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	249	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	40	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	181	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	324	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	167	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	213	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	96	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	193	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	139	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**3269**	**0**	
TOTAL	Steps:	**3269**		**SLEEP**	Total Hrs:	**NA**					**Met?**		**WEATHER**	**68/S**	
	Aerobic:	**0**			Interupted:	**NA**		**GOAL**	Weekly:	**NA**	**NA**				
	Miles:	**1.75**							Strategy:	**NA**					
	Calories:	**53**													

Experiment Day 33 (1/1/2010)

Date:	Friday, January 01, 2010				Week	5		Home	N						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	11	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	336	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	217	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	129	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	382	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	313	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	118	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	21	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	201	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	191	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	133	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	14	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	121	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	113	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**2300**	**0**	

TOTAL	Steps:	2300		SLEEP	Total Hrs:	NA					Met?		WEATHER	71/S
	Aerobic:	0			Interupted:	NA		GOAL	Weekly:	NA	NA			
	Miles:	1.23							Strategy:	NA				
	Calories:	44												

Experiment Day 34 (1/2/2010)

Date:	Saturday, January 02, 2010				Week	5		Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	28	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	290	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	481	0	
10:00:00	0:06:52	0:05:33	0:04:04	0:00:00	0:04:54	0:13:41	0:24:55	0:00:00	0:00:00	0:00:00	0:00:00	0:00:06	1088	0	
11:00:00	0:22:16	0:10:40	0:12:04	0:00:00	0:03:02	0:11:57	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	419	0	
12:00:00	0:18:16	0:09:03	0:06:02	0:00:00	0:04:44	0:03:36	0:18:18	0:00:00	0:00:00	0:00:08	0:00:06	0:00:29	1705	0	Lunch
13:00:00	0:13:06	0:06:24	0:01:19	0:00:00	0:06:26	0:32:44	0:00:00	0:07:42	0:00:00	0:00:00	0:00:00	0:00:20	282	0	
14:00:00	0:00:00	0:00:10	0:00:51	0:00:00	0:02:47	0:32:43	0:23:28	0:02:44	0:00:00	0:00:00	0:00:00	0:00:00	68	0	
15:00:00	0:00:20	0:04:39	0:02:11	0:00:00	0:03:08	0:12:21	0:37:20	0:06:32	0:00:00	0:00:00	0:00:00	0:00:00	1480	1121	
16:00:00	0:00:08	0:26:10	0:00:00	0:00:00	0:00:10	0:33:31	0:00:00	0:20:53	0:00:00	0:00:00	0:09:10	0:01:38	121	0	
17:00:00	0:16:43	0:06:44	0:00:53	0:00:00	0:01:30	0:34:09	0:00:00	0:24:35	0:00:00	0:00:05	0:00:21	0:00:04	137	0	Dinner
18:00:00	0:00:00	0:01:25	0:00:10	0:00:00	0:02:11	0:56:13	0:00:00	0:52:37	0:00:00	0:00:04	0:00:08	0:00:32	41	0	
19:00:00	0:06:32	0:14:18	0:03:53	0:00:00	0:01:29	0:33:47	0:00:00	0:25:33	0:00:00	0:00:00	0:00:00	0:00:00	148	0	
20:00:00	0:04:05	0:01:27	0:01:47	0:00:00	0:00:40	0:52:00	0:00:00	0:43:18	0:00:00	0:00:00	0:00:00	0:00:00	128	0	
21:00:00	0:00:00	0:00:52	0:45:35	0:40:03	0:09:03	0:04:29	0:00:00	0:02:26	0:26:02	0:00:00	0:00:00	0:00:00	19	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:28:18	1:27:25	3:18:47	2:40:01	0:40:04	5:21:11	11:43:51	3:06:20	0:26:02	0:00:17	0:09:45	0:03:09	6435	1121	
TOTAL	Steps:	6435		SLEEP	Total Hrs:	0:00:00					Met?		WEATHER	83/MS	
	Aerobic:	1121			Interupted:	NA		GOAL	Weekly:	6000	Y				
	Miles:	3.45							Strategy:	NA					
	Calories:	179													

Experiment Day 35 (1/3/2010)

Date: Sunday, January 03, 2010 | Week 5 | Home Y

Hour	Room Presence: Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Room Activities: Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Walking: Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:07	0:55:30	0:52:21	0:03:49	0:00:33	0:00:00	0:00:00	0:16:17	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:22:45	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:04	0:04:21	0:41:02	0:35:11	0:09:37	0:04:55	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	19	0	
8:00:00	0:03:44	0:02:58	0:19:18	0:00:40	0:03:28	0:30:31	0:00:00	0:07:26	0:00:00	0:00:29	0:00:02	0:00:16	203	0	Breakfest
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:14:35	0:45:24	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	379	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	139	0	
11:00:00	0:11:41	0:05:40	0:00:36	0:00:00	0:08:20	0:12:15	0:21:27	0:05:34	0:00:00	0:00:00	0:00:32	0:01:19	241	0	
12:00:00	0:00:00	0:06:14	0:01:55	0:00:00	0:02:52	0:36:02	0:12:56	0:22:41	0:00:00	0:00:03	0:00:00	0:00:44	1479	1306	Lunch
13:00:00	0:17:27	0:02:50	0:14:30	0:13:29	0:04:33	0:20:39	0:00:00	0:12:52	0:10:21	0:00:00	0:00:12	0:00:02	62	0	
14:00:00	0:00:00	0:01:16	0:41:06	0:21:19	0:02:41	0:13:21	0:01:35	0:00:00	0:57:57	0:00:00	0:00:00	0:00:09	304	199	
15:00:00	0:00:00	0:00:18	0:00:49	0:00:00	0:00:00	0:00:31	0:58:21	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1370	1129	
16:00:00	0:00:00	0:02:00	0:01:10	0:00:00	0:04:22	0:44:21	0:08:06	0:42:38	0:00:00	0:00:00	0:00:00	0:00:11	136	0	
17:00:00	0:00:00	0:01:15	0:00:00	0:00:00	0:01:39	0:57:05	0:00:00	0:32:01	0:00:00	0:00:08	0:00:05	0:00:27	104	0	Dinner
18:00:00	0:00:00	0:00:14	0:00:00	0:00:00	0:03:00	0:56:45	0:00:00	0:55:51	0:00:00	0:00:00	0:00:00	0:00:00	53	0	
19:00:00	0:00:00	0:00:15	0:44:11	0:39:57	0:05:50	0:09:43	0:00:00	0:02:07	0:52:38	0:00:00	0:00:00	0:00:00	9	0	
20:00:00	0:00:00	0:01:00	0:56:50	0:56:32	0:01:45	0:00:24	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:04:56	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:32:56**	**0:28:28**	**13:36:48**	**12:39:20**	**0:51:56**	**5:01:40**	**3:27:48**	**3:01:10**	**4:44:52**	**0:00:40**	**0:00:51**	**0:03:08**	**4498**	**2634**	

TOTAL	Steps:	4498	SLEEP	Total Hrs;	9:18:03	GOAL	Met?	WEATHER 78/PC
	Aerobic:	2634		Interupted:	Y	Weekly: 6000	N	
	Miles:	2.41				Strategy: NA		
	Calories:	142						

Experiment Day 36 (1/4/2010)

Date:	Monday, January 04, 2010			Week	6		Home	Y						

	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:57:39	0:57:22	0:01:56	0:00:24	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:01:12	0:55:54	0:55:11	0:02:30	0:00:23	0:00:00	0:00:00	0:18:53	0:00:00	0:00:00	0:00:02	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:21	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:19:24	0:02:48	0:32:23	0:30:35	0:04:47	0:00:37	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:25:17	0:21:56	0:03:59	0:00:00	0:00:36	0:08:11	0:00:00	0:00:00	0:00:00	0:00:00	0:00:31	0:00:55	134	0	Breakfest
8:00:00	0:22:03	0:11:27	0:03:18	0:00:00	0:22:08	0:01:03	0:00:00	0:00:00	0:00:00	0:00:00	0:00:03	0:00:00	114	0	
9:00:00	0:00:21	0:05:34	0:19:11	0:04:09	0:10:54	0:03:17	0:20:42	0:00:00	0:22:58	0:00:02	0:00:00	0:00:00	2066	1399	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	171	0	
11:00:00	0:00:19	0:09:48	0:03:34	0:00:00	0:00:17	0:33:31	0:12:30	0:27:16	0:00:00	0:00:02	0:00:01	0:00:18	682	0	Lunch
12:00:00	0:00:11	0:04:58	0:02:30	0:00:00	0:02:19	0:29:16	0:20:45	0:12:53	0:00:00	0:00:00	0:00:00	0:00:26	502	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	156	0	
14:00:00	0:00:58	0:01:29	0:00:37	0:00:00	0:03:38	0:00:55	0:52:22	0:00:00	0:00:00	0:00:00	0:00:00	0:00:07	664	0	
15:00:00	0:00:58	0:02:18	0:02:41	0:00:00	0:04:04	0:15:05	0:34:53	0:00:00	0:00:00	0:00:00	0:00:00	0:00:05	406	0	
16:00:00	0:00:17	0:02:31	0:00:36	0:00:00	0:04:19	0:52:16	0:00:00	0:38:31	0:00:00	0:00:02	0:00:00	0:00:19	113	0	
17:00:00	0:00:06	0:04:10	0:01:52	0:00:00	0:04:45	0:49:06	0:00:00	0:35:12	0:00:00	0:00:06	0:00:18	0:00:00	166	0	Dinner
18:00:00	0:00:00	0:07:23	0:00:00	0:00:00	0:01:56	0:50:40	0:00:00	0:45:53	0:00:00	0:00:00	0:00:03	0:00:08	15	0	
19:00:00	0:00:00	0:05:59	0:01:52	0:00:00	0:01:20	0:50:48	0:00:00	0:45:31	0:00:00	0:00:00	0:00:00	0:00:01	19	0	
20:00:00	0:00:00	0:00:19	0:25:20	0:23:49	0:03:25	0:30:55	0:00:00	0:29:19	0:27:17	0:00:00	0:00:00	0:00:02	0	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:21:26	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:09:54**	**1:21:52**	**10:31:19**	**9:50:59**	**1:08:54**	**5:26:27**	**4:21:10**	**3:54:35**	**1:30:55**	**0:00:12**	**0:00:56**	**0:02:23**	**5208**	**1399**	

TOTAL	Steps:	**5208**		**SLEEP**	Total Hrs:	**7:59:14**				**Met?**		**WEATHER**	**74/S**	
	Aerobic:	**1399**			Interupted:	**Y**	**GOAL**	Weekly:	**5600**	**N**				
	Miles:	**2.79**						Strategy:	**Neutral**					
	Calories:	**152**												

Experiment Day 37 (1/5/2010)

Date:	Tuesday, January 05, 2010	Week	6	Home	Y

	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:57:58	0:57:44	0:01:43	0:00:18	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:05	0:58:56	0:00:25	0:00:29	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:31:09	0:00:58	0:22:22	0:21:06	0:04:56	0:00:34	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:36:01	0:00:00	0:08:19	0:00:00	0:15:26	0:00:13	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	134	0	
8:00:00	0:17:41	0:02:13	0:25:11	0:00:00	0:07:14	0:07:40	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:01	114	0	Breakfest
9:00:00	0:08:23	0:00:49	0:03:19	0:00:00	0:03:34	0:02:56	0:40:58	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	2066	1399	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	171	0	
11:00:00	0:01:02	0:01:32	0:00:34	0:00:00	0:00:43	0:00:40	0:55:28	0:00:00	0:00:00	0:00:00	0:00:00	0:00:06	682	0	
12:00:00	0:19:41	0:09:52	0:01:08	0:00:00	0:03:25	0:25:53	0:00:00	0:01:33	0:00:00	0:00:00	0:00:00	0:00:00	502	0	
13:00:00	0:41:43	0:14:06	0:01:35	0:00:00	0:02:12	0:00:23	0:00:00	0:00:00	0:00:00	0:00:00	0:00:11	0:00:04	156	0	Lunch
14:00:00	0:10:28	0:06:34	0:07:11	0:00:00	0:08:10	0:27:36	0:00:00	0:11:29	0:00:00	0:00:00	0:00:00	0:00:03	664	0	
15:00:00	0:07:22	0:00:26	0:02:46	0:00:00	0:06:31	0:41:45	0:01:09	0:36:07	0:00:00	0:00:00	0:00:00	0:00:04	406	0	
16:00:00	0:00:31	0:04:54	0:01:30	0:00:00	0:00:22	0:33:39	0:19:03	0:23:36	0:00:00	0:00:06	0:00:00	0:00:31	113	0	Dinner
17:00:00	0:01:14	0:01:30	0:03:40	0:00:00	0:03:59	0:25:42	0:23:54	0:19:28	0:00:00	0:00:00	0:00:00	0:00:00	166	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	15	0	
19:00:00	0:05:48	0:02:16	0:04:46	0:00:00	0:04:13	0:07:42	0:35:14	0:00:26	0:00:00	0:00:00	0:00:00	0:00:00	19	0	
20:00:00	0:12:52	0:07:28	0:01:18	0:00:00	0:01:23	0:36:58	0:00:00	0:17:59	0:00:00	0:00:00	0:00:04	0:00:00	0	0	
21:00:00	0:00:07	0:01:03	0:00:01	0:00:00	0:00:41	0:58:07	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:11	0:00:45	0:26:56	0:25:34	0:04:46	0:27:21	0:00:00	0:00:00	0:26:12	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	1:00:07	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:16:02	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**3:14:13**	**0:54:26**	**8:47:42**	**7:43:15**	**1:09:43**	**4:57:56**	**4:55:44**	**1:50:38**	**0:42:14**	**0:00:06**	**0:00:15**	**0:00:49**	**5208**	**1399**	

TOTAL			SLEEP			GOAL				WEATHER	
	Steps:	5208		Total Hrs:	8:27:04				Met?		78/S
	Aerobic:	1399		Interupted:	Y		Weekly:	5600	N		
	Miles:	2.79					Strategy:	Guilt			
	Calories:	152									

Experiment Day 38 (1/6/2010)

Date:	Wednesday, January 06, 2010				Week	6		Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:58	0:59:58	0:00:00	0:00:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:04	0:00:02	0:57:16	0:57:04	0:02:06	0:00:31	0:00:00	0:00:00	0:21:13	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:01:46	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:45:10	0:01:05	0:06:40	0:05:30	0:05:37	0:01:27	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	67	0	
8:00:00	0:18:55	0:05:15	0:18:13	0:00:00	0:14:38	0:02:58	0:00:00	0:00:00	0:00:00	0:00:00	0:00:04	0:00:12	147	0	Breakfest
9:00:00	0:31:59	0:01:35	0:01:29	0:00:00	0:04:51	0:02:21	0:17:44	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1390	0	
10:00:00	0:05:24	0:02:51	0:02:06	0:00:00	0:00:05	0:49:33	0:00:00	0:42:53	0:00:00	0:00:00	0:00:04	0:00:06	170	0	
11:00:00	0:00:14	0:09:30	0:00:00	0:00:00	0:02:04	0:48:11	0:00:00	0:46:03	0:00:00	0:00:05	0:00:05	0:00:16	65	0	
12:00:00	0:10:53	0:11:55	0:12:12	0:00:00	0:10:03	0:14:56	0:00:00	0:00:00	0:14:06	0:00:00	0:00:13	0:01:09	491	0	Lunch
13:00:00	0:00:37	0:05:57	0:04:18	0:00:00	0:08:58	0:40:09	0:00:00	0:35:47	0:03:23	0:00:00	0:00:00	0:00:00	185	0	
14:00:00	0:00:06	0:03:37	0:00:46	0:00:00	0:02:55	0:52:35	0:00:00	0:36:33	0:00:00	0:00:00	0:00:33	0:00:13	123	0	
15:00:00	0:00:33	0:01:59	0:01:41	0:00:00	0:01:53	0:37:27	0:16:26	0:34:33	0:00:00	0:00:00	0:00:00	0:00:05	1476	1190	
16:00:00	0:06:37	0:03:13	0:01:34	0:00:00	0:01:08	0:47:27	0:00:00	0:41:35	0:00:00	0:00:03	0:00:00	0:00:14	87	0	
17:00:00	0:00:15	0:01:42	0:03:14	0:00:00	0:01:26	0:53:22	0:00:00	0:46:11	0:00:00	0:00:02	0:00:07	0:00:24	81	0	Dinner
18:00:00	0:01:22	0:01:17	0:00:35	0:00:00	0:01:46	0:54:59	0:00:00	0:52:48	0:00:00	0:00:00	0:00:00	0:00:00	66	0	
19:00:00	0:00:00	0:00:39	0:57:06	0:55:19	0:00:00	0:02:14	0:00:00	0:01:09	0:57:52	0:00:00	0:00:00	0:00:00	47	0	
20:00:00	0:00:00	0:02:53	0:41:56	0:39:25	0:11:16	0:03:54	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	59	0	
21:00:00	0:00:00	0:00:04	0:56:15	0:56:08	0:01:34	0:02:06	0:00:00	0:00:00	0:15:58	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:02:04	0:55:05	0:54:32	0:02:05	0:00:45	0:00:00	0:00:00	0:13:41	0:00:00	0:00:00	0:00:31	0	0	
Sub Total	2:02:09	0:55:38	12:20:18	11:27:50	1:12:25	6:54:56	0:34:10	5:37:32	3:07:58	0:00:10	0:01:06	0:03:10	4454	1190	
TOTAL	Steps:	4454		SLEEP	Total Hrs:	7:24:17					Met?		WEATHER	75/PC	
	Aerobic:	1190			Interupted:	Y		GOAL	Weekly:	5600	N				
	Miles:	2.39							Strategy:	Praise					
	Calories:	126													

Experiment Day 39 (1/7/2010)

Date: Thursday, January 07, 2010 | Week 6 | Home Y

	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:37:35	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:04	0:00:00	0:03:14	0:03:06	0:03:25	0:53:16	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	219	0	
8:00:00	0:33:10	0:03:28	0:00:54	0:00:00	0:00:25	0:22:02	0:00:00	0:00:00	0:00:00	0:00:03	0:00:06	0:00:11	92	0	Breakfest
9:00:00	0:01:01	0:00:15	0:01:29	0:00:00	0:05:47	0:51:27	0:00:00	0:03:26	0:00:00	0:00:00	0:00:00	0:00:00	82	0	
10:00:00	0:02:36	0:00:02	0:00:45	0:00:00	0:02:11	0:10:43	0:43:42	0:02:55	0:00:00	0:00:00	0:00:00	0:00:00	319	0	
11:00:00	0:15:11	0:04:21	0:07:17	0:00:00	0:03:10	0:26:22	0:03:38	0:19:45	0:00:00	0:00:00	0:00:00	0:00:06	503	0	
12:00:00	0:08:34	0:10:12	0:01:48	0:00:00	0:08:04	0:16:37	0:14:44	0:03:19	0:00:00	0:00:00	0:01:07	0:00:25	1702	1440	Lunch
13:00:00	0:00:13	0:01:08	0:02:56	0:00:00	0:03:06	0:52:36	0:00:00	0:46:48	0:00:00	0:00:00	0:00:00	0:00:00	92	0	
14:00:00	0:00:00	0:00:00	0:00:11	0:00:00	0:02:08	0:03:43	0:53:57	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	590	0	
15:00:00	0:01:14	0:01:15	0:05:07	0:00:00	0:03:56	0:01:51	0:46:36	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	2057	1219	
16:00:00	0:01:06	0:04:58	0:03:31	0:00:00	0:02:38	0:47:46	0:00:00	0:32:27	0:00:00	0:00:04	0:00:28	0:00:17	174	0	Dinner
17:00:00	0:01:06	0:00:36	0:01:19	0:00:00	0:01:44	0:55:14	0:00:00	0:52:43	0:00:00	0:00:00	0:00:05	0:00:00	83	0	
18:00:00	0:00:03	0:00:00	0:04:21	0:00:00	0:04:10	0:51:25	0:00:00	0:48:47	0:00:00	0:00:00	0:00:00	0:00:05	65	0	
19:00:00	0:03:00	0:00:42	0:02:59	0:00:00	0:01:55	0:51:23	0:00:00	0:32:05	0:00:00	0:00:00	0:00:00	0:00:06	172	0	
20:00:00	0:00:00	0:00:13	0:47:08	0:45:50	0:04:04	0:08:34	0:00:00	0:06:09	0:33:51	0:00:00	0:00:00	0:00:00	18	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:07:18	0:27:10	11:22:49	10:48:46	0:46:43	7:32:59	2:42:37	4:08:24	1:11:26	0:00:07	0:01:46	0:01:10	6168	2659	

TOTAL			SLEEP			GOAL				WEATHER	
	Steps:	6168		Total Hrs:	6:25:28				Met?		75/PC
	Aerobic:	2659		Interupted:	N		Weekly:	5600	Y		
	Miles:	3.30					Strategy:	Guilt			
	Calories:	173									

Experiment Day 40 (1/8/2010)

Date:	Friday, January 08, 2010			Week	6		Home	Y						
	Room Presence						Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:14	0:57:11	0:56:30	0:02:15	0:00:19	0:00:00	0:00:00	0:48:38	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:27:11	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:17:23	0:01:21	0:34:57	0:34:16	0:04:29	0:01:49	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	0:00:00	32	0	
5:00:00	0:31:05	0:00:56	0:09:40	0:04:11	0:16:30	0:01:48	0:00:00	0:00:00	0:03:57	0:00:00	0:00:00	0:00:00	68	0	
6:00:00	0:05:01	0:02:59	0:14:07	0:12:03	0:00:48	0:37:04	0:00:00	0:34:56	0:13:57	0:00:04	0:00:05	0:00:09	91	0	
7:00:00	0:36:59	0:01:47	0:01:44	0:00:00	0:08:02	0:11:27	0:00:00	0:00:00	0:00:00	0:00:03	0:00:08	0:00:05	50	0	Breakfest
8:00:00	0:25:13	0:02:52	0:00:36	0:00:00	0:07:23	0:23:55	0:00:00	0:20:25	0:00:00	0:00:00	0:00:00	0:00:00	175	0	
9:00:00	0:16:09	0:00:06	0:00:44	0:00:00	0:02:01	0:40:59	0:00:00	0:36:52	0:00:00	0:00:00	0:00:00	0:00:00	73	0	
10:00:00	0:00:42	0:05:18	0:04:40	0:00:00	0:01:12	0:48:07	0:00:00	0:31:42	0:00:00	0:00:00	0:00:32	0:00:22	174	0	
11:00:00	0:00:00	0:00:39	0:00:00	0:00:00	0:02:01	0:34:17	0:23:02	0:33:29	0:00:00	0:00:00	0:00:00	0:00:04	35	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	86	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	240	0	
14:00:00	0:02:15	0:00:28	0:00:05	0:00:00	0:00:00	0:01:57	0:55:14	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1488	0	
15:00:00	0:01:29	0:04:00	0:00:53	0:00:00	0:04:52	0:46:32	0:02:13	0:41:58	0:00:00	0:00:00	0:00:18	0:00:00	283	0	Lunch
16:00:00	0:00:39	0:01:48	0:01:36	0:00:00	0:04:28	0:45:06	0:06:22	0:40:14	0:00:00	0:00:00	0:00:03	0:00:04	460	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	124	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	27	0	
19:00:00	0:00:00	0:01:29	0:02:49	0:00:17	0:09:40	0:25:09	0:20:52	0:15:53	0:00:00	0:00:00	0:00:06	0:00:06	287	0	Dinner
20:00:00	0:00:00	0:01:43	0:27:35	0:23:51	0:08:19	0:22:22	0:00:00	0:09:39	0:29:08	0:00:03	0:00:00	0:00:03	271	0	
21:00:00	0:00:06	0:00:13	0:49:35	0:49:03	0:07:58	0:02:07	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	14	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:20:26	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	2:17:01	0:25:53	8:26:07	8:00:06	1:19:58	5:42:58	5:47:39	4:25:08	3:23:16	0:00:10	0:01:14	0:00:53	3978	0	

TOTAL	Steps:	3978		SLEEP	Total Hrs:	6:28:50					Met?		WEATHER	76/MS
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	5600	N			
	Miles:	2.13							Strategy:	Praise				
	Calories:	95												

Experiment Day 41 (1/9/2010)

Date:	Saturday, January 09, 2010			Week	6			Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:57:45	0:57:34	0:01:53	0:00:21	0:00:00	0:00:00	0:28:26	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:03:51	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:31:56	0:03:07	0:14:34	0:12:39	0:06:40	0:03:42	0:00:00	0:00:00	0:00:00	0:00:00	0:00:59	0:00:00	103	0	
9:00:00	0:00:03	0:01:37	0:15:25	0:07:49	0:12:14	0:30:40	0:00:00	0:00:00	0:08:42	0:00:06	0:00:02	0:00:04	113	0	Breakfest
10:00:00	0:04:46	0:10:42	0:04:06	0:00:00	0:03:28	0:06:43	0:30:14	0:00:26	0:00:00	0:00:00	0:00:10	0:00:01	316	0	
11:00:00	0:00:37	0:06:46	0:08:47	0:00:00	0:18:27	0:12:11	0:13:11	0:00:00	0:12:16	0:00:00	0:00:00	0:00:00	1273	0	
12:00:00	0:05:49	0:25:46	0:03:49	0:00:00	0:16:30	0:08:05	0:00:00	0:00:00	0:00:00	0:00:00	0:01:16	0:01:39	461	0	Lunch
13:00:00	0:03:13	0:13:00	0:00:46	0:00:33	0:07:33	0:35:27	0:00:00	0:11:56	0:00:00	0:00:00	0:00:12	0:00:05	220	0	
14:00:00	0:00:37	0:05:26	0:01:48	0:00:00	0:03:40	0:11:14	0:37:14	0:00:51	0:00:00	0:00:00	0:00:00	0:00:00	1572	0	
15:00:00	0:06:35	0:01:19	0:32:08	0:30:39	0:03:06	0:16:51	0:00:00	0:08:40	0:30:59	0:00:00	0:00:00	0:00:00	136	0	
16:00:00	0:07:24	0:04:17	0:40:48	0:40:27	0:03:34	0:03:56	0:00:00	0:00:00	0:48:45	0:00:04	0:00:00	0:00:29	93	0	Dinner
17:00:00	0:08:06	0:02:40	0:00:10	0:00:00	0:01:34	0:47:29	0:00:00	0:45:05	0:00:00	0:00:00	0:00:12	0:00:00	30	0	
18:00:00	0:00:13	0:06:44	0:00:31	0:00:23	0:02:00	0:50:31	0:00:00	0:44:02	0:00:00	0:00:00	0:00:22	0:00:02	99	0	
19:00:00	0:00:00	0:07:35	0:00:15	0:00:00	0:00:00	0:52:09	0:00:00	0:43:21	0:00:00	0:00:00	0:00:00	0:00:00	97	0	
20:00:00	0:00:00	0:06:19	0:00:00	0:00:00	0:00:18	0:53:22	0:00:00	0:52:53	0:00:00	0:00:00	0:00:00	0:00:00	25	0	
21:00:00	0:00:00	0:01:53	0:20:49	0:15:54	0:02:07	0:35:10	0:00:00	0:33:45	0:18:59	0:00:00	0:00:00	0:00:27	27	0	
22:00:00	0:00:00	0:00:59	0:52:28	0:52:17	0:05:24	0:01:08	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:08:32	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**1:09:19**	**1:38:10**	**12:14:01**	**11:38:07**	**1:28:28**	**6:08:59**	**1:20:39**	**4:00:59**	**3:40:29**	**0:00:10**	**0:03:13**	**0:02:47**	**4565**	**0**	

TOTAL	Steps:	4565		SLEEP	Total Hrs:	9:16:47					Met?		WEATHER	76/PC	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	5600	N				
	Miles:	2.46							Strategy:	Guilt					
	Calories:	123													

Experiment Day 42 (1/10/2010)

Date:		Sunday, January 10, 2010			Week	6		Home	P						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:58:09	0:57:49	0:01:01	0:00:49	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:57:52	0:57:47	0:01:55	0:00:12	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:01:04	0:03:40	0:26:04	0:00:30	0:22:36	0:06:35	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	123	0	
8:00:00	0:31:48	0:10:09	0:07:35	0:00:00	0:04:53	0:03:02	0:02:32	0:00:00	0:00:00	0:00:04	0:00:06	0:00:14	347	0	Breakfest
9:00:00	0:05:28	0:00:15	0:00:16	0:00:00	0:03:54	0:00:45	0:49:21	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	433	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	258	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	92	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	137	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	99	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	104	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	237	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	190	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	214	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	169	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	88	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	0:38:20	0:14:04	7:29:51	6:56:01	0:34:19	0:11:23	14:51:39	0:00:00	0:00:00	0:00:04	0:00:06	0:00:14	2491	0	

TOTAL	Steps:	2491		SLEEP	Total Hrs:	6:31:25					Met?		WEATHER	79/MS	
	Aerobic:	0			Interupted:	Y		GOAL	Weekly:	5600	N				
	Miles:	1.33							Strategy:	NA					
	Calories:	36													

Experiment Day 43 (1/11/2010)

Date:	Monday, January 11, 2010			Week	7		Home	N							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	296	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	374	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	274	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	34	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	145	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	243	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	222	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	96	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	104	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	113	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	94	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	26	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**2021**	**0**	

TOTAL	Steps:	**2021**		**SLEEP**	Total Hrs:	**NA**				**Met?**		**WEATHER**	**79/MS**
	Aerobic:	**0**			Interupted:	**NA**	**GOAL**	Weekly:	**NA**	**NA**			
	Miles:	**1.08**						Strategy:	**NA**				
	Calories:	**23**											

Experiment Day 44 (1/12/2010)

Date:	Tuesday, January 12, 2010			Week	7		Home	N							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	47	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	166	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	266	0	
11:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	191	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	359	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	232	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	122	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	236	0	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	285	0	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	198	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	142	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	289	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	234	0	
21:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	270	0	
22:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**23:59:36**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**0:00:00**	**3037**	**0**	

TOTAL	Steps:	**3037**		**SLEEP**	Total Hrs:	**NA**					**Met?**		**WEATHER**	**75/MS**
	Aerobic:	**0**			Interupted:	**NA**		**GOAL**	Weekly:	**NA**	**NA**			
	Miles:	**1.62**							Strategy:	**NA**				
	Calories:	**34**												

Experiment Day 45 (1/13/2010)

Date:	Wednesday, January 13, 2010			Week	7		Home	P							
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	169	0	
8:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	227	0	
9:00:00	0:05:40	0:01:56	0:08:32	0:00:00	0:16:04	0:05:50	0:21:57	0:00:00	0:00:00	0:00:00	0:00:00	0:00:05	96	0	
10:00:00	0:01:33	0:00:27	0:09:19	0:00:00	0:06:49	0:14:39	0:27:12	0:00:00	0:00:00	0:00:00	0:00:02	0:00:00	431	0	
11:00:00	0:01:42	0:03:27	0:20:24	0:08:05	0:16:03	0:04:27	0:13:56	0:00:00	0:32:01	0:00:00	0:00:00	0:00:00	1250	0	
12:00:00	0:42:29	0:00:42	0:01:10	0:00:00	0:03:33	0:02:23	0:09:42	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	949	0	
13:00:00	0:36:23	0:07:46	0:04:34	0:00:00	0:06:43	0:04:33	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:21	140	0	Lunch
14:00:00	0:16:00	0:04:53	0:04:51	0:00:00	0:03:54	0:30:21	0:00:00	0:27:18	0:00:00	0:00:00	0:00:00	0:00:00	102	0	
15:00:00	0:00:11	0:00:28	0:05:11	0:00:00	0:00:26	0:36:21	0:17:22	0:35:01	0:00:00	0:00:00	0:00:00	0:00:00	1508	1122	
16:00:00	0:05:08	0:01:08	0:00:00	0:00:00	0:02:34	0:51:09	0:00:00	0:49:01	0:00:00	0:00:00	0:00:00	0:00:04	41	0	
17:00:00	0:00:19	0:06:03	0:00:00	0:00:00	0:02:17	0:51:20	0:00:00	0:38:10	0:00:00	0:00:00	0:01:23	0:00:37	84	0	Dinner
18:00:00	0:00:00	0:02:28	0:00:00	0:00:00	0:02:43	0:54:48	0:00:00	0:53:38	0:00:00	0:00:00	0:00:00	0:00:00	54	0	
19:00:00	0:00:00	0:00:17	0:00:00	0:00:00	0:00:00	0:59:42	0:00:00	0:59:32	0:00:00	0:00:00	0:00:00	0:00:00	16	0	
20:00:00	0:00:00	0:01:43	0:00:00	0:00:00	0:00:25	0:57:51	0:00:00	0:57:06	0:00:00	0:00:00	0:00:00	0:00:02	30	0	
21:00:00	0:00:00	0:01:58	0:47:13	0:45:37	0:08:06	0:02:42	0:00:00	0:00:00	0:50:43	0:00:00	0:00:00	0:00:01	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:01:13	0:55:59	0:55:40	0:01:56	0:00:51	0:00:00	0:00:00	0:23:22	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	1:49:25	0:34:29	3:37:12	2:49:21	1:11:33	6:16:57	10:30:00	5:19:46	1:46:06	0:00:00	0:01:25	0:01:10	5097	1122	

TOTAL	Steps:	5097		SLEEP	Total Hrs:	0:00:00					Met?		WEATHER	59/R	
	Aerobic:	1122			Interupted:	NA		GOAL	Weekly:	5100	N				
	Miles:	2.73							Strategy:	Neutral					
	Calories:	146													

Experiment Day 46 (1/14/2010)

Date:	Thursday, January 14, 2010			Week	7		Home	Y	Incomplete Data; researcher error					
	Room Presence						Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:56	0:59:56	0:00:00	0:00:03	0:00:00	0:00:00	0:50:17	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:57:48	0:57:39	0:01:57	0:00:14	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:12	0:03:08	0:54:58	0:54:34	0:00:26	0:01:15	0:00:00	0:00:00	0:31:18	0:00:04	0:00:34	0:00:15	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	16	0	
7:00:00	0:06:16	0:00:58	0:41:29	0:40:21	0:09:11	0:01:32	0:00:33	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	102	0	
8:00:00	0:19:44	0:05:40	0:16:20	0:00:00	0:07:10	0:10:21	0:00:44	0:00:00	0:00:00	0:00:00	0:00:04	0:00:06	208	0	
9:00:00	0:19:00	0:00:09	0:01:28	0:00:00	0:03:06	0:36:07	0:00:09	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	2127	1474	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	19	0	
11:00:00	0:00:41	0:01:38	0:02:43	0:00:00	0:00:51	0:53:59	0:00:07	0:03:40	0:00:00	0:00:00	0:00:00	0:00:24	578	0	
12:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
13:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	21	0	
14:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	322	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	300	191	
16:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	1317	902	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	258	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
19:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	277	0	
20:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	326	0	
21:00:00	0:00:00	0:00:00	0:43:35	0:43:25	0:00:41	0:15:43	0:00:00	0:00:00	0:13:46	0:00:00	0:00:00	0:00:00	8	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	**0:45:53**	**0:11:33**	**10:38:11**	**10:15:49**	**0:23:22**	**2:59:13**	**0:01:33**	**0:03:40**	**1:35:21**	**0:00:04**	**0:00:38**	**0:00:45**	**5879**	**2567**	

TOTAL	Steps:	5879		SLEEP	Total Hrs:	6:11:02				Met?		WEATHER	76/S/W	
	Aerobic:	2567			Interupted:	Y	GOAL	Weekly:	5100	Y				
	Miles:	3.15						Strategy:	Praise					
	Calories:	172												

Experiment Day 47 (1/15/2010)

Date:	Friday, January 15, 2010			Week	7		Home	Y						
	Room Presence						Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:45:04	0:02:56	0:04:16	0:00:50	0:05:10	0:02:33	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:02	0	0	
5:00:00	0:15:32	0:01:11	0:11:32	0:00:00	0:30:14	0:01:30	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	39	0	
6:00:00	0:25:01	0:07:40	0:21:18	0:00:00	0:03:34	0:02:26	0:00:00	0:00:00	0:00:00	0:00:00	0:00:04	0:00:06	272	0	
7:00:00	0:16:45	0:00:23	0:11:35	0:00:00	0:07:55	0:23:21	0:00:00	0:16:01	0:00:00	0:00:00	0:00:00	0:00:00	172	0	Breakfest
8:00:00	0:25:50	0:01:28	0:00:55	0:00:00	0:12:02	0:04:20	0:15:24	0:00:00	0:00:00	0:00:03	0:00:00	0:00:11	159	0	
9:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	281	0	
10:00:00	0:00:00	0:02:14	0:00:14	0:00:00	0:00:00	0:02:13	0:55:18	0:00:00	0:00:00	0:00:00	0:00:00	0:00:28	850	0	
11:00:00	0:00:00	0:18:34	0:03:11	0:00:00	0:08:47	0:29:27	0:00:00	0:25:09	0:00:00	0:00:00	0:00:08	0:00:26	214	0	
12:00:00	0:01:05	0:09:00	0:03:38	0:00:00	0:06:13	0:19:28	0:20:35	0:00:28	0:00:00	0:00:00	0:00:04	0:00:04	2092	1335	Lunch
13:00:00	0:00:54	0:10:58	0:00:18	0:00:00	0:05:23	0:42:26	0:00:00	0:39:17	0:00:00	0:00:00	0:00:00	0:00:04	54	0	
14:00:00	0:00:00	0:18:13	0:00:29	0:00:00	0:02:06	0:39:11	0:00:00	0:27:15	0:00:00	0:00:00	0:00:17	0:00:51	113	0	
15:00:00	0:00:02	0:01:26	0:00:41	0:00:00	0:01:24	0:56:26	0:00:00	0:49:14	0:00:00	0:00:04	0:00:10	0:00:04	122	0	Dinner
16:00:00	0:00:14	0:00:13	0:01:29	0:00:00	0:02:50	0:27:46	0:27:27	0:14:55	0:00:00	0:00:00	0:00:00	0:00:12	1239	1068	
17:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	169	0	
18:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	7	0	
19:00:00	0:03:58	0:05:23	0:01:17	0:00:00	0:02:34	0:03:55	0:42:52	0:00:00	0:00:00	0:01:39	0:00:00	0:00:22	138	0	
20:00:00	0:14:54	0:30:27	0:00:59	0:00:00	0:01:29	0:12:10	0:00:00	0:06:07	0:00:00	0:09:41	0:00:04	0:00:00	220	0	
21:00:00	0:00:00	0:00:22	0:40:52	0:38:04	0:06:22	0:12:23	0:00:00	0:09:46	0:47:43	0:00:00	0:00:00	0:00:00	19	0	
22:00:00	0:00:00	0:00:36	0:56:49	0:56:33	0:01:55	0:00:39	0:00:00	0:00:00	0:51:03	0:00:00	0:00:00	0:00:06	0	0	
23:00:00	0:00:00	0:00:17	0:59:00	0:58:47	0:00:24	0:00:18	0:00:00	0:00:00	0:35:37	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	2:29:19	1:51:21	7:38:27	6:34:08	1:38:22	4:40:34	5:41:33	3:08:12	2:14:23	0:11:27	0:00:47	0:02:56	6160	2403	

TOTAL	Steps:	6160		SLEEP	Total Hrs:	6:24:17				Met?		WEATHER	72/MS
	Aerobic:	2403			Interupted:	N	GOAL	Weekly:	5100	Y			
	Miles:	3.30						Strategy:	Praise				
	Calories:	170											

Experiment Day 48 (1/16/2010)

Date:	Saturday, January 16, 2010			Week	7		Home	Y							
	Room Presence						Room Activities					Walking			
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:58	0:59:58	0:00:00	0:00:01	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:20	0:57:33	0:57:16	0:01:28	0:00:38	0:00:00	0:00:00	0:46:54	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:34:27	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:28:30	0:01:22	0:23:34	0:23:04	0:05:35	0:00:58	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	40	0	
8:00:00	0:35:37	0:01:35	0:05:40	0:00:00	0:15:32	0:01:35	0:00:00	0:00:00	0:00:00	0:00:03	0:00:06	0:00:03	73	0	Breakfest
9:00:00	0:16:01	0:05:49	0:23:19	0:00:00	0:10:29	0:04:21	0:00:00	0:00:00	0:19:29	0:00:00	0:00:00	0:00:09	176	0	
10:00:00	0:16:29	0:00:35	0:02:00	0:00:00	0:02:16	0:02:06	0:36:33	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	373	0	
11:00:00	0:09:45	0:03:49	0:06:36	0:00:00	0:04:06	0:04:33	0:31:10	0:00:00	0:00:57	0:00:00	0:00:00	0:00:00	1759	0	
12:00:00	0:45:15	0:04:10	0:01:32	0:00:00	0:04:58	0:04:04	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	97	0	
13:00:00	0:18:14	0:25:26	0:03:48	0:00:00	0:06:03	0:06:28	0:00:00	0:00:00	0:00:00	0:00:00	0:00:04	0:01:12	412	0	Lunch
14:00:00	0:01:08	0:03:16	0:06:10	0:00:00	0:08:16	0:30:34	0:10:35	0:13:31	0:00:00	0:00:00	0:00:00	0:00:06	377	0	
15:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	170	0	
16:00:00	0:00:02	0:00:22	0:06:45	0:00:00	0:03:00	0:22:37	0:27:13	0:03:49	0:00:00	0:00:07	0:00:04	0:00:17	453	0	
17:00:00	0:01:53	0:02:11	0:01:27	0:00:00	0:00:00	0:54:28	0:00:00	0:48:17	0:00:00	0:00:00	0:00:00	0:00:05	147	0	
18:00:00	0:00:17	0:01:26	0:00:57	0:00:00	0:00:26	0:56:53	0:00:00	0:53:36	0:00:00	0:00:04	0:00:07	0:00:05	92	0	Dinner
19:00:00	0:05:11	0:00:52	0:26:30	0:23:18	0:05:52	0:21:34	0:00:00	0:17:14	0:24:11	0:00:00	0:00:00	0:00:13	150	0	
20:00:00	0:00:00	0:00:57	0:57:28	0:55:40	0:00:36	0:00:58	0:00:00	0:00:00	0:59:59	0:00:00	0:00:03	0:00:00	58	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:05:17	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	2:58:22	0:52:10	12:43:09	11:39:08	1:08:37	3:31:48	2:45:30	2:16:27	3:11:14	0:00:14	0:00:24	0:02:10	4377	0	

TOTAL	Steps:	4377		SLEEP	Total Hrs:	6:26:01				Met?		WEATHER	70/PC	
	Aerobic:	0			Interupted:	Y	GOAL	Weekly:	5100	N				
	Miles:	2.34						Strategy:	Praise					
	Calories:	110												

Experiment Day 49 (1/17/2010)

Date:	Sunday, January 17, 2010			Week	7			Home	Y						
	Room Presence							Room Activities					Walking		
Hour	Dining Room	Kitchen	BedRm	Bed	BathRm	LivingRm	Outside Home	Couch-TV	TV-BedRm	uWave	Food Cabinet	Fridge	Steps	Aerobic Steps	Meal
0:00:00	0:00:00	0:00:00	0:59:57	0:59:57	0:00:00	0:00:02	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
1:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
2:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
3:00:00	0:00:06	0:03:10	0:50:45	0:49:59	0:05:18	0:00:40	0:00:00	0:00:00	0:35:08	0:00:00	0:01:39	0:00:00	0	0	
4:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:27:23	0:00:00	0:00:00	0:00:00	0	0	
5:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
6:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
7:00:00	0:00:34	0:00:37	0:33:49	0:28:14	0:23:19	0:01:40	0:00:00	0:00:00	0:02:09	0:00:00	0:00:00	0:00:00	30	0	
8:00:00	0:12:57	0:05:46	0:22:00	0:10:16	0:00:43	0:18:33	0:00:00	0:11:05	0:20:11	0:00:04	0:00:08	0:00:06	468	0	Breakfest
9:00:00	0:03:28	0:01:20	0:01:15	0:00:00	0:05:50	0:01:41	0:46:25	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	442	0	
10:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	193	0	
11:00:00	0:05:05	0:01:11	0:05:03	0:00:00	0:08:05	0:21:52	0:18:43	0:13:07	0:00:00	0:00:00	0:00:00	0:00:00	1894	1309	
12:00:00	0:00:57	0:00:12	0:00:28	0:00:00	0:01:14	0:57:08	0:00:00	0:55:25	0:00:00	0:00:00	0:00:00	0:00:00	81	0	
13:00:00	0:00:31	0:02:20	0:01:14	0:00:00	0:07:09	0:48:45	0:00:00	0:42:28	0:00:00	0:00:03	0:00:06	0:00:04	204	0	Lunch
14:00:00	0:00:04	0:00:45	0:01:46	0:00:00	0:02:46	0:51:52	0:02:46	0:40:23	0:00:00	0:00:00	0:00:00	0:00:05	201	0	
15:00:00	0:00:21	0:05:10	0:01:35	0:00:00	0:01:51	0:27:16	0:23:46	0:04:27	0:00:00	0:00:08	0:00:04	0:00:13	471	0	Dinner
16:00:00	0:00:17	0:00:35	0:18:24	0:16:59	0:03:12	0:37:31	0:00:00	0:32:39	0:19:53	0:00:00	0:00:00	0:00:00	166	0	
17:00:00	0:00:00	0:00:30	0:56:27	0:56:15	0:01:57	0:01:05	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	22	0	
18:00:00	0:00:13	0:01:41	0:55:21	0:54:39	0:01:54	0:00:50	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:00	50	0	
19:00:00	0:07:42	0:01:35	0:45:29	0:45:08	0:04:13	0:01:00	0:00:00	0:00:00	0:59:59	0:00:00	0:00:00	0:00:08	0	0	
20:00:00	0:03:38	0:01:46	0:46:39	0:46:15	0:06:46	0:01:10	0:00:00	0:00:00	0:46:57	0:00:00	0:00:00	0:00:00	0	0	
21:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
22:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
23:00:00	0:00:00	0:00:00	0:59:59	0:59:59	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0	0	
Sub Total	0:35:53	0:26:38	14:40:04	14:07:34	1:14:17	4:31:05	2:31:39	3:19:34	5:31:38	0:00:15	0:01:57	0:00:36	4222	1309	
TOTAL	Steps:	4222		SLEEP	Total Hrs:	9:15:11					Met?		WEATHER	63/MS	
	Aerobic:	1309			Interupted:	Y		GOAL	Weekly:	5100	N				
	Miles:	2.26							Strategy:	Praise					
	Calories:	114													

APPENDIX O: PRE AND POST-STUDY SURVEY INSTRUMENT

A Secure Behavior Modification Sensor System for Physical Activity Improvement
Demographic Information

Name: ______________________________

Address: ______________________________

____

Phone Number: ______________________________

Age: ______________

Weight: ______________

Height: ______________

Ethnicity: ______________

Highest Education: ______________

	Male	Female
Gender:	☐	☐

	Good	Poor	If Poor, please describe why.
Health:	☐	☐	______________________________

____

____

____

____

____

A Secure Behavior Modification Sensor System for Physical Activity Improvement
Study Survey

The following are a list of questions that will help me to understand your attitudes, perceptions, or beliefs regarding exercise or physical activity. Exercise or physical activity is defined as your daily walking activity. Regular exercise or regular physical activity is defined as your daily walking activity for 30 minutes or more per day and done at least 3-5 times per week. For example, you could take one, 30-minute walk or take three, 10-minute walks for a daily total of 30 minutes.

Please indicate your best answer by placing a check mark in the appropriate box to each statement or question below. If you disagree with a statement and you are unsure how to answer it, the statement is probably not important to you.

	Yes	No
1. I am currently physically active.	☐	☐

	Yes	No
2. I intend to become more physically active in the next six months.	☐	☐

	Yes	No
3. I currently engage in regular physical activity.	☐	☐

	Yes	No
4. I have been regularly physically activity for the past six months.	☐	☐

Beginning Question: How important are the following opinions in your decision to exercise or not to exercise?	**1** Not important	**2** A little bit Important	**3** Somewhat important	**4** Quite important	**5** Extremely important
5. I would have more energy for family and friends if I exercised regularly.	☐	☐	☐	☐	☐
6. I would feel embarrassed if people saw me exercising.	☐	☐	☐	☐	☐
7. I would feel less stressed if I exercised regularly.	☐	☐	☐	☐	☐
8. Exercise prevents me from spending time with my friends.	☐	☐	☐	☐	☐
9. Exercising puts me a better mood for the rest of day.	☐	☐	☐	☐	☐
10. I feel uncomfortable or embarrassed in exercise clothes.	☐	☐	☐	☐	☐
11. I would feel more comfortable with my body if I exercised regularly.	☐	☐	☐	☐	☐
12. There is too much I would have to learn to exercise.	☐	☐	☐	☐	☐
13. Regular exercise would help me have a more positive outlook on life.	☐	☐	☐	☐	☐

How certain are you that you could overcome the following barriers?

Beginning Question: I can manage to carry out my exercise intentions, …	**1** Very uncertain	**2** Rather uncertain	**3** Rather certain	**4** Very certain
14. …even when I have worries or problems.	☐	☐	☐	☐
15. …even if I feel depressed.	☐	☐	☐	☐
16. …even when I feel tense.	☐	☐	☐	☐
17. …even when I am tired.	☐	☐	☐	☐
18. …even when I am busy.	☐	☐	☐	☐

Instructions: Please respond to each question on the basis of how true that response is to you.	**1** **Not true for me**	**2**	**3**	**4**	**5**	**6**	**7** **Very true for me**
19. Because I want to be physically fit.	☐	☐	☐	☐	☐	☐	☐
20. Because it is fun.	☐	☐	☐	☐	☐	☐	☐
21. Because I like engaging in activities which physically challenge me.	☐	☐	☐	☐	☐	☐	☐
22. Because I want to obtain new skills.	☐	☐	☐	☐	☐	☐	☐
23. Because I want to look or maintain weight so I look better.	☐	☐	☐	☐	☐	☐	☐

Instructions: Please respond to each question on the basis of how true that response is to you.	**1** **Not true for me**	**2**	**3**	**4**	**5**	**6**	**7** **Very true for me**
24. Because I want to be with my friends.	☐	☐	☐	☐	☐	☐	☐
25. Because I like to do this activity.	☐	☐	☐	☐	☐	☐	☐
26. Because I want to improve my existing skills.	☐	☐	☐	☐	☐	☐	☐
27. Because I like the challenge.	☐	☐	☐	☐	☐	☐	☐
28. Because I want to define my muscles so I look better.	☐	☐	☐	☐	☐	☐	☐
29. Because it makes me happy.	☐	☐	☐	☐	☐	☐	☐
30. Because I want to keep my current skill level.	☐	☐	☐	☐	☐	☐	☐
31. Because I want to have more energy.	☐	☐	☐	☐	☐	☐	☐
32. Because I like activities which are physically challenging.	☐	☐	☐	☐	☐	☐	☐

Instructions: Please respond to each question on the basis of how true that response is to you.	**1** **Not true for me**	**2**	**3**	**4**	**5**	**6**	**7** **Very true for me**
33. Because I like to be with others who are interested in this activity.	☐	☐	☐	☐	☐	☐	☐
34. Because I want to improve my cardiovascular fitness.	☐	☐	☐	☐	☐	☐	☐
35. Because I want to improve my appearance.	☐	☐	☐	☐	☐	☐	☐
36. Because I think it is interesting.	☐	☐	☐	☐	☐	☐	☐
37. Because I want to maintain my physical strength to live a healthy life.	☐	☐	☐	☐	☐	☐	☐
38. Because I want to be attractive to others.	☐	☐	☐	☐	☐	☐	☐
39. Because I want to meet new people.	☐	☐	☐	☐	☐	☐	☐
40. Because I enjoy this activity.	☐	☐	☐	☐	☐	☐	☐
41. Because I want to maintain my physical health and well-being.	☐	☐	☐	☐	☐	☐	☐
42. Because I want to improve my body shape.	☐	☐	☐	☐	☐	☐	☐
43. Because I want to get better at my activity.	☐	☐	☐	☐	☐	☐	☐
44. Because I find this activity stimulating.	☐	☐	☐	☐	☐	☐	☐
45. Because I will feel physically unattractive if I do not.	☐	☐	☐	☐	☐	☐	☐
46. Because my friends want me to.	☐	☐	☐	☐	☐	☐	☐
47. Because I like the excitement of participation.	☐	☐	☐	☐	☐	☐	☐
48. Because I enjoy spending time with others doing this activity.	☐	☐	☐	☐	☐	☐	☐

Instructions: Please respond to each question on the basis of how true that response is to you.	**1** Not true	**2** Hardly ever true	**3** Somewhat true	**4** True	**5** Very true
49. I exercise because other people say I should.	☐	☐	☐	☐	☐
50. I feel guilty when I do not exercise.	☐	☐	☐	☐	☐
51. I value the benefits of exercise.	☐	☐	☐	☐	☐
52. I exercise because it is fun.	☐	☐	☐	☐	☐
53. I take part in exercise because my friends, family, or spouse say I should.	☐	☐	☐	☐	☐
54. I feel ashamed when I miss an exercise session.	☐	☐	☐	☐	☐
55. It is important to me to exercise regularly.	☐	☐	☐	☐	☐
56. I enjoy my exercise sessions.	☐	☐	☐	☐	☐
57. I exercise because others will not be pleased with me if I do not.	☐	☐	☐	☐	☐
58. I feel like a failure when I have not exercised in a while.	☐	☐	☐	☐	☐
59. I think it is important to make the effort to exercise regularly.	☐	☐	☐	☐	☐
60. I find exercise a pleasurable activity.	☐	☐	☐	☐	☐
61. I feel under pressure from friends or family to exercise.	☐	☐	☐	☐	☐
62. I get restless if I do not exercise regularly.	☐	☐	☐	☐	☐
63. I get pleasure and satisfaction from participating from exercise.	☐	☐	☐	☐	☐

Scoring Information

Physical Activity States of Change (PASCO)
Precontemplation: Question One = No, Question Two = No
Contemplation: Question One = No, Question Two = Yes
Preparation: Question One = Yes, Question Three = No
Action: Question One = Yes, Question Three = Yes, Question Four = No
Maintenance: Question One = Yes, Question Three = Yes, Question Four = Yes

Decisional Balance (DBS)
PRO's: 5, 7, 9, 11, 13
CON's: 6, 8, 10, 12

Physical Exercise Self-Efficacy Scale (PESES)
14-18: Higher scores represent more confidence in the ability to routinely engage in physical activity while lower scores represent less confidence in ability to routinely engage in physical activity. In this study total scores that ranged from 5 to 12 indicated less confidence in exercise intention and total scores that ranged from 13 to 20 indicated more confidence in exercise intention.

Motives for Physical Activities Measure—Revised (MPAM-R)
Interest/Enjoyment: 20, 25, 29, 36, 40, 44, 47
Competence: 21, 22, 26, 27, 30, 32, 43
Appearance: 23, 28, 35, 38, 42, 45
Fitness: 19, 31, 34, 37, 41
Social: 24, 33, 39, 46, 48

Behavioral Regulation in Exercise Questionnaire (BREQ)
External Regulation: 49, 53, 57, 61
Introjected Regulation: 50, 54, 58,
Indentified Regulation: 51, 55, 59, 62
Intrinsic Motivation: 52, 56, 60, 63

APPENDIX P: INFORMED CONSENT FORM

Informed Consent Form for
"A Secure Behavior Modification Sensor System for Physical Activity Improvement"

You are being asked to participate in a dissertation research project conducted by Alan Price, a student in the School of Information Systems and Technology, Claremont Graduate University (CGU). You are being asked because of your willingness and non-coerced offer to volunteer for the study described below.

PURPOSE: The purpose of this study is to evaluate and better understand the impact of persuasive messages on promoting behavior change associated with non-sports physical activity. A persuasive message is a communication between me and you via an email, physical letter, or other delivery method that includes information about your current and past physical activity, recommendations on how you can improve your physical activity, and motivational messages intended to encourage you to become more active in your life. Physical activity for this study is measured by the number of daily steps that you walk as you move about your daily life.

PARTICIPATION: Your participation in this study is expected to take about three months of your time. You will be asked to daily wear a pedometer (e.g., watch or similar device) during your non-sleep times. The pedometer is used to determine your physical activity. You will be asked to charge the pedometer on a daily basis and typically before you go to bed by simply plugging the pedometer into a standard electrical socket or to a computer using a provided cable. The selected pedometer is designed to send your physical activity data to a computer that will be provided by me and placed in your home (referred to as "your computer" from this point forward). The data will be sent to me by your computer over the Internet and to a secure computer that I will use to study your data and to provide you with messages about your daily physical activity levels. If you do not have an Internet connection, I will provide one to you to use during the study.

Supporting your collected physical activity information as described above, your blood pressure, weight, and how you move about your home though out the day will also be collected. By participating in this study, you will be asked to take your blood pressure and weight reading at least once per week using two provided devices. The blood pressure monitor will require you to simply place an arm cuff around your arm and to press a "Start" button to take a blood pressure reading. The blood pressure device will automatically expand the arm cuff, determine your blood pressure, and deflate the arm cuff once the measurement is done. Your weight will be determined using a typical weight scale. Operating the scale is as simple as stepping on the scale to determine your weight. Each device will be connected to your computer so that your information may be record. This information is tracked to understand how your physical activity may or may not affect your blood pressure and weight.

To understand how you live your daily life (e.g., how much time you spend watching TV, how much time you spend doing low physical activities, how much time you spend in various household rooms, how long you sleep in a day, how many times you open a refrigerator or food cabinet, and how much time you spend using your microwave), I will place various sensors throughout your house. This information is needed to provide you with a clearer picture of how your home-life activities may or may not impact your daily physical activity levels. These devices will be placed discretely so to minimize any unsightly looks in your house. No damage will be done to your home in placing the sensors. All sensors will be connected to your computer so that your daily living patterns may be recorded. If you feel uncomfortable at anytime during the study with having this type of information collected, you may request any or all of the sensors to be removed. No negative feelings will occur from me with meeting this request.

The information collected in this study will be used by me to send you a daily message that contains summary information about changes in your physical activity, blood pressure and weight readings, and daily living patterns. Included in the message will be motivational information and suggestions of how you might improve your daily physical activity. A typical part of the message might look like: "You have walked 0.23 miles more today than yesterday. Great Job! Your health is in your control." You are not required or obligated to follow any improvement suggestion. To receive the message, you will be asked to use a simple email program (e.g., Microsoft Outlook) to open and read an email or to view a computer screen to read a message that will be placed on your computer's desktop. If you do not know how to use a computer, I will provide training to you. You will not be required to respond to any message. In the event that you do not feel comfortable with using a computer, I will provide you with a physical letter that contains the same information as in the email or computer message. Instead of receiving this information on a daily basis, a physical letter may be delivered to you weekly via the U.S. postal service.

You will be asked to complete a simple paper-based survey at the beginning and end of the study. This information will be collected to help me to adjust the study for improvement or to better understand the impact of the study on improving your physical activity. The surveys will not be computer based and you may use a standard pencil or pen to complete the surveys.

This study requires different types of technology to be used. All technology has been selected to be easy for you to use. You will not be responsible for setting up the technology or for maintaining the technology. In the event that a technical problem does occur, you are asked to contact me so that I may correct the problem within 24 hours. This may require me to enter your home. I will contact you to setup a time that is convenient for you to have me enter your home. With the exception of wearing and charging the pedometer, using the blood pressure monitor and weight scales, or opening and reading an email or viewing a computer message, the rest of the technology used in the study will invisible to you.

Once the study is completed, all technology used in the study will be removed and your home will be placed back to its original condition, as prior to the start of the study. Lastly, at the end of the study, you will be given the option of keeping a copy of all the data collected and any conclusion outcomes that may result from the study. The information collected during the three-month study period will be used in my Ph.D. dissertation, which you will be allowed to read upon the completion of the document.

RISKS & BENEFITS: No real or potential risk exists in your participation in this study with the exception of the possible inconvenience to you in carrying a small pedometer throughout your waking day. Since the pedometer is small (e.g., 1.5"(W) x" 2"(H) x 0.5"(D)) and light weight (e.g., approximately the weight of a small watch), this inconvenience is expected to be small. To reduce any inconvenience, you may carry the pedometer in your pocket or on your hip.

The research in this study is expected to benefit the scientific community by increasing the understanding of how computer technology can be used to impact physical activity. The results from the study may be extended to other health or non-health areas including disease prevention and management—i.e., alcoholism, diabetes, and hypertension.

COMPENSATION: Participation in this study is voluntary. You will receive zero ($0) payment compensation for your participation.

VOLUNTARY PARTICIPATION: Please understand that your participation is completely voluntary. Your decision whether or not to participate will in no way affect your current or future relationship with CGU or its faculty, students, or staff. You have the right to withdraw from the research at any time without penalty. You also have the right to refuse to answer any question(s) for any reason, without penalty.

CONFIDENTIALITY: Your individual privacy will be maintained in all publications or presentations resulting from this study. All data collected in the study will be maintained in a secure computer by me.

No data will be shared during or after the study to the research community (e.g., journal publications, conferences, etc.) that will identify you by name or other identifiable marks; confidentiality and anonymity of your information will be strictly maintained, and all physical documents (e.g., completed survey forms) will be shredded upon the completion of the study.

If you have any questions or would like additional information about this research, please contact me at:

Mailing Address	**Phone Number**	**email Address**
Alan Price P.O. Box 5292 Riverside, CA 92517	909-868-4032 (work)	aprice94@yahoo.com (personal) aprice@devry.edu (work)

You may also contact my research collaborator/advisor at:

Mailing Address	**Phone Number**	**email Address**
Dr. Samir Chatterjee 130 East 9th St., Claremont, CA 91711	909-607-4651 (work)	samir.chaterjee@cgu.edu (work)

This study and its procedures have been approved by the Claremont Graduate University Institutional Review Board. This Board is responsible for ensuring the protection of research participants. The CGU Institutional Review Board, which is administered through the Office of Research and Sponsored Programs (ORSP), may be contacted at (909) 607-9406 with any questions.

A signed copy of this consent form will be given to you.

I understand the above information and have had all of my questions about participation on this research project answered. I voluntarily consent to participate in this research.

Signature of Participant ________________________________ Date ____________________

Printed Name of Participant _____________________________

Signature of Researcher ________________________________ Date ____________________