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Injunctive and descriptive norms effect on physical activity

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INJUNCTIVE AND DESCRIPTIVE NORMS

EFFECT ON PHYSICAL ACTIVITY

An Abstract of a Thesis

submitted

in Partial Fulfillment

of the Requirements for the Degree

Master of Arts

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ABSTRACT

Nearly half of adults in the United States do not meet the recommended guidelines for both aerobic and strengthening activities despite the benefits of regular physical activity (National Center for Health Statistics, 2014; US Department of Health and Human Services, 2008). The purpose of the current study was to test whether normative feedback (i.e., descriptive and descriptive plus injunctive norms) affects levels of physical activity. Participants wore a Fitbit Zip pedometer to record exercise behavior and received normative feedback messages sent to their mobile phones. Participants were 52 undergraduate students with a mean age of 18.66 (SD = 0.83); 27 participants were randomly assigned to the descriptive condition and 25 participants were assigned to the descriptive plus injunctive condition. Participants did not increase their number of steps from week one to week two of the study, suggesting that self-monitoring did not have a significant effect on participants' physical activity. Participants below the norm, regardless of condition, did not increase their number of steps for week three and week four of the study after receiving the normative feedback, suggesting that the normative feedback did not have a significant effect on participants' physical activity. Participants above the norm for weeks one and two in the descriptive norm condition did not decrease number of steps for week three and week four of the study after receiving the normative feedback. Participants in the descriptive plus injunctive norm condition did not take more steps than participants in the descriptive norm condition for week three and week four of the study, suggesting that there was not a difference between the two conditions after the normative feedback was delivered. The current study was underpowered and all conclusions are tentative; however, the current study was the first study to use both descriptive and injunctive norms in an attempt to experimentally manipulate physical activity. The current study also incorporated popular and inexpensive technology which could help make exercise interventions more accessible to a diverse population.

Keywords: exercise intervention, focus theory of normative conduct, injunctive, descriptive

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CHAPTER 1

INJUNCTIVE AND DESCRIPTIVE NORMS EFFECT ON PHYSICAL ACTIVITY

Regular physical activity has many physical and psychological benefits such as reduced risks of cardiovascular disease, depression, and obesity, and improved cognitive functioning (Hogan et al., 2013; Kerr et al., 2013; Lee, Blair, & Jackson, 1999; Padilla, Perez, Andres, & Parmentier, 2013; Uebelacker et al., 2013; US Department of Health and Human Services, 2008). To gain optimal health benefits, adults should perform 75 to 150 minutes of moderate to vigorous intensity aerobic exercise per week as well as moderate to high intensity muscle strengthening activities on two or more days of the week (Centers for Disease Control and Prevention, 2014; US Department of Health and Human Services, 2008). In 2012, only 20.8% of American adults met the guidelines for both aerobic and strengthening activities, and 46.6% of American adults met neither the aerobic activity nor the muscle strengthening guidelines (National Center for Health Statistics, 2014).

While physical inactivity is not the sole cause of obesity, physically inactive adults have an increased risk of becoming overweight or obese (US Department of Health and Human Services, 2008). Almost 70% of men and 60% of women in the United States are overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014). Excess body weight has serious health and financial consequences (Field et al., 2001; Finkelstein, Ruhm, & Kosa, 2005; Wright & Aronne, 2012). Obese and overweight adults have an increased risk for developing diabetes, gallstones, hypertension, heart disease, high cholesterol and stroke compared to normal weight adults (Field et al., 2001). The combined direct and indirect costs of obesity, such as doctor's visits and reduced productivity at work, may be as high as $139 billion dollars per year as of 2005 (Finkelstein et al., 2005). Excess body weight and fat are the result of more calories being consumed than expended. Physical activity can help reduce excess weight and help people maintain a stable weight over time, which could reduce the number of overweight or obese adults in the United States and associated health and financial costs (US Department of Health and Human Services, 2008).

Physical inactivity can have a negative impact independent of the excess body weight and fat associated with obesity. Disease and death rates are higher for normal weight adults who are physically inactive and unfit compared to overweight or obese adults who are physically active and fit (Blair & Brodney, 1999; Lee, et al., 1999). Disease and death rates are also higher for overweight or obese adults who are physically inactive and unfit compared to overweight or obese adults who are physically active and fit, even after adjusting for age and other variables such as smoking (Blair & Brodney, 1999). Despite the numerous benefits of physical activity, many American adults are not engaging in the required amount of physical activity to gain maximum health benefits (US Department of Health and Human Services, 2008). Therefore, an efficacious and cost effective exercise intervention is needed to increase the amount of time adults routinely engage in physical activity, which will increase health benefits and decrease the number of overweight and obese adults.

CHAPTER 2

PREVIOUS EXERCISE INTERVENTIONS

The United States Department of Health and Human Services (2008) has offered several methods for exercise interventions including education, workplace-focused interventions, and community-focused interventions. Interventions that use education have focused on areas such as goal setting and educational materials with varying results (Aittasalo, Miilunpalo, Kukkonen-Harjula, & Pasanen, 2006; Agurs-Collins, Kumanyika, Ten Have, & Adams-Campbell, 1997; Conn, Hafdahl, Brown, & Brown, 2008; Tudor-Locke et al., 2014). For example, in an exercise intervention for African American women, participants were provided with extensive educational materials about the effects of diet and physical exercise on diabetes, resulting in significant increases in their amounts of physical activity at a 3-month follow-up. At the 6-month follow up, however, this change was not maintained and physical activity levels were not significantly different from baseline levels (Agurs-Collins et al., 1997). These results suggest that education may be effective in increasing physical activity initially, but the increase is not maintained long term. Given the time and material costs of education interventions, there is a great need for exercise interventions that are cost effective and easily administered.

Several organizations have implemented workplace interventions with varying effects on physical activity (Coleman et al., 1999; John & Norton, 2013; Malik, Blake, & Suggs, 2014). For example, one workplace implemented a 16-week walking program that included a behavioral contract, education, individual meetings, and group walks. The exercise intervention did not increase participants' physical activity to the desired levels nor did it increase physical activity in the desired environment. Employees did not successfully meet the exercise goals of thirty minutes of walking per day nor did they exercise more in the workplace. While participants did exercise more outside of work, the participants' still did not meet the physical activity recommendations set forth by Centers for Disease Control and Prevention (Coleman et al., 1999). These results exemplify the need for exercise interventions that are effective in the desired environments and are personalized to help people meet their individual fitness goals.

Exercise interventions have also focused on the community. Community interventions often use multiple techniques in combination to increase physical activity. These techniques include distributing health messages on the television and radio, increasing social support, and providing education in several settings such as schools and workplaces (Reger et al., 2002; Roux et al., 2008; Young, Haskell, Taylor, & Fortmann, 1996). A community intervention was successful in increasing physical activity; however, these increases were only observed with sedentary adults (Reger et al., 2002). Only 20.6% of American adults meet the guidelines for both aerobic and strengthening activities needed to gain maximum health benefits, suggesting that exercise interventions need to increase physical activity in both sedentary and moderately active adults (US Department of Health and Human Services, 2008).

Several exercise interventions at the personal, workplace, and community levels have successfully increased physical activity; however, the effects of exercise interventions often decline shortly after the intervention ends (Roux et al., 2008). Therefore, other effective techniques and programs to increase physical activity should be explored as many current, group-based interventions are diffuse and largely focus on educational materials.

CHAPTER 3

SELF-MONITORING

Self-monitoring is another technique frequently used in exercise interventions (Aittasalo et al., 2006; Agurs-Collins et al., 1997; Nicklas et al., 2014; Reger et al., 2002; Roux et al., 2008; Tudor-Locke et al., 2014; Young et al., 1996). Self-monitoring is the act of observing and recording one's behavior such as through the use of pen and paper, smartphone applications, or audio recording (Tudor-Locke et al., 2014). Self-monitoring provides individuals with information about the frequency of their behaviors. This information indicates whether the frequency of a behavior is within cultural or self-imposed limits and indicates if the individual should increase or decrease the frequency of his or her behavior (Spates & Kanfer, 1977).

Self-monitoring influences a variety of processes including treatment of depression, smoking cessation, and weight loss (Baker & Kirschenbaum, 1993; Harmon, Nelson, & Hayes, 1980; McFall & Hammen, 1971). For example, individuals with depression engaged in more pleasant activities and experienced fewer depressed moods when noting these activities and mood (Harmon et al., 1980). Self-monitoring also effects health behaviors such as weight loss. In an 18-week cognitive behavioral weight-loss program, weight loss was positively correlated with consistent self-monitoring of food intake (Baker & Kirschenbaum, 1993). These results suggest that self-monitoring is an effective method for behavior change.

Self-monitoring is also frequently used in exercise interventions as the sole, active element of the intervention (Aittasalo et al., 2006; Nicklas et al., 2014; Tudor-Locke et al., 2014). For example, recording spontaneous physical activity increased physical activity and decreased weight gain in a group of sedentary, older adults with increases in physical activity maintained over a 10-month period (Nicklas et al., 2014). Self-monitoring is also used to simply measure the effects of an exercise intervention. For example, individuals completed a weekly walking log to measure the effects of weekly phone calls on the frequency and duration of walking in an exercise intervention. The weekly phone calls were the active component of the exercise intervention and self-monitoring merely a measure of physical activity rather than the sole active component (Lombard, Lombard, & Winett, 1995).

Because self-monitoring is an effective exercise intervention as the sole active component, self-monitoring may account for a portion of any intervention's effectiveness if the intervention uses self-monitoring to measure exercise behavior. The effect of self-monitoring should be considered when analyzing the effectiveness of any exercise intervention that uses self-monitoring as the primary measure of physical activity. Self-monitoring can be an effective, cost-efficient, and easily delivered exercise intervention; however, theory-based exercise interventions should be further explored for effects beyond those of self-monitoring.

Many exercise interventions using self-monitoring, education, community resources, and workplace programs have been successful at increasing physical activity; however, the effects of these techniques are often short-term, limited to a select population, and resource intensive (Agurs-Collins et al., 1997; Reger et al., 2002; Roux et al., 2008). Therefore, there is a pressing need for interventions that are, at the very least, cost effective and easily administered. Social norms may be one additional element that could be used in designing efficient, effective, and theory-based exercise interventions.

CHAPTER 4

SOCIAL NORMS

Social norms dictate what is perceived to be correct or appropriate in certain circumstances and develop from interactions and sanctions within a social network (Cialdini & Trost, 1998). Several theories offer explanations for how social norms generate individual change (Cialdini, Reno, & Kallgren, 1990; Contractor & DeChurch, 2014; Miller & McFarland, 1991). Cialdini and Trost (1998) suggest that the need to be accurate, to affiliate, and to maintain a positive self-concept drive an individual to conform to social norms and change behavior. Social norms develop under the assumption that all members of a group endorse the norm and public behavior is an accurate reflection on internal opinions about the norm (Ahn & Rodkin, 2014).

The structured influence process (SIP) suggests that the process of social influence occurs through social networks and human social motives (Contractor & DeChurch, 2014). Individuals experience discomfort when their attitudes or behaviors are incongruent with the group norms so they typically change their behavior or attitudes to resolve the conflict (Prentice & Miller, 1993). For example, in classrooms with dense social ties, aggressive behavior occurred less frequently when aggressive behavior was associated with the loss of social status compared to classrooms where aggressive behavior was associated with an increase in popularity (Ahn & Rodkin, 2014).

Social networks have been implicated in a variety of negative behaviors including tobacco use, alcohol consumption, and substance use (Duan, Chou, Andreeva, & Pentz, 2009; Fujimoto & Valente, 2012; Neighbors, Larimer, & Lewis, 2004; Rinker &

Neighbors, 2013). Increases in adolescents' own use of tobacco, alcohol, and marijuana are associated with increases in perceived friends' use and peer use (Duan et al., 2009). College students are also more likely to drink heavily when they believe other students at their university also drink heavily (Rinker & Neighbors, 2013).

Recently, social networks have also been implicated in the increased rates of obesity (Christakis & Fowler, 2007; Okun et al., 2003; Valente, Fujimoto, Chou, & Spruijt-Metz, 2009). For example, an individual's risk of obesity increased by 57% when he or she had an obese friend. An individual's risk of obesity was not increased when he or she had an obese neighbor in the geographic area, implying that "social distance" is more important than geographic distance in the rate of obesity (Christakis & Fowler, 2007). College students' perceptions of their friends' physical activity was also a significant predictor of frequency of their own physical activity (Okun et al., 2003). These results suggest that individuals use social norms within their social networks to guide their own health-related behaviors.

Individuals may incorrectly identify the norm of the social network, resulting in pluralistic ignorance. Pluralistic ignorance is the maintenance of misidentified norms resulting from the assumption that public behavior is an accurate reflection of private attitudes (Fields & Schuman, 1976). The majority of group members may reject a norm but incorrectly assume that others accept that norm and behave accordingly. This perpetuates an incorrect norm because an individual may privately reject a norm but still behave in accordance to the rejected norm to avoid discomfort associated with nonconformity (Miller & McFarland, 1991). For example, both male and female undergraduate students overestimate their peers' level of comfort in sexual behaviors without present or future commitment (Cohen & Shotland, 1996; Lambert, Kahn, & Apple, 2003). Undergraduate students also overestimate their peers' acceptance of alcohol use, resulting in the increased availability and use of alcohol in social situations, despite individual rejection of alcohol use (Garnett et al., 2015; Prentice & Miller, 1993).

Distributing accurate social norm information can help correct pluralistic ignorance and alter behavior. Focus theory of normative conduct suggests that increasing the salience of a social norm increases the compliance to that social norm, thereby increasing or decreasing the prevalence of a behavior (Cialdini, Kallgren, & Reno, 1991). Focus theory of normative conduct further states that there are two types of norms, descriptive norms and injunctive norms. A descriptive norm is a person's conscious or unconscious perception of how often a behavior occurs, whereas an injunctive norm is the perception of whether a behavior is culturally acceptable. A descriptive norm can not only increase desired behaviors or decrease undesired behaviors to meet the norm, but it can also decrease desirable behaviors or increase undesirable behaviors to conform to the norm. This is known as the boomerang effect. An injunctive norm can be used to counter the boomerang effect of the descriptive norm (Cialdini, 2003; Cialdini et al., 1990; Schultz, Khazian, & Zaleski, 2008). An injunctive norm can also increase desired behaviors or decrease undesired behaviors to meet the norm; however, an injunctive norm can also provide reinforcement for individuals already meeting the social norm, resulting in continued desired behavior. Unlike a descriptive norm, an injunctive norm not only changes behavior in a desired direction for individuals not meeting the norm, but it also encourages individuals already meeting the norm to continue behaving accordingly.

For example, making students aware of norms for other students' study habits may have several different effects. Students below the norm who received a descriptive norm (e.g., students spend an average of 6 hours per week studying) would likely increase the amount of time the students spent studying in order to meet the norm. Students below the norm who received an injunctive norm (e.g., students should spend 10 hours per week studying) would also increase the time the students spent studying to meet the norm. Both of these effects would be desirable if the goal of delivering normative information was to increase the students' time spent studying. Students above the norm who received the same descriptive norm (e.g., students spend an average of 6 hours per week studying), however, would likely decrease the amount of time the students spent studying in order to meet the norm, an undesirable effect if the goal of delivering normative information was to increase the students' time spent studying. Students above the average who received an injunctive norm (e.g., students should spend 10 hours per week studying) would likely maintain the amount of time they spent studying in order to meet the norm, a desirable or benign effect if the goal of delivering normative information was to increase the students' time spent studying. This example illustrates how an injunctive norm can change behavior in a desired direction as well as avoid behavior change in the undesired direction unlike the descriptive norm.

Schultz, Nolan, Cialdini, Goldstein, and Griskevicius (2007) used normative information to alter households' energy consumption. Households were given information about how much energy they consumed and either a descriptive or injunctive norm. The descriptive norm was of the average energy consumption per household in their community, whereas the injunctive norm was the descriptive norm with an additional sad or happy face to indicate whether the household's above- or below-average energy consumption was culturally acceptable. Households that received the descriptive norm and consumed more energy than average decreased their energy consumption; however, households that received the descriptive norm and consumed less energy than average increased their energy consumption to meet the descriptive norm, which illustrates the boomerang effect (Schultz et al., 2007). The households that consumed more energy than average and received the injunctive norm decreased their energy consumption and the households that consumed less energy than average and received the injunctive norm continued to consume energy at lower than average rates (Schultz et al., 2007).

CHAPTER 5

APPLICATIONS OF FOCUS THEORY OF NORMATIVE CONDUCT

Social-norms marketing campaigns have used focus theory of normative conduct to increase the prevalence of desired behaviors or decrease the prevalence of undesired behaviors by making people aware of social norms (Cialdini et al., 1990). Social-norms marketing campaigns have been used to increase desirable behaviors related to environmental conservation such as energy conservation, recycling, and towel reuse (Burchell, Rettie, & Patel, 2013; Cialdini, 2003; Cialdini et al., 1990; Schultz et al., 2007; Schultz et al., 2008). For example, individuals planned to recycle more in the future after receiving a descriptive and injunctive norm message that recycling was both prevalent and culturally acceptable (Cialdini, 2003).

Social-norms marketing campaigns have also been used to increase desirable behaviors related to health such as sun protection, cancer screenings, and fruit and vegetable intake (Baron et al., 2008; Burger et al., 2010; Mollen, Rimal, Ruiter, & Kok, 2013; Reid & Aiken, 2013; Robinson, Fleming, & Higgs, 2014; Robinson, Harris, Thomas, Aveyard, & Higgs, 2013; Saraiya et al., 2004; Snyder et al., 2004; Wakefield, Loken, & Hornik, 2010; Zikmund-Fisher, Windschitl, Exe, & Ubel, 2011). For example, undergraduate women tended to make snack choices consistent with descriptive norms in a study about healthy eating choices. Women who believed other women had made healthy snack choices also made healthy snack choices (Burger et al., 2010). College students also significantly decreased their consumption of high calorie snack food when given a descriptive norm that read “Students eat less junk food than you might realize.

Most students limit how much junk food they are eating to 1 or less than 1 serving a day.* based on a 2012 study" as compared to receiving a message unrelated to nutrition (Robinson et al., 2013).

Social-norms marketing campaigns have also been used to reduce undesirable behaviors such as alcohol use, smoking, and unhealthy snack choices (Bewick et al., 2013; Broughton & Molasso, 2006; Capone, Wood, Borsari, & Laird, 2007; Merrill, Carey, Reid, & Carey, 2014; Paek & Hove, 2012; Ridout & Campbell, 2014; Wakefield et al., 2010). Social-norms marketing campaigns have been effective at reducing college students' alcohol use (Broughton & Molasso, 2006; Capone et al., 2007; Merrill et al., 2014). College students decrease the quantity and frequency of alcohol use after receiving descriptive and injunctive norms that indicate that their peers actually drink less than the perceived norm (Paek & Hove, 2012; Ridout & Campbell, 2014).

The role of descriptive and injunctive norms has also been investigated in the context of physical activity (Carrell, Hoekstra, & West, 2011; Heinrich, Jokura, & Maddock, 2008; Okun et al., 2003; Rimal, 2008; Rivis & Sheeran, 2003; White, Smith, Terry, Greenslade, & McKimmie, 2009). For example, individuals' perceptions of their friends and family members time spent walking (e.g., the descriptive norm for walking) significantly predicted the amount of time the individual spent walking (Heinrich et al., 2008). College students' perceptions of their friends' physical activity also significantly predicted the frequency of their own physical activity (Okun et al, 2003).

While several studies have shown that social norms are associated with physical activity, few studies have explored the application of focus theory of normative conduct to exercise interventions. Burger and Shelton (2011) found that a descriptive norm message posted near the elevator increased the number of individuals who used the stairs as opposed to the elevator. The increase in number of individuals who used the stairs was upheld for one week after the sign had been removed (Burger & Shelton, 2011). In a mid-sized company, three types of information were distributed via e-mail messages: descriptive norm information, information about the relationship between physical activity and health, and information about the relationship between physical activity and appearance. The descriptive norm information was more effective at increasing physical activity than both information about physical activity and health and physical activity and appearance (Priebe & Spink, 2012). These results suggests that messages about descriptive norms may be effective at increasing physical activity.

Studies that have used social norms as a means to increase physical activity have only used descriptive norms, ignoring an important component of focus theory of normative conduct- injunctive norms (Cialdini, 2003; Cialdini et al., 1990; Burger & Shelton, 2011; John & Norton, 2013; Priebe & Spink, 2012; Schultz et al., 2008). Descriptive norm messages may decrease physical activity. In a large corporation, employees could exercise while working on treadmills attached to their work stations. Employees were randomly assigned to receive weekly emails containing a descriptive norm about the treadmill usage of one other coworker or the usage of four other coworkers for six months. Over the six month period, overall usage of the treadmills declined and usage declined even further for employees that had access to information about the treadmill usage of one or more of their coworkers, illustrating the boomerang effect. The employees conformed to the descriptive norm (i.e., not using the treadmills by decreasing their physical activity), so the intervention was ineffective at increasing the employees' level of physical activity (John & Norton, 2013). These results suggest that including all aspect of focus theory of normative conduct is important in exercise interventions.

Aspects of focus theory of normative conduct have been investigated with respect to physical activity; however, most studies have only explored the relationship between social norms and physical activity rather than using social norms to experimentally increase physical activity (Burger & Shelton, 2011; Carrell et al., 2011; Heinrich et al., 2008; John & Norton, 2013; Okun et al., 2003; Priebe & Spink, 2012; Rimal, 2008; Rivis & Sheeran, 2003; White et al., 2009). While John and Norton (2013) illustrated how focus theory of normative conduct might be used in exercise interventions, the results also illustrated why it is important to consider all aspects of focus theory of normative conduct and include the injunctive norm as well as the descriptive norm.

CHAPTER 6

CURRENT STUDY

The purpose of the current study was to test whether normative feedback (i.e., descriptive and descriptive plus injunctive norms) affects physical activity (i.e., number of steps per week). Participants were randomly assigned to either the descriptive or descriptive plus injunctive norm condition. Participants recorded how often they participated in physical activity for four weeks using the Fitbit Zip pedometer (Fitbit, Inc., 2014) and the MyFitnessPal (MFP) mobile application software (MyFitnessPal Inc., 2014). After recording daily physical activity for two weeks, participants received either descriptive or descriptive plus injunctive feedback through a multimedia messaging service (MMS) sent via email to the participants' mobile phones. Participants continued to record individual physical activity for the remaining two weeks using the MFP application and Fitbit Zip.

Both descriptive and descriptive plus injunctive normative feedback was used in the current study. Both focus theory of normative conduct and results from John and Norton (2013) suggest that physical activity may decrease for those above the norm and that the injunctive norm is needed to counteract the boomerang effect. Results from previous studies also suggest that injunctive norm information may have a stronger effect on behavior in comparison to descriptive norm information (Cialdini, 2003; Schultz et al., 2008). The current study sought to further explore the application of focus theory of normative conduct to increasing physical activity.

Number of steps was used to operationally define physical activity because number of steps is a non-self-report measure of physical activity, and several studies have suggested that self-reported exercise can be subject to over reporting, social desirability, and confusion about self-report of exercise (Brenner & DeLamater, 2014; Shephard, 2003). The Fitbit Zip was also used in conjunction with a self-report measure as the Fitbit Zip pedometer was limited in its ability to capture all of the participants' physical activity such as bicycling or upper body movements (Lee, Kim, & Welk, 2014).

The impact of self-monitoring was also considered in the current study as participants' self-reported physical activity and participants could view their number of steps per day via the pedometer. Several studies have suggested self-monitoring of physical activity alone can increase the frequency and duration of physical activity. Aittasalo and colleagues (2006) also found that self-monitoring physical activity using a diary and pedometer increased physical activity (Aittasalo et al., 2006; Nicklas et al., 2014; Tudor-Locke et al., 2014). Therefore, increases in physical activity could potentially be the result of self-monitoring rather than the effect of receiving normative feedback.

It was expected that normative information would influence motivations to be physically active.

Hypothesis 1: Participants would increase number of steps from week 1 to week 2 of the study as a result of self-monitoring via the Fitbit Zip pedometer.

Hypothesis 2: Regardless of condition (descriptive or injunctive feedback), participants below the norm for weeks 1 and 2 would increase their number of steps for week 3 and week 4 of the study after receiving the normative feedback.

Hypothesis 3: Participants above the norm for weeks 1 and 2 in the descriptive norm condition would decrease number of steps for week 3 and week 4 of the study after receiving the normative feedback.

Hypothesis 4: Participants in the descriptive plus injunctive norm condition would take more steps than participants in the descriptive norm only condition for week 3 and week 4 of the study.

CHAPTER 7

METHOD

Design

The present study used a 2-group repeated measures randomized experimental design with the independent variable being normative feedback type (descriptive or descriptive plus injunctive) and the resulting dependent variable of number of steps.

Participants

Given that a study of this nature had not been conducted, a power analysis could not be used to determine the exact number of participants needed for the proposed study. Several power analyses were conducted with the recommended adequate statistical power (.80) and the effect sizes of studies looking at similar concepts with effect sizes ranging from d = 0.35 (Neighbors et al., 2004) to d = 0.80 (Cialdini et al., 1990). Power analyses of independent and dependent t-tests estimated 12 to 52 participants would be needed for the current study.

Participants were 52 undergraduate students from a Midwestern university, with a mean age of 18.66 (SD = 0.83). A large portion of the participants identified as Caucasian/White (80.8%) and female (86.5 %; see Table 1). Six participants did not come into the lab for debriefing and never returned the Fitbit Zip, seven participants did not respond to the manipulation check (Appendix E), and eight participants reported steps on fewer than 50% of the total days of the current study. Six participants overlapped in at least two of these categories; however, data were not lost for all of these participants as data were retrieved remotely via the Fitbit website. A maximum of 15 participants were removed from analyses due to missing data, failure to respond to the manipulation check, or failure to return the Fitbit Zip. Four participants in the descriptive plus injunctive norm condition had pre-existing health conditions (i.e., asthma and rheumatoid arthritis), whereas no participants in the descriptive norm condition had pre-existing health conditions. Six participants monitored their physical activity before participating in the study; three of these participants were in the descriptive norm condition and three of these participants were assigned to the descriptive plus injunctive norm condition.

Participants were recruited through SONA, a web-based sign up system for research participants in the Psychology department. Participation in this study was completely voluntary as participants can chose from numerous studies to obtain credit hours. Participants received partial course credit plus $10 cash for participation. Participants were also entered into a drawing for one of two $40 Amazon gift cards if they wore the FitBit Zip for 85% of the four weeks (24 of 28 days) and responded to all messages sent out over the course of the 4 weeks. Participants were also entered into a drawing for one of five $10 Amazon gift cards for responding to the two messages containing normative feedback. Participants younger than 18 and participants without a smartphone were excluded from this study.

Procedures and Measures

Fitbit Zip Wireless Activity Tracker (Fitbit Inc., 2014)

The Fitbit Zip wireless activity tracker is a pedometer that tracks number of steps, distance, and calories burned. The Fitbit Zip uploads the information wirelessly to Mac or PC computers via a USB component that plugs into the computer’s USB port. The Fitbit

Zip also syncs to supported mobile phones using Bluetooth. The Fitbit Zip stores minute-by-minute data for seven days and a daily total for 23 days until the device is synced to a computer. Number of steps is displayed on the front screen of the Fitbit Zip.

The Fitbit Zip is a relatively accurate measure of energy expenditure for activities such as sitting, walking, stepping, Wii tennis, and basketball compared to well-established calorimeters that calculate energy expenditure based on oxygen consumption and carbon dioxide production (Dannecker, Sazonova, Melanson, Sazonov, & Browning, 2013; Lee et al., 2014). Energy expenditure measured by the Fitbit Zip was strongly correlated with energy expenditure measured by an established metabolic analyzer, $r = .81$ (Lee et al., 2014). The Fitbit Zip is limited in its ability to accurately measure energy expenditure related to upper body movement and activities such as biking; however, this is a limitation of most consumer-based accelerometers (Lee et al., 2014). While the current study used steps measured by the Fitbit Zip, the Fitbit Zip calculates calories (i.e., energy expenditure) based on number of steps so it follows that number of steps are a moderately accurate measure of physical activity.

In the current study, participants were able to view their daily steps via the Fitbit Zip display screen. Data for every day of the study was not stored on the Fitbit Zip as the Fitbit Zip only stores a daily total for 23 days if the Fitbit Zip is not synced to a computer. Data for the first five days of the study were lost if participants did not sync the Fitbit Zip for the full duration of the study. Data were also lost for the Fitbit Zip if participants did not sync the Fitbit Zip to a computer for the full duration of the study and return the Fitbit Zip to the researchers.

Normative Feedback (Appendix A)

Normative feedback was delivered 15 and 22 days after beginning participation. The normative feedback was calculated based on the number of steps recorded in the previous two week observations of number of steps as recorded by the Fitbit Zip. Participants' steps were viewed and recorded remotely using the Fitbit website (Fitbit Inc., 2014). The normative feedback delivered on day 15 was the average number of steps of all participants for week one and two of the study. The mean number of steps for week one and two, as calculated on day 14, was 98,560.43 (SD = 42078.19). Participants' number of steps were totaled for week one and two. This information was used to create a bar graph that compared the mean number of steps and each participant's number of steps for weeks one and two. A graphic including the bar graph and questions about the graph was created and sent to the participants' mobile phone as a multimedia messaging service (MMS) picture message. Due to a calculation error, participants received comparisons to an average of 63, 639 steps rather than 98, 560.43 steps for the first normative feedback. This resulted in 11 of 52 participants incorrectly receiving feedback that they were above the norm; five of the eleven participants were in the descriptive condition and six participants were in the descriptive plus injunctive condition. Thirty-one of the 52 participants should have received feedback that they were above the norm as all participants had not synced their Fitbits at the time of the norm calculation, resulting in a negatively skewed norm (i.e., skewness of -0.77, SE = 0.33). Forty-two of the 52 participants actually received feedback that they were above the norm.

The calculation error in the first normative feedback message resulted in an unequal number of participants in the above (80.80%) and below (19.20%) the norm comparisons. About 40% of participants should have received feedback that they were below the norm and the other 60% of participants should have received feedback that they were above the norm as the data were negatively skewed. Again, all participants had not synced their Fitbits at the time of the norm calculation so the norm was negatively skewed. The error in the normative feedback message resulted in loss of power to test hypothesis two (i.e., participants below the norm for weeks 1 and 2 would increase their number of steps for week 3 and week 4 of the study after receiving the normative feedback) because there were so few participants that received feedback that they were below the norm.

The normative feedback delivered on day 22 was the average of the number of steps of all participants for week two and three of the study. The mean number of steps for week two and three, as calculated on day 21, was 77317.35 (*SD* = 43514.72). Participants' number of steps were totaled for weeks two and three. This information was again used to create a bar graph that compared the mean number of steps and each participant's number of steps for weeks two and three. Another graphic including the bar graph and questions about the graph was created and sent to the participants' mobile phone as a multimedia messaging service (MMS) picture message.

The descriptive feedback graphic included the bar graph that showed participants their average number of steps per week in comparison to the average number of steps per week for the typical university student. The descriptive plus injunctive feedback graphic also included the bar graph with an additional smiling or frowning emoticon. Schultz and colleagues (2007) used this same manipulation to look at the effects of normative information on energy consumption. The descriptive plus injunctive feedback included a smiling face if the participant's number of steps per week was above the comparison average or a frowning emoticon face if the participant's number of steps was below the comparison average. Normative feedback also included a text based message stating either "Your average number of steps was above the average UNI student's steps" or "Your average number of steps was below the average UNI student's steps." Normative feedback was distributed using a multimedia messaging service (MMS) sent via email to the participants' mobile phones.

In the current study, the participants were informed at the beginning of the study that messages that might be added as a regular part of a fitness-related smartphone application would be sent to them and the researchers would like their feedback about these messages. The questions accompanying the normative feedback served as a manipulation check to ensure that participants received, viewed, and understood the normative feedback (see Appendix A). The purpose of the question "How do your number of steps compare to the typical UNI student this week?" was to ensure the participants attended to the normative feedback. The purpose of "Was this graphic easy to read? If no, why not?" and "Would you use this type of feedback function if it were a regular part of a fitness-related smartphone application?" were to make the cover story more believable. Participants returned their responses electronically.

Forty-four of the 52 participants responded to the question, “How do your number of steps compare to the typical UNI student this week?” for the first normative feedback message. There was a slight discrepancy between participants’ perception of the normative feedback and the normative feedback they received with 71.20% of participants reporting that they were above the norm while 80.80% were actually above the miscalculated norm. Additionally, 13.50% of participants reported they were below the norm and 19.20% of participants were actually below the miscalculated norm. However, this discrepancy is a result of the eight participants who did not respond to the question.

Forty-five of 52 participants responded to the question, “How do your number of steps compare to the typical UNI student this week?” for the second normative feedback message. Again, there was a slight discrepancy between participants’ perception of the normative feedback and the actual normative feedback with 53.80% of participants reporting that they were above the norm and 57.70% were actually above the norm. Additionally, 32.70% of participants reported they were below the norm and 42.30% of participants were actually below the norm. This discrepancy was the result of the seven participants who did not respond to the question and one participant misperceiving that he or she was below the norm.

Forty-five of the 52 participants responded to the question, “Was this graphic easy to read? If no, why not?” for the first normative feedback message. Eighty-four percent of participants reported that the graphic was easy to read, one participant reported that the graphic was not easy to read, and seven participants did not respond to the question.

Forty-three of the 52 participants responded to the question, "Was this graphic easy to read? If no, why not?" for the second normative feedback message. Eighty percent of participants reported that the graphic was easy to read, one participant reported that the graphic was not easy to read, and nine participants did not respond to the question.

Forty-three of the 52 participants responded to the question, "Would you use this type of feedback function if it were a regular part of a fitness-related smartphone application?" for the first normative feedback message. Seventy-five percent of participants reported that they would use this feedback function, four participants reported that they would not use this feedback function, and nine participants did not respond to the question. Forty-two of the 52 participants responded to the question, "Would you use this type of feedback function if it were a regular part of a fitness-related smartphone application?" for the second normative feedback message. Seventy-one percent of participants reported that that they would use this feedback function, five participants reported that they would not use this feedback function, and ten participants did not respond to the question.

MyFitnessPal (MFP) Mobile Application Software (Appendix B)

The MFP (Version 2.10) mobile application software (MyFitnessPal Inc., 2014) is a free, self-report diary application that can be accessed on a mobile phone as well as online. The application enables users to record and track food consumption and physical activity. The physical activity diary feature enables users to choose from over 350 physical activities such as bowling, chin ups, or chopping wood and report the number of minutes of each physical activity. MFP calculates calories expended for each activity based on the activity and amount of time engaged in the activity (MyFitnessPal Inc., 2014). The MFP application is recommended for its content, quality, usability, accessibility, and low cost (Lieffers, Vance, & Hanning, 2014; Lippman, 2013).

In the current study, self-report data were collected via the MFP mobile phone application. Participants were instructed to record physical activity using the MFP mobile phone application at the termination of each activity. The diaries were accessed remotely using the MFP website (MyFitnessPal Inc., 2014). The purpose of the self-report data was to get a clearer description of types of physical activities and intensity of activities that participants engage in as the Fitbit Zip pedometer was limited in its ability to capture all of the participants' physical activity.

Measures

Demographic Questionnaire (Appendix C)

A demographic questionnaire was used to obtain sample characteristics. The questionnaire included items such as age, race, and year in school. The questionnaire also included items about current self-monitoring of physical activity and pre-existing medical conditions that might restrict physical activity. Mobile phone number, carrier, and model was also be included on the demographics questionnaire. This information was used to send the normative feedback messages.

International Physical Activity Questionnaire (IPAQ-L; Appendix D)

The self-administered long form of the IPAQ-L (The International Physical Activity Questionnaire, 2002) is a 27 item self-report measure of physical activity. The IPAQ-L measures five domains of physical activity including job-related physical activity; housework, house maintenance, and caring for family; transportation physical activity; recreation, sport, and leisure-time physical activity; and time spent sitting. For the purposes of this study, the "usual week" and English version of the IPAQ-L was used. Participants were asked to answer questions such as "Not counting any walking you have already mentioned, during a usual week, on how many days do you walk for at least 10 minutes at a time in your leisure time?" Items are fill-in-the blank with number of minutes per day, hours per week, and days per week (The International Physical Activity Questionnaire, 2002).

The questionnaire was found to have good test-retest reliability estimates, ranging from Spearman's $\rho = .79$ to .83 (Craig et al., 2003). The questionnaire was also found to have acceptable concurrent validity, Spearman's $\rho = .55$ to .67, when compared to an accelerometer (device that measures the speed and distance of human movement) and a physical activity log book, respectively. Criterion validity compared to aerobic fitness (maximal oxygen consumption) and anthropometry (body weight, height, and fat percentage) ranged from Spearman's $\rho = .21$ to .25 respectively (Hagstromer, Oja, & Sjostrom, 2006).

For the current study, the IPAQ-L assessed self-reported past physical activity as a control to note any group differences in physical activity prior to the recording of steps via pedometers. The IPAQ-L responses were converted into calories using a standardized formula. These caloric indices were used for all subsequent analysis.

Procedure

Participants signed up for the study via SONA and were then directed to Qualtrics where participants were provided with information about the study, including the purpose, procedures, risks, benefits, confidentiality, and right to refuse or withdraw from the study. After reviewing the information, the participant electronically signed and dated the consent form. Participants completed the first phase of the study individually, outside of the lab via Qualtrics. Participants completed a demographic questionnaire (Appendix C) and the IPAQ-L (The International Physical Activity Questionnaire, 2002; Appendix D) to assess past physical activity before beginning participation in the study.

Next, the participant received instructions about how to download the MyFitnessPal (MFP; Appendix B) application on their phone. The researcher assigned participant a username that did not contain any identifying information about the participant. The participant was also instructed to disconnect all social media settings and set the viewing privileges for users' diary to private to maintain participant confidentiality. The participant was instructed to set a reminder using the application's reminder function that served to remind the participant to log an activity every day. The participant was provided with instructions on how to log a physical activity using the application's physical activity diary feature. The participant was instructed to log every physical activity in the electronic diary immediately after termination of participation in each physical activity. The researcher's contact information was made available for technical difficulties. Participants also signed up for one of four, in-person informational sessions via Qualtrics where they were able to ask questions and receive the Fitbit Zip pedometer.

Upon arrival at the informational session, participants were provided with information about the Fitbit, including the purpose, procedures, risks, benefits, confidentiality, and right to refuse or withdraw. After reviewing the information, the participant signed and dated the consent form. The participant was then issued a Fitbit Zip pedometer as well as information about the Fitbit Zip. The participant was instructed to wear the pedometer daily. The researcher also verbally confirmed that all participants had downloaded the MFP application.

The participant was informed that the researchers would distribute several messages using a multimedia messaging service (MMS) sent via email to the participant’s phones. The participant was informed that the messages might be added as a regular part of a fitness-related smartphone application and the researchers would like his or her feedback about these messages. The participant was asked to respond electronically to questions within messages sent by the researchers. The participant was thanked and dismissed. Participants were instructed to start wearing the pedometers on Thursday, November 6. The first two weeks of the study occurred before Thanksgiving Break. The participants did not wear the Fitbit Zip for the week of Thanksgiving Break (November 21 to November 30). Participants were instructed to start wearing the pedometer again on the Monday after Thanksgiving Break (December 1). On day 15 (Monday, December 1) and day 22 (Monday, December 8) normative feedback was delivered via a MMS message and participants were asked to respond electronically to questions about the normative feedback (Appendix A, E).

On the twenty-ninth day after beginning participation, questions about the participant's perceived compliance were sent via email (see Appendix F). The participant was instructed to respond to these questions electronically with an email message. The email also detailed how to return the Fitbit and receive compensation. Participants were debriefed orally and provided with written information about the purpose of the study when participants returned the Fitbits. Participants were informed that the purpose of the messages they received was to influence their level of physical activity and the messages were not being explored as an addition to a fitness application. Upon returning the Fitbit, participants were thanked and compensated for participating in the current study.

CHAPTER 8

RESULTS

Each individual MFP account was accessed via the MFP website. Minutes of physical activity and type of activity were recorded in SPSS, Version 22.0. The Fitbit Zip pedometer was synced to its respective account when participants returned the Fitbit Zip pedometer using the USB component. Each individual account was then accessed via the Fitbit website and the number of steps was recorded in SPSS, Version 22.0. Pedometer data were collected Monday through Sunday over a 4-week period.

A continuous variable of metabolic equivalent of task (MET) minutes of physical activity per week was calculated for the IPAQ-L as outlined by the scoring protocol. The IPAQ-L assessed participants' self-reported level of physical before participating in the study. Fifty-one of the 52 participants reported physical activity (M = 380833, SD = 3351.863) and one participant did not complete the IPAQ-L. The data were not normally distributed, as assessed by Shapiro-Wilk's test (p = 0.00). There was not a significant difference in MET minutes of physical activity between the descriptive norm condition (Mdn = 4266.00) and the descriptive plus injunctive norm condition (Mdn = 234.00); U(51) = 245.00, p = .10, r = .23. This indicates that there was not a significant difference between the two groups in level of physical activity before the experiment. Fifty-three percent of participants did not meet the requirements for high levels of physical activity (i.e., fewer than a total of 3000 combined-intensity MET-minutes per week or a fewer than a total of 1500 vigorous-intensity MET-minutes per week) indicating that they did not meet the physical activity guidelines set forth by the US Department of Health and Human Services (2008).

Before completing analysis to assess hypotheses, data cleaning was conducted. Frequencies, distributions, and ranges were evaluated, and missing data were identified. Any day without an entry for the MFP data was categorized as missing. Over 90% of the data points were missing for the four weeks of the study. Missing data ranged from 69.23% to 100% of the data points on any particular day of the study so the MFP could not be used in any analyses.

Any day with zero participants' steps was categorized as missing for the Fitbit Zip data. Of 1456 data points (i.e., one data point every day for 52 participants for 28 days), 325 data points were considered missing for the 28 days of the current study which accounted for over 20% of the total data points. The percent of data points considered missing increased following a week-long university holiday; from week one (12.09% of the data points for the week) and two (18.13% of the data points for the week) to week three (28.57% of the data points for the week) and four (30.49% of the data points for the week) of the study. Saturdays (4.33% of the total data points for all 28 days), Sundays (4.19% of the total data points for all 28 days), and Thursdays (3.23% of the total data points for all 28 days) accounted for the largest percentage of missing data points for both conditions compared to the other days of the week (see Table 2). The descriptive norm condition (63.38% of the total missing data points) had more missing data points than the descriptive norm plus injunctive norm condition (36.62% of the total missing data points).

Analyses

Schultz and colleagues (2007) used a series of *t*-tests to analyze differences in energy consumption between two groups that received two messages containing either descriptive norm feedback or a descriptive plus injunctive norm feedback. Short-term change was calculated for the week period between the first and second message. Long-term change was calculated for the 3-week period after the second message (Schultz et al., 2007). The same analytic strategy was used in the current study as the current study attempted to replicate Schultz and colleagues' (2007) work in the context of exercise behavior.

T-tests and non-parametric tests (i.e., Wilcoxon signed-rank tests and Mann-Whitney U tests were used to test the four hypotheses. The symmetry and normality of the data were assessed by Shapiro-Wilk's test and inspection of boxplots for values greater than 1.5 box-lengths from the edge of the box. Participants varied across conditions outside of the independent variable so analyses were run using five different groups of participants to account for differences in results between all recruited participants (n = 52), participants who returned the Fitbit Zip (n = 46), participants who responded to the manipulation check (n = 45), participants who reported steps on at least 50% of the days of the study (n = 44), and participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check (n = 37).

Analyses were run three different ways (i.e., comparing days of the week, weekly averages, and averages based on specific calendar days) in order to explore how the missing data affected the results and different methods for addressing the missing data. First, averages were computed for each participant based on the number of days he or she reported steps. For example, if a participant only reported steps on three of the seven days of the week, the three days were summed and divided by three rather than seven. These weekly averages were compared to test the four hypothesis. Weekly averages were compared to explore differences in the total week based on days that participants reported steps. Computing averages based only on days that participants reported steps helped address missing data for each participant and explore weekly differences accounting for the variance in compliance across participants. Analyses comparing the weekly averages were conducted using all five different participant groups.

Second, corresponding days of the week were compared for the four weeks of the study (e.g., comparing Monday of week one to Monday of week two and so forth). Days of the week were compared to one another because missing data varied across the days of the week and the days of the week may not have been different at random (e.g., a Monday is different from a Friday due to schedules, obligations, upcoming free time). Pairwise deletion was used to exclude any case that contained missing data for a particular day (i.e., no steps were recorded for the day). Analyses comparing the days of the week were conducted using all five different participant groups.

Third, analyses were conducted after the days accounting for the largest percentage of missing data points were removed. Saturdays (4.33% of the total data points for all 28 days), Sundays (4.19% of the total data points for all 28 days), and Thursdays (3.23% of the total data points for all 28 days) were dropped from all four weeks of the study as these days accounted for the largest percentage of missing data points for both conditions compared to the other days of the week (see Table 2). All participants who did not return the Fitbit Zip, did not respond to the manipulation check, and did not report steps on at least 50% of the days of the study were also removed from analyses (n = 37). These analyses were the more conservative treatment of the data as all participants that varied on the grouping criteria were removed as well as the largest portion of missing data. These analyses reduced the chances of making a type II error.

Hypothesis One

Overall differences in number of steps from week one to week two as well as differences from week one to week two for either condition, the descriptive norm or the injunctive norm condition, were analyzed. The first hypothesis was not supported as there was not a statistically significant increase in number of steps from week one to week two. Significant findings for hypothesis one were opposite of the predicted direction for all analyses for all participant groupings.

Comparison of Weekly Averages (Table 3)

There was a statistically significant decrease in number of steps from week one to week two for both conditions for all five participant groupings. There was also a statistically significant decrease in number of steps from week one to week two for the injunctive condition for all five participant groupings. There was a significant decrease in number of steps from week one to week two for the descriptive condition for participants who returned the Fitbit Zip (*n* = 46) and participants who responded to the manipulation check (*n* = 45), but not for all recruited participants (*n* = 52), participants who reported steps on at least 50% of the days of the study (*n* = 44), or for participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check (*n* = 37).

Comparison of Days (Tables 4-8)

There was a statistically significant decrease in number of steps from week one to week two for both conditions on Monday for all participant groupings except participants who responded to the manipulation check (*n* = 45). There was also a statistically significant decrease in number of steps from week one to week two for both conditions on Wednesday for participants who responded to the manipulation check (*n* = 45; see Table 6). There was a statistically significant decrease in number of steps from week one to week two for both conditions on Friday for all recruited participants (*n* = 52; see Table 4), participants who returned the Fitbit Zip (*n* = 46; see Table 5), and participants who reported steps on at least 50% of the days of the study (*n* = 44; see Table 7), but not for and participants who responded to the manipulation check (*n* = 45) or for participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check (*n* = 37). There was a significant decrease in number of steps from week one to week two on Sunday for participants who responded to the manipulation check (*n* = 45; see Table 6) and participants who returned the Fitbit Zip (*n* = 46; see Table 5).

There was a statistically significant decrease in number of steps from week one to week two for the descriptive condition on Monday for all participant groupings (see Tables 4-8). There was also a statistically significant decrease in number of steps from week one to week two for the descriptive condition on Tuesday for participants who responded to the manipulation check (*n* = 45; see Table 6).

There was a statistically significant decrease in number of steps from week one to week two for the injunctive condition on Monday for participants who returned the Fitbit Zip (*n* = 46; see Table 5). There was a statistically significant decrease in number of steps from week one to week two for the injunctive condition on Wednesday for participants who responded to the manipulation check (*n* = 45; see Table 6). There was a statistically significant decrease in number of steps from week one to week two for the injunctive condition on Friday for all participant groupings (see Tables 4-8).

There was also a statistically significant decrease from week one to week two for the injunctive condition for all five participant groupings. There was a significant decrease from week one to week two for the descriptive condition for participants who returned the Fitbit Zip (n = 46) and participants who responded to the manipulation check (*n* = 45), but not for all recruited participants (*n* = 52), participants who reported steps on at least 50% of the days of the study (*n* = 44), or for participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check (*n* = 37).

Comparison of Averages minus Thursday, Saturday, and Sunday (Table 9)

There was a statistically significant decrease in number of steps from week one to week two for both conditions but not for the descriptive or injunctive condition independently. Of 32 participants who reported steps for both weeks one and two, 10 participants increased number of steps from week one to week two, whereas 22 participants decreased number of steps from week one to week two. A Wilcoxon signed-rank test determined that there was a statistically significant decrease in steps from week one (*Mdn* = 3695.50) to week two (*Mdn* = 32602.5), $T = 133.00$, $p = .014$, $r = .31$ (see Table 9).

Hypothesis Two

The second hypothesis that, regardless of condition (descriptive or injunctive feedback), participants below the norm for weeks one and two would increase their number of steps for week three and week four of the study after receiving the normative feedback was not supported. There were not enough participants below the norm who reported steps in the descriptive condition and the injunctive for weeks two, three, and four for the comparison of the days of the week or a comparison of averages with Thursday, Saturday, and Sunday removed.

Comparison of Weekly Averages (Table 10)

There were not enough participants below the norm who reported steps in the descriptive condition for weeks two and three for the comparison of weekly averages. Weeks three and four could be compared for all recruited participants ($n = 52$) and participants who reported steps on at least 50% of the days of the study (n = 44) in the descriptive condition. There were no significant increases or decreases for the descriptive condition from week three to week four and the test statistics were the same for both participant groupings.

There were no significant increases or decreases for the injunctive condition from week two to week three or from week three to week four. Test statistics were the same for all five participant groupings for week two to week three and week three to week four.

Hypothesis Three

The third hypothesis that participants above the norm for weeks one and two in the descriptive norm condition would decrease number of steps for week three and week four of the study after receiving the normative feedback was partially supported as participants reported fewer steps overall for weeks three and four for the comparison of days (see Tables 11-13).

Comparison of Weekly Average (Table 11)

There were no significant increases or decreases from week two to week three or from week three to week four for any of the five participant groupings.

Comparison of Days (Table 12)

There was a statistically significant decrease in number of steps from week two to week three on Friday for participants who responded to the manipulation check (n = 45) and participants who reported steps on at least 50% of the days of the study (n = 44; see Table

12). There was also a statistically significant decrease in number of steps from week three to week four on Monday for all five participant groupings (see Table 12).

Comparison of Averages minus Thursday, Saturday, and Sunday (Table 13)

There were no significant increases or decreases from week two to week three or from week three to week four.

Hypothesis Four

The final hypothesis that participants in the descriptive plus injunctive norm condition would take more steps than participants in the descriptive norm condition for week three and week four of the study was not supported (see Tables14-17).

Comparison of Weekly Averages (Table 14)

There were no significant increases or decreases from week three to week four.

Comparison of Days (Tables 15-16)

There was a statistically significant decrease from week three to week four on Thursday for all five participant groupings.

Comparison of Averages minus Thursday, Saturday, and Sunday (Table 17)

There were no significant increases or decreases from week three to week four.

CHAPTER 9

DISCUSSION

The purpose of the current study was to test the effects of normative feedback on physical activity. Participants were randomly assigned to either the descriptive or descriptive plus injunctive norm condition and physical activity was measured for four weeks using the Fitbit Zip pedometer. It was hypothesized that normative information would influence motivations to be physically active. Forty-six of 52 participants responded to at least one of the three questions accompanying both normative feedback messages (Appendix A), suggesting that 88% of the participants received and viewed both normative feedback messages.

Participants did not increase their number of steps from week one to week two of the study as hypothesized. These results suggest that self-monitoring did not have a significant effect on participants' physical activity. Although participants could view their number of daily steps via the Fitbit Zip display screen, participants were not instructed to monitor their number of steps or use the information provided by the Fitbit Zip in any manner. Participants were simply instructed to wear the Fitbit Zip pedometer daily and did not receive any feedback regarding their steps for the first two weeks of the current study. Participants were also instructed to record physical activity in the MyFitnessPal application; however, fewer than 50% of participants recorded physical activity in the MyFitnessPal application on any given day of the current study. Participants were not instructed to actively monitor their physical activity via the Fitbit Zip and the results suggest that participants did not monitor their physical activity via the

MyFitnessPal application, which may explain why self-monitoring did not increase the participants' physical activity in the current study.

Participants below the norm, regardless of condition (descriptive or injunctive feedback) for weeks one and two, did not increase their number of steps for week three and week four of the study after receiving the normative feedback. This may be a result of the timing of the study. Thanksgiving break occurred between weeks two and three of the study, so the participants had a week long university holiday during which they were not required to wear the Fitbit pedometer and missing data increased after the break. The number of steps also decreased after the week long holiday. This may also be a result of increased stress and decreased leisure time as weeks three and four of the study were the two weeks before the university's final exams.

Participants above the norm for weeks one and two in the descriptive norm condition did not significantly decrease number of steps for week three and week four of the study after receiving the normative feedback. While participants did decrease number of steps, results were not significant and the decrease in steps is likely a consequence of the decrease in number of total steps in both conditions after the week long university holiday. Participants were not required to wear the Fitbit Zip during the holiday break which may have disrupted the participants' routine of wearing the Fitbit daily. The two weeks of the study after the normative feedback were also the two weeks before the university's final exam so the decrease in number of steps may also be a reflection of increased stress and decreased leisure time.

Participants in the descriptive plus injunctive norm condition did not take more steps than participants in the descriptive norm condition for week three and week four of the study. There was not a significant difference between the two conditions for either week three or week four of the study. Again, this may be a result of the increase in missing data and overall decrease in number of steps after the normative feedback. Focus theory of normative conduct also suggests that individuals above the norm will either maintain or increase the frequency of a desired behavior after receiving injunctive norm feedback (Cialdini et al., 1991). If participants in the injunctive norm condition maintained number of steps after receiving injunctive norm feedback, their number of overall steps might not exceed the number of steps of the participants in the descriptive norm condition.

These results suggest that it may be the case that focus theory of normative conduct cannot successfully be applied to exercise behaviors. This, however, is inconsistent with previous research as descriptive norm information has been used successfully to alter other health behaviors such as sun protection, cancer screenings, alcohol use, smoking, unhealthy snack choices, and fruit and vegetable intake (Baron et al., 2008; Bewick et al., 2013; Broughton & Molasso, 2006; Burger et al., 2010; Capone et al., 2007; Merrill et al., 2014; Mollen et al., 2013;Paek & Hove, 2012; Reid & Aiken, 2013; Ridout & Campbell, 2014; Robinson et al., 2013; Robinson et al., 2014; Saraiya et al., 2004; Snyder et al., 2004; Wakefield et al., 2010; Zikmund-Fisher et al., 2011). Descriptive norm interventions have also been used with moderate success in previous exercise interventions (Burger & Shelton, 2011; John & Norton, 2013; Priebe & Spink, 2012). In the current study, the descriptive norm was not effective at increasing participants' physical activity, which is inconsistent with both focus theory of normative conduct and previous research. These results are likely the result of missing data and lack of power.

Previous research also suggests that technology is an effective means for delivering exercise interventions. Several studies have successfully used technology such as email or online social media to distribute educational materials, social norm information, and social support and increase physical activity levels (Croteau, 2004; Fjeldsoe, Miller, Graves, Barnett, & Marshall, 2015; John & Norton, 2013; Priebe & Spink, 2012; Valle, Tate, Mayer, Allicock, & Cai, 2013). Technology has also been used to improve self-monitoring and deliver more immediate feedback in order to improve weight loss treatments. Individuals who used electronic diaries and received immediate feedback lost more weight than individuals who used traditional pencil and paper diaries as well as individuals who used electronic diaries without immediate feedback when self-monitoring food intake and physical activity (Burke et al., 2011).

In the current study, participants reported that they would use the feedback and they reported that the technology was easy to use. These results suggest that smartphones and pedometers may be an appealing and user-friendly method for administering exercise interventions. Additionally, many smartphones are now equipped with built-in pedometers; however, few studies that used pedometers within smartphones reported accuracy measurements for them. Studies that did report accuracy measurements reported average-to-high levels of accuracy for recording physical activity (Bort-Roig, Gilson, Puig-Ribera, Contreras, & Trost, 2014). Using pedometers built into smartphones may be a method for reducing missing data as participants would only have to remember to carry their cellphone rather than an additional recording device. Pedometers built into smartphones also automatically sync with several smartphone applications which would further reduce missing data.

Despite the lack of significant results, the current study contributes to the literature by further exploring the application of focus theory of normative conduct and the use of technology in order to increase physical activity. The current study was the first study to use both descriptive and injunctive norms in an attempt to experimentally manipulate physical activity. The current study employed popular and inexpensive technology to record participants' physical activity and deliver the intervention. Participants responded positively to the feedback, with over 70% of participants reporting that the normative feedback messages were easy to read and that they would use the feedback function if it were a regular component of a fitness application. The current study also sought to use both self-report and non-self-report measures of physical activity to accurately capture participants' physical activity.

Limitations

There are several limitations to the current study. First, the current study was underpowered. The initial sample size was small ($n = 52$) and participants were removed due to participants who did not return the Fitbit Zip ($n = 6$), participants who did not respond to the manipulation check ($n = 7$), and participants who did not report steps on at least 50% of the days of the study ($n = 8$). Additionally, the calculation error in the first normative feedback message caused a number of participants to receive incorrect feedback that they were above the norm. This decreased the number of participants who received feedback that they were below the norm and, in turn, limited power due to a small number of participants below the norm. This restricted the ability to test the second hypothesis that participants below the norm, regardless of condition (descriptive or injunctive feedback), would increase their number of steps for week three and week four of the study after receiving the normative feedback.

In addition to a small sample size, there was a large amount of missing data (i.e., over 20%). The missing data resulted from a lack of compliance in wearing the Fitbit Zip pedometer and recording physical activity in the MFP application. The study coincided with a major holiday and a week-long university break, during which participants were not required to wear the Fitbit Zip. The percentage of missing data was greater after the holiday. The normative feedback was delivered on the first Monday after the university holiday; however, there was no personal interaction with the researchers at this time. The university holiday and lack of interaction with the researchers may have decreased the salience of participating in the current study resulting in decreased compliance. Participants were also awarded credits before the completion of the study due to the semester deadline for credit completion, which may have decreased the participants' motivation to participate in the study. Participants received ten dollars compensation and further incentives were offered contingent on participation; however, participants did not receive compensation until the end of the study. Future research should explore alternative incentive programs that offer more immediate rewards as well as continuous monitoring, especially over the occurrence of holidays. Monitoring physical activity would not only continue the daily habit of using a pedometer but also provide important information about changes in physical activity during holidays and times when individuals are less likely to exercise.

Another limitation of the current study was the participants' noncompliance with recording physical activity in the MyFitnessPal application. In the compliance check, only seven of 52 participants reported that they recorded physical activity in the smartphone application. Participants may not have reported physical activity due to lack of incentives to use the MyFitnessPal application. The MyFitnessPal application was an additional and potentially time consuming component of the current study; however, no additional incentives were offered for compliance with reporting physical activity in the MyFitnessPal application. Future research should explore an incentive system for self-report of exercise. Participants might not have found the smartphone application useful or easy to use and the compliance check did not assess for willingness to use the application or usefulness of the application. Future research should assess the variety of self-report and self-monitoring applications available for smartphones on several dimensions such as user preference, ease of use, familiarity with the application, and design of the application.

Additionally, the current study did not measure or address participants' motivation to be more physical active. Previous research using social norms to experimentally manipulate exercise behavior used community samples rather than university samples (Burger & Shelton, 2011; John & Norton, 2013; Priebe & Spink, 2012). Participants from community samples may be more motivated to increase physical activity before a manipulation because community samples have fewer external motivators for participation (i.e., completing credit hours as is the case with participants in a university sample). Because the purpose of an exercise intervention is to increase physical activity for individuals who are not meeting exercise guidelines, baseline motivation for exercise is very important. Future research should assess baseline motivation and explore methods for increasing motivation not only for physical activity but also participation in an exercise intervention.

Future Directions

Several limitations of the current study, such as the error in normative feedback and the timeline, could be corrected by future research. Future research on the application of focus theory of normative conduct to exercise interventions should include random assignment, a larger sample size, and accurate normative feedback. Future research should also further explore incentive and compensation programs as well as time periods. Missing data was another limitation that could be addressed by future research. The missing data resulted from a lack of compliance in wearing the Fitbit Zip pedometer and recording physical activity in the MFP application. Future research should explore the use of pedometers built into smartphones as well as other self-report applications available for smartphones.

Several of the limitations of the current study suggest that this study as well as other exercise interventions lack crucial components that address motivation and compliance. Several factors influence a decision, and social norms appear to be only a small piece of the puzzle in a life-long behavior change such as physical activity. According to Rivis and Sheeran (2003), descriptive norms only increased participants' intention to exercise by five percent after taking attitude, injunctive norm, and perceived behavioral control into account. Additional components may need to be added to create an effective intervention especially an intervention that maintains gains long term

Further research should also investigate the role of social norms in larger wellness campaigns. Several exercise interventions are being offered at the community level, and social norms may be an important component in creating widespread change. Social norm feedback messages have already been successfully applied at larger community levels to decrease energy consumption. For example, the Sacramento Municipal Utility Pilot was launched in 2008 and provided 35,000 households with normative feedback via postal mail and Opower Inc. (a cloud-based software used by utility companies and customers). At the six month follow, there was a 2.5% reduction in energy consumption (Schultz, 2010). Future research should explore how social norm feedback can be applied to exercise in conjunction with other components that address barriers such as motivation, availability, and perceived importance at the community level. Creating a social environment that is favorable for increased levels of physical activity may be an important factor in creating life-long, sustainable increase in physical activity.

Implications

In the United States, almost 70% of men and 60% of women are overweight or obese, and excess body weight has serious health and financial consequences (Field et al., 2001; Finkelstein et al., 2005; Wright & Aronne, 2012). Regular physical activity could help increase quality of life and address causes and symptoms of disease. Regular physical activity should be better integrated into treatment, which requires further research about the most effective exercise interventions and how to maintain physical activity gains long term. While the current study was underpowered and all conclusions are tentative, the current study incorporated popular and inexpensive technology that could help make exercise interventions more accessible to a diverse population. Effective and accessible interventions could help reduce the rates of overweight and obese adults which could aid in increasing the health and quality of life for a substantial portion of the United States.

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Table 1

Sample Characteristics

Variable	Total	Percentage (%)
Sex		
Female	42	80.8
Male	10	19.2
Race		
Caucasian/White	45	86.5
Asian/Asian American	6	11.5
Pacific Islander	1	1.9
Age		
18	22	42.3
19	17	32.7
Missing	8	15.4
20	4	7.7
22	1	1.9
Academic Standing		
Freshman	44	84.6
Sophomore	4	7.7
Junior	2	3.8
Senior	1	1.9
Other	1	1.9
Native Language		
English	48	92.3
Chinese	1	1.9
Korean	1	1.9
Russian	1	1.9
Vietnamese	1	1.9
Phone Carrier		
Verizon	25	48.1
US Cellular	15	28.8
Sprint	4	7.7
I-Wireless	4	7.7
AT&T	3	5.8
Phone Operating System		
iOS	40	76.9
Android	12	23.1
Pre-existing Health Condition		
None	48	92.3
Asthma	3	5.8
Rheumatoid Arthritis	1	1.9

Table 2

Missing Data Frequencies

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total Missing	Total Data Points	Percent Missing
Week 1	7	5	6	7	4	7	8	44	364	12.09
Week 2	8	13	9	9	5	9	13	66	364	18.13
Week 3	10	12	10	14	18	23	17	104	364	28.57
Week 4	13	7	13	17	14	24	23	111	364	30.49
Total Missing	38	37	38	47	41	63	61	325	1456	22.32
Total Data Points	208	208	208	208	208	208	208			
Percent Missing	2.61	2.54	2.61	3.23	2.82	4.33	4.19			

Table 3

Hypothesis One, Comparison of Weekly Averages

		Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	Shapiro-Wilk *p*
Both Conditions	*n* = 52	*Mdn* = 8455.93	*Mdn* = 7511.29	*T*(47) = 261.00	.001*	*r* = .33	13	34	.024*
	n = 46	*Mdn* = 8492.00	*Mdn* = 7416.42	*T*(42) = 162.00	.000*	*r* = .39	10	32	.019*
	n = 45	*Mdn* = 8492.00	*Mdn* = 7416.42	*T*(42) = 162.00	.000*	*r* = .39	10	32	.019*
	n = 44	*Mdn* = 8558.50	*Mdn* = 7514.86	*T*(44) = 232.00	.002*	*r* = .33	12	32	.038*
	n = 37	*Mdn* = 8625.00	*Mdn* = 7410.33	*T*(37) = 108.00	.000*	*r* = .43	8	29	.038*
Descriptive	*n* = 52	*M* = 8436.43 *SD* = 1639.34	*M* = 7935.00 *SD* = 1398.38	*t*(22) = 1.349	.191	*d* = .28		*M* = 501.44 *SD* = 1782.09	-269.20, 1272.07
	n = 46	*M* = 8594.95 *SD* = 1583.62	*M* = 7769.12 *SD* = 1380.39	*t*(18) = 2.786	.012*	*d* = .64		*M* = 825.83 *SD* = 1292.20	203.01, 1448.65
	n = 45	*M* = 8594.95 *SD* = 1583.62	*M* = 7769.12 *SD* = 1380.39	*t*(18) = 2.786	.012*	*d* = .64		*M* = 825.83 *SD* = 1292.20	203.01, 1448.65
	n = 44	*M* = 8387.03 *SD* = 1626.78	*M* = 7874.73 *SD* = 1402.77	*t*(20) = 1.261	.222	*d* = .28		*M* = 512.30 *SD* = 1862.16	-335.34, 1359.95
	n = 37	*M* = 8387.03 *SD* = 1626.78	*M* = 7874.73 *SD* = 1402.77	*t*(20) = 1.261	.222	*d* = .28		*M* = 512.30 *SD* = 1862.16	-335.34, 1359.95
Injunctive	*n* = 52	*M* = 8130.89 *SD* = 2468.45	*M* = 6716.47 *SD* = 2257.35	*t*(23) = 2.665	.014*	*d* = .54		*M* = 1414.42 *SD* = 2599.81	316.61, 2512.22
	n = 46	*M* = 8102.51 *SD* = 2519.92	*M* = 6656.80 *SD* = 477.22	*t*(22) = 2.613	.016*	*d* = .54		*M* = 1445.71 *SD* = 2653.61	298.20, 2593.22
	n = 45	*M* = 8102.51 *SD* = 2519.92	*M* = 6656.80 *SD* = 477.22	*t*(22) = 2.613	.016*	*d* = .54		*M* = 1445.71 *SD* = 2653.61	298.20, 2593.22
	n = 44	*M* = 8276.20 *SD* = 2416.70	*M* = 6833.97 *SD* = 2231.78	*t*(22) = 2.606	.016*	*d* = .54		*M* = 1442.23 *SD* = 2654.59	294.30, 2590.16
	n = 37	*M* = 8253.13 *SD* = 2470.98	*M* = 6776.93 *SD* = 2267.07	*t*(21) = 2.553	.019*	*d* = .54		*M* = 1476.20 *SD* = 2711.93	273.80, 2678.61

Note. CI = confidence interval. n = 52 (all recruited participants), n = 46 (participants who returned the Fitbit Zip), n = 45 (participants who responded to the manipulation check), n = 44 (participants who reported steps on at least 50% of the days of the study), n = 37 (participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check).

*p < .05

Table 4

Hypothesis One, Comparison of Days, All Recruited Participants (n = 52)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
Both Conditions	Monday	*Mdn* = 9399.00	*Mdn* = 7696.50	*T*(41) = 238.00	.013*	*r* = .28	16	25		.003*
	Tuesday	*Mdn* = 8169.00	*Mdn* = 7245.00	*T*(38) = 240.50	.059	*r* = .22	14	24		.025*
	Wednesday	*Mdn* = 8167.50	*Mdn* = 8009.00	*T*(41) = 328.00	.184	*r* = .15	17	24		.001*
	Thursday	*M* = 9243.69 *SD* = 3323.20	*M* = 8757.29 *SD* = 3894.13	*t*(44) = 0.857	.396	*d* = .13		*M* = 486.40 *SD* = 3807.04	-371.52, 1934.32	.083
	Friday	*M* = 9384.13 *SD* = 3985.56	*M* = 8036.02 *SD* = 3033.81	*t*(45) = 2.043	.047*	*d* = .30		*M* = 1348.11 *SD* = 4474.87	429.78, 3057.20	.069
	Saturday	*M* = 5741.98 *SD* = 3486.99	*M* = 4876.51 *SD* = 2704.24	*t*(40) = 1.275	.210	*d* = .20		*M* = 865.46 *SD* = 4345.80	-677.98, 2277.40	.258
	Sunday	*Mdn* = 4767.00	*Mdn* = 4912.00	*T*(35) = 225.00	.140	*r* = .18	15	20		.036*
Descriptive	Monday	*M* = 9544.33 *SD* = 3531.84	*M* = 8007.62 *SD* = 3375.93	*t*(20) = 2.859	.010*	*d* = .66		*M* = 1536.71 *SD* = 2463.20	415.48, 2657.95	.432
	Tuesday	*M* = 10659.89 *SD* = 4500.33	*M* = 9380.63 *SD* = 4628.07	*t*(18) = 1.059	.304	*d* = .50		*M* = 1279.26 *SD* = 5264.42	-1258.11, 3816.63	.156

(table continues)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro -Wilk *p*
	Wednesday	*Mdn* = 8167.50	*Mdn* = 8871.00	*T*(19) = 97.00	.936	*r* = .01	10	9		.015*
	Thursday	*M* = 9498.82 *SD* = 2748.60	*M* = 9261.27 *SD* = 3520.85	*t*(21) = .263	.795	*d* = .24		*M* = 217.55 *SD* = 3876.90	-501.38, 1936.47	.99
	Friday	*M* = 9317.74 *SD* = 3723.85	*M* = 8775.52 *SD* = 2974.59	*t*(22) = .521	.607	*d* = .26		*M* = 542.22 *SD* = 4988.52	-614.92, 2699.42	.096
	Saturday	*M* = 5621.45 *SD* = 2308.07	*M* = 4974.60 *SD* = 3124.60	*t*(19) = .770	.451	*d* = .11		*M* = 646.85 *SD* = 3754.84	-110.47, 2404.17	.186
	Sunday	*Mdn* = 4574.50	*Mdn* = 4685.50	*T*(16) = 64.00	.836	*r* = .04	8	8		.008*
Injunctive	Monday	*Mdn* = 9000.00	*Mdn* = 9039.50	*T*(20) = 78.00	.313	*r* = .16	9	11		.035*
	Tuesday	*M* = 8247.42 *SD* = 098.93	*M* = 7421.95 *SD* = 431.69	*t*(18) = .629	.537	*d* = .14		*M* = 825.47 *SD* = 719.91	-931.44, 3582.38	.079
	Wednesday	*M* = 8893.73 *SD* = 210.14	*M* = 7621.86 *SD* = 797.55	*t*(21) = 1.412	.173	*d* = .30		*M* = 1271.86 *SD* = 225.00	-601.39, 3145.12	.096
	Thursday	*Mdn* = 7859.00	*Mdn* = 7249.00	*T*(23) = 81.00	.083	*r* = .26	7	*16*		.023*

(table continues)

Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*	Day
	Friday	*Mdn* = 8737.50	*Mdn* = 6904.00	*T*(23) = 47.00	.006*	*r* = .41	6	*17*		.019*
	Saturday	*M* = 5856.76 *SD* = 385.09	*M* = 4783.10 *SD* = 309.08	*t*(20) = .998	.330	*d* = .22		*M* = 1073.67 *SD* = 927.95	-1169.5, 3316.84	.143
	Sunday	*M* = 6387.95 *SD* = 242.67	*M* = 4737.26 *SD* = 430.39	*t*(18) = 1.929	.070	*d* = .44		*M* = 1650.68 *SD* = 3729.90	-147.07, 3448.43	.410

Note. CI = confidence interval.

*p < .05

Table 5

Hypothesis One, Comparison of Days, Participants Who Returned the Fitbit Zip (n = 46)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
Both Conditions	Monday	*Mdn* = 9466.00	*Mdn* = 7836.50	*T*(38) = 200.00	.013*	*r* = .25	14	24		.005*
	Tuesday	*M* = 9307.11 *SD* = 3825.72	*M* = 7938.80 *SD* = 3889.91	*t*(34) = 1.628	.113	*d* = .28		*M* = 1368.31 *SD* = 4971.71	-339.53, 3076.16	.095
	Wednesday	*M* = 9151.41 *SD* = 3270.82	*M* = 8087.24 *SD* = 3281.46	*t*(36) = 1.709	.096	*d* = .28		*M* = 1064.16 *SD* = 3788.53	-199.00, 2327.32	.121
	Thursday	*M* = 9576.83 *SD* = 3375.49	*M* = 8795.43 *SD* = 3755.20	*t*(39) = 1.371	.178	*d* = .22		*M* = 781.40 *SD* = 3604.94	-371.52, 1934.32	.170
	Friday	*M* = 9488.93 *SD* = 4082.15	*M* = 7745.44 *SD* = 2922.63	*t*(40) = 2.682	.011*	*d* = .42		*M* = 1743.49 *SD* = 4162.07	429.78, 3057.20	.270
	Saturday	*M* = 5613.82 *SD* = 3589.27	*M* = 4814.11 *SD* = 2774.33	*t*(37) = 1.097	.280	*d* = .18		*M* = 799.71 *SD* = 4495.68	-677.98, 2277.40	.372
	Sunday	*M* = 6304.97 *SD* = 3165.43	*M* = 4953.27 *SD* = 2335.28	*t*(32) = 2.122	.042*	*d* = .37		*M* = 1351.70 *SD* = 3659.43	54.12, 2649.28	.071
Descriptive	Monday	*M* = 9715.11 *SD* = 3633.45	*M* = 8111.89 *SD* = 3567.37	*t*(17) = 2.805	.012*	*d* = .66		*M* = 1603.22 *SD* = 424.97	397.31, 2809.13	.702
	Tuesday	*M* = 10565.50 *SD* = 3146.78	*M* = 8552.56 *SD* = 4407.47	*t*(15) = 2.016	.062	*d* = .50		*M* = 2012.80 *SD* = 993.74	-115.18, 4141.05	.998
	Wednesday	*M* = 9529.33 *SD* = 3434.37	*M* = 8769.80 *SD* = 2308.96	*t*(14) = .932	.367	*d* = .24		*M* = 759.53 *SD* = 156.68	-988.58, 2507.64	.804
	Thursday	*M* = 10357.71 *SD* = 2523.25	*M* = 9525.12 *SD* = 2948.84	*t*(16) = 1.002	.331	*d* = .24		*M* = 832.59 *SD* = 425.87	-928.832, 2594.01	.945
	Friday	*M* = 9538.00 *SD* = 3887.76	*M* = 8319.06 *SD* = 2836.19	*t*(17) = 1.123	.277	*d* = .26		*M* = 1218.94 *SD* = 603.93	-1070.54, 3508.43	.537
	Saturday	*M* = 5313.71 *SD* = 2362.67	*M* = 4852.41 *SD* = 3336.39	*t*(16) =.473	.643	*d* = .11		*M* = 461.29 *SD* = 20.23	-1605.72, 2528.31	.445

(table continues)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro -Wilk *p*
	Sunday	*Mdn* = 5064.00	*Mdn* = 4459.00	*T*(14) = 46.00	.683	*r* = .08	7	7		.022*
Injunctive	Monday	*Mdn* = 9000.00	*Mdn* = 9039.50	*T*(20) = 78.00	.313	*r* = .16	9	11		.035*
	Tuesday	*M* = 8247.42 *SD* = 4098.93	*M* = 7421.95 *SD* = 3431.69	*t*(18) = .629	.537	*d* = .14		*M* = 825.47 *SD* = 719.91	-1931.44, 3582.38	.079
	Wednesday	*M* = 8893.73 *SD* = 3210.14	*M* = 7621.86 *SD* = 3797.55	*t*(21) =1.412	.173	*d* = .30		*M* = 1271.86 *SD* = 225.00	-601.39, 3145.12	.096
	Thursday	*Mdn* = 7859.00	*Mdn* = 7249.00	*T*(23) = 81.00	.083	*r* = .26	7	*16*		.023*
	Friday	*Mdn* = 8737.50	*Mdn* = 6904.00	*T*(23) = 47.00	.006*	*r* = .41	6	*17*		.019*
	Saturday	*M* = 5856.76 *SD* = 4385.09	*M* = 4783.10 *SD* = 2309.08	*t*(20) = .998	.330	*d* = .22		*M* = 1073.67 *SD* = 927.95	-1169.5, 3316.84	.143
	Sunday	*M* = 6387.95 *SD* = 3242.67	*M* = 4737.26 *SD* = 2430.39	*t*(18) = 1.929	.070	*d* = .44		*M* = 1650.68 *SD* = 3729.90	-147.07, 3448.44	.410

Note. CI = confidence interval.

*p < .05

Table 6

Hypothesis One, Comparison of Days, Participants Who Responded To the Manipulation Check (n = 45)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro -Wilk *p*
Both Conditions	Monday	*Mdn* = 9082.00	*Mdn* = 7588.00	*T*(36) = 193.00	.28	*r* = .26	14	22		.005*
	Tuesday	*M* = 9757.71 *SD* = 4361.79	*M* = 8175.82 *SD* = 4126.40	*t*(33) = 1.825	.077	*d* = .31		*M* = 1581.88 *SD* = 055.55	-182.08, 3345.85	.127
	Wednesday	*Mdn* = 8373.00	*Mdn* = 7245.00	*T*(34) = 163.50	.022*	*r* = .28	11	23		.002*
	Thursday	*M* = 9226.39 *SD* = 3384.30	*M* = 8513.54 *SD* = 3895.93	*t*(40) = 1.270	.211	*d* = .20		*M* = 712.85 *SD* = 592.86	-421.19, 1846.90	.078
	Friday	*M* = 9267.78 *SD* = 4041.55	*M* = 8047.20 *SD* = 3142.92	*t*(40) = 1.696	.098	*d* = .26		*M* = 1220.59 *SD* = 607.05	-233.58, 2674.75	.079
	Saturday	*M* = 5617.69 *SD* = 3620.30	*M* = 4689.53 *SD* = 2460.32	*t*(35) = 1.301	.202	*d* = .22		*M* = 928.17 *SD* = 282.00	-520.66, 2376.99	.100
	Sunday	*M* = 6419.29 *SD* = 3163.40	*M* = 4923.94 *SD* = 2368.26	*t*(30) = 2.229	.033*	*d* = .40		*M* = 1495.36 *SD* = 735.91	125.01, 2865.70	.155
Descriptive	Monday	*M* = 9297.59 *SD* = 3841.05	*M* = 7740.41 *SD* = 3627.97	*t*(16) = 2.609	.019*	*d* = .63		*M* = 1557.18 *SD* = 461.01	291.84, 2822.51	.831
	Tuesday	*M* = 11524.50 *SD* = 3935.38	*M* = 8962.50 *SD* = 4706.28	*t*(15) = 2.617	.019*	*d* = .65		*M* = 2562.00 *SD* = 3915.73	475.455, 4648.55	.981
	Wednesday	*Mdn* = 8167.50	*Mdn* = 8871.00	*T*(16) = 73.00	.796	*r* = .05	9	7		.007*
	Thursday	*M* = 9396.84 *SD* = 2747.15	*M* = 8884.63 *SD* = 3408.96	*t*(18) = .660	.518	*d* = .15		*M* = 512.21 *SD* = 384.92	-1119.27, 2143.69	.784
	Friday	*M* = 9123.42 *SD* = 3687.82	*M* = 8961.00 *SD* = 3090.62	*t*(18) = .136	.893	*d* = .03		*M* = 162.42 *SD* = 195.04	-2341.51, 2666.35	.118

(table continues)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro -Wilk *p*
	Saturday	*Mdn* = 5378.00	*Mdn* = 4082.00	*T*(16) = 38.00	.121	*r* = .27	3	13		.006*
	Sunday	*Mdn* = 5064.00	*Mdn* = 4459.00	*T*(13) = 30.00	.279	*r* = .21	5	8		.042*
Injunctive	Monday	*Mdn* = 8918.00	*Mdn* = 8633.00	*T*(19) = 77.00	.469	*r* = .12	9	10		.028*
	Tuesday	*M* = 8187.22 *SD* = 4209.11	*M* = 7476.56 *SD* = 3522.68	*t*(17) = .514	.614	*d* = .12		*M* = 710.67 *SD* = 863.17	-2205.02, 3626.35	.140
	Wednesday	*M* = 8837.00 *SD* = 3278.09	*M* = 7450.38 *SD* = 3792.56	*t*(20) = 1.480	.155	*d* = .32		*M* = 1386.62 *SD* = 294.06	-568.01, 3341.25	.084
	Thursday	*Mdn* = 8095.50	*Mdn* = 6971.00	*T*(22) = 65.00	.046*	*r* = .30	6	16		.009*
	Friday	*Mdn* = 8316.00	*Mdn* = 6879.00	*T*(22) = 46.00	.009*	*r* = .39	6	16		.023*
	Saturday	*M* = 5919.55 *SD* = 4489.32	*M* = 4755.25 *SD* = 2365.44	*t*(19) = 1.034	.314	*d* = .23		*M* = 1164.30 *SD* = 037.98	-1193.55, 3522.15	.230
	Sunday	*M* = 6393.50 *SD* = 3336.59	*M* = 4664.33 *SD* = 2479.37	*t*(17) = 1.921	.072	*d* = .45		*M* = 1729.17 *SD* = 821.86	-171.40, 3629.73	.394

Note. CI = confidence interval.

*p < .05

Table 7

Hypothesis One, Comparison of Days, Participants Who Reported Steps on at Least 50% of Days (n = 44)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro -Wilk *p*
Both Conditions	Monday	*Mdn* = 9466.00	*Mdn* = 7751.00	*T*(41) = 238.00	.013*	*r* = .28	16	25		.003*
	Tuesday	*Mdn* = 8271.00	*Mdn* = 7202.00	*T*(38) = 240.50	.059	*r* = .22	14	24		.025*
	Wednesday	*Mdn* = 8167.50	*Mdn* = 8223.50	*T*(40) = 321.00	.232	*r* = .13	17	23		.001*
	Thursday	*M* = 9468.02 *SD* = 3306.16	*M* = 8834.40 *SD* = 3882.05	*t*(41) = 1.070	.291	*d* = .17		*M* = 633.62 *SD* = 837.89	-562.35, 1829.59	.062
	Friday	*M* = 9578.58 *SD* = 4031.62	*M* = 8007.84 *SD* = 2950.99	*t*(42) = 2.357	.023*	*d* = .36		*M* = 1570.74 *SD* = 370.44	225.72, 2915.77	.202
	Saturday	*M* = 5741.98 *SD* = 3486.99	*M* = 4876.51 *SD* = 2704.25	*t*(40) = 1.275	.210	*d* = .20		*M* = 865.46 *SD* = 345.80	-506.24, 2237.17	.258
	Sunday	*Mdn* = 5038.00	*Mdn* = 4877.00	*T*(35) = 225.00	.140	*r* = .18	15	20		.036*
Descriptive	Monday	*M* = 9544.33 *SD* = 3531.84	*M* = 8007.62 *SD* = 3375.93	*t*(20) = 2.859	.010*	*d* = .62		*M* = 1536.71 *SD* = 463.20	415.48, 2657.95	.432
	Tuesday	*M* = 10659.89 *SD* = 4500.33	*M* = 9380.63 *SD* = 4628.07	*t*(18) = 1.059	.304	*d* = 24		*M* = 1279.26 *SD* = 264.42	-1258.11, 3816.63	.156
	Wednesday	*Mdn* = 8075.00	*Mdn* = 9055.50	*T*(18) = 92.00	.777	*r* = .05	10	8		.027*
	Thursday	*M* = 9743.95 *SD* = 2759.93	*M* = 9226.00 *SD* = 3568.50	*t*(19) = .599	.556	*d* = .13		*M* = 517.95 *SD* = 869.18	-1292.88, 2328.78	.992
	Friday	*M* = 9523.48 *SD* = 3804.76	*M* = 8627.62 *SD* = 2853.69	*t*(20) = .854	.403	*d* = .19		*M* = 895.86 *SD* = 804.51	-1291.13, 3082.85	.227
	Saturday	*M* = 5621.45 *SD* = 2308.07	*M* = 4974.60 *SD* = 3124.65	*t*(19) = .770	.451	*d* = .17		*M* = 646.85 *SD* = 754.84	-1110.47, 2404.17	.186
	Sunday	*Mdn* = 4834.00	*Mdn* = 4459.00	*T*(16) = 225.00	.836	*r* = .04	8	8		.008*

(table continues)

Injunctive	Monday	*Mdn* = 9082.00	*Mdn* = 9039.50	*T*(20) = 78.00	.313	*r* = .16	9	11		.035*
	Tuesday	*M* = 8247.42 *SD* = 4098.93	*M* = 7421.95 *SD* = 3431.69	*t*(18) = .629	.537	*d* = .14		*M* = 825.47 *SD* = 719.91	-1931.44, 3582.38	.079
	Wednesday	*M* = 8893.73 *SD* = 3210.14	*M* = 7621.86 *SD* = 3787.55	*t*(21) = 1.412	.173	*d* = .30		*M* = 1271.86 *SD* = 225.00	-601.39, 3145.12	.096
	Thursday	*Mdn* = 8332.00	*Mdn* = 7501.50	*T*(22) = 77.00	.1108	*r* = .24	7	15		.035*
	Friday	*Mdn* = 9308.50	*Mdn* = 6929.00	*T*(22) = 45.00	.008*	*r* = .40	6	16		.033*
	Saturday	*M* = 5856.76 *SD* = 4385.09	*M* = 4783.10 *SD* = 2309.08	*t*(20) = .998	.330	*d* = .22		*M* = 1073.67 *SD* = 927.95	-1169.51, 3316.84	.143
	Sunday	*M* = 6387.95 *SD* = 3242.67	*M* = 4737.26 *SD* = 2430.39	*t*(18) = 1.929	.070	*d* = .44		*M* = 1650.68 *SD* = 729.90	-147.07, 3448.44	.410

Note. CI = confidence interval.

*p < .05

Table 8

Hypothesis One, Comparison of Days, Participants Who Returned the Fitbit Zip, Reported Steps on At Least 50% of Days, Responded to the Manipulation Check (n = 37)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro -Wilk *p*
Both Conditions	Monday	*Mdn* = 9466.00	*Mdn* = 7751.00	*T*(41) = 238.00	.013*	*r* = .28	16	25		.003*
	Tuesday	*Mdn* = 8271.00	*Mdn* = 7202.00	*T*(38) = 240.50	.059	*r* = .22	14	24		.025*
	Wednesday	*Mdn* = 8167.50	*Mdn* = 8223.50	*T*(40) = 321.00	.232	*r* = .13	17	23		.001*
	Thursday	*M* = 9468.02 *SD* = 3306.16	*M* = 8834.40 *SD* = 3882.05	*t*(41) = 1.070	.291	*d* = .17		*M* = 633619 *SD* = 837.89	-562.35, 1829.59	.062
	Friday	*M* = 9578.58 *SD* = 4031.62	*M* = 8007.84 *SD* = 2950.99	*t*(42) = 2.357	.023*	*d* = .34		*M* = 1507.74 *SD* = 370.44	225.72, 2915.77	.202
	Saturday	*M* = 5741.98 *SD* = 3486.99	*M* = 4876.51 *SD* = 2704.25	*t*(40) = 1.275	.210	*d* = .20		*M* = 865.46 *SD* = 345.80	-506.24, 2237.17	.258
	Sunday	*Mdn* = 5038.00	*Mdn* = 4877.00	*T*(35) = 225.00	.140	*r* = .18	15	20		.036*
Descriptive	Monday	*M* = 9544.33 *SD* = 3531.84	*M* = 8007.62 *SD* = 3375.93	*t*(20) = 2.859	0.10*	*d* = .62		*M* = 1536.71 *SD* = 463.20	415.48, 2657.95	.432
	Tuesday	*M* = 10659.89 *SD* = 4500.33	*M* = 9380.63 *SD* = 4628.07	*t*(18) = 1.059	.304	*d* = .24		*M* = 1279.23 *SD* = 264.42	-1258.11, 3816.63	.156
	Wednesday	*Mdn* = 8075.00	*Mdn* = 9055.50	*T*(18) = 92.00	.777	*r* = .05	10	8		.027*
	Thursday	*M* = 9743.95 *SD* = 2759.93	*M* = 9226.00 *SD* = 3568.50	*t*(19) = .599	.556	*d* = .13		*M* = 517.950 *SD* = 869.18	-1292.88, 2328.78	.992
	Friday	*M* = 9523.48 *SD* = 3804.76	*M* = 8627.62 *SD* = 2853.69	*t*(20) = .854	.403	*d* = .19		*M* = 895.86 *SD* = 804.51	-1291.13, 3082.85	.227
	Saturday	*M* = 5621.45 *SD* = 2308.07	*M* = 4974.60 *SD* = 3124.65	*t*(19) = .770	.451	*d* = .17		*M* = 646.85 *SD* = 754.84	-1110.47, 2404.17	.186
	Sunday	*Mdn* = 4834.00	*Mdn* = 4459.00	*T*(16) = 225.00	.836	*r* = .04	8	8		.008*

(table continues)

	Day	Week 1	Week 2	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro -Wilk *p*
Injunctive	Monday	*Mdn* = 9082.00	*Mdn* = 9039.50	*T*(20) = 78.00	.313	*r* = .16	9	11		.035*
	Tuesday	*M* = 8247.42 *SD* = 4098.93	*M* = 7421.95 *SD* = 3431.69	*t*(18) = .629	.537	*d* = .14		*M* = 825.47 *SD* = 719.91	-1931.44, 3582.38	.079
	Wednesday	*M* = 8893.73 *SD* = 3210.14	*M* = 7621.86 *SD* = 3787.55	*t*(21) = 1.412	.173	*d* = .30		*M* = 1271.86 *SD* = 225.00	-601.39, 3145.12	.096
	Thursday	*Mdn* = 8332.00	*Mdn* = 7501.50	*T*(22) = 77.00	.108	*r* = .24	7	15		.035*
	Friday	*Mdn* = 9308.50	*Mdn* = 6929.00	*T*(22) = 45.00	.008*	*r* = .40	6	16		.033*
	Saturday	*M* = 5856.76 *SD* = 4385.09	*M* = 4783.10 *SD* = 2309.08	*t*(20) = .998	.330	*d* = .22		*M* = 1073.67 *SD* = 927.95	-1169.51, 3316.84	.143
	Sunday	*M* = 6387.95 *SD* = 3242.67	*M* = 4737.26 *SD* = 2430.39	*t*(18) = 1.929	.070	*d* = .44		*M* = 1650.68 *SD* = 729.90	-147.07, 3448.44	.410

Note. CI = confidence interval.

*p < .05

Table 9

Hypothesis One, Comparison of Averages Minus Thursday, Saturday, and Sunday (n = 37)

	Week 1	Week 2	Test Statistic	p value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
Both	*Mdn* = 36958.50	*Mdn* = 32602.500	*T*(32) = 133.00	.014*	*r* = .31	10	22		.016*
Descriptive	*M* = 36614.14 *SD* = 9649.14	*M* = 35085.71 *SD* = 7909.85	*t*(13) = 0.572	.577	*d* = .15		*M* = 1528.43 *SD* = 9994.12	-242.01, 7298.86	.106
Injunctive	*M* = 37641.56 *SD* = 1162.76	*M* = 31548.78 *SD* = 9224.02	*t*(17) = 1.844	.083	*d* = .15		*M* = 6092.78 *SD* = 14016.40	-877.41, 13062.97	.101

Note. CI = confidence interval.

*p < .05

Table 10

Hypothesis Two, Descriptive and Injunctive, Comparison of Weekly Averages

Injunctive		Week 2	Week 3	Test Statistic	*p* value	Effect size	Decrease	CI (95%)	Shapiro-Wilk *p*
	$n = 52$	$M = 4051.47$ $SD = 488.54$	$M = 5352.33$ $SD = 1623.65$	$t(2) = -1.146$	.370	$d = .66$	$M = -1300.86$ $SD = 1965.26$	-6182.84, 3581.12	.522
	$n = 46$	$M = 4051.47$ $SD = 488.54$	$M = 5352.33$ $SD = 1623.65$	$t(2) = -1.146$	.370	$d = .66$	$M = -1300.86$ $SD = 1965.26$	-6182.84, 3581.12	.522
	$n = 45$	$M = 4051.47$ $SD = 488.54$	$M = 5352.33$ $SD = 1623.65$	$t(2) = -1.146$	.370	$d = .66$	$M = -1300.86$ $SD = 1965.26$	-6182.84, 3581.12	.522
	$n = 44$	$M = 4051.47$ $SD = 488.54$	$M = 5352.33$ $SD = 1623.65$	$t(2) = -1.146$	.370	$d = .66$	$M = -1300.86$ $SD = 1965.26$	-6182.84, 3581.12	.522
	$n = 37$	$M = 4051.47$ $SD = 488.54$	$M = 5352.33$ $SD = 1623.65$	$t(2) = -1.146$	.370	$d = .66$	$M = -1300.86$ $SD = 1965.26$	-6182.84, 3581.12	.522
Descriptive		Week 3	Week 4	Test Statistic	*p* value	Effect size	Decrease	CI (95%)	Shapiro-Wilk *p*
	$n = 52$	$M = 7275.73$ $SD = 3750.93$	$M = 6185.31$ $SD = 1628.29$	$t(2) = 0.468$	.686	$d = .27$	$M = 1090.42$ $SD = 4034.67$	-8932.26, 11113.11	.855
	$n = 44$	$M = 7275.73$ $SD = 3750.93$	$M = 6185.31$ $SD = 1628.29$	$t(2) = 0.468$	.686	$d = .27$	$M = 1090.42$ $SD = 4034.67$	-8932.26, 11113.11	.855
Injunctive		Week 3	Week 4	Test Statistic	*p* value	Effect size	Decrease	CI (95%)	Shapiro-Wilk *p*
	$n = 52$	$M = 5036.14$ $SD = 1647.31$	$M = 4976.58$ $SD = 1533.09$	$t(9) = 0.171$	.868	$d = .05$	$M = 59.57$ $SD = 1099.12$	-726.69, 845.83	.134
	$n = 46$	$M = 5036.14$ $SD = 1647.31$	$M = 4976.58$ $SD = 1533.09$	$t(9) = 0.171$	.868	$d = .05$	$M = 59.57$ $SD = 1099.12$	-726.69, 845.83	.134
	$n = 45$	$M = 5036.14$ $SD = 1647.31$	$M = 4976.58$ $SD = 1533.09$	$t(9) = 0.171$	.868	$d = .05$	$M = 59.57$ $SD = 1099.12$	-726.69, 845.83	.134

(table continues)

Injunctive	Week 2	Week 3	Test Statistic	*p* value	Effect size	Decrease	CI (95%)	Shapiro-Wilk *p*
n = 44	*M* = 5036.14 *SD* = 1647.31	*M* = 4976.58 *SD* = 1533.09	*t*(9) = 0.171	.868	*d* = .05	*M* = 59.57 *SD* = 1099.12	-726.69, 845.83	.134
n = 37	*M* = 5036.14 *SD* = 1647.31	*M* = 4976.58 *SD* = 1533.09	*t*(9) = 0.171	.868	*d* = .05	*M* = 59.57 *SD* = 1099.12	-726.69, 845.83	.134

Note. CI = confidence interval. n = 52 (all recruited participants), n = 46 (participants who returned the Fitbit Zip), n = 45 (participants who responded to the manipulation check), n = 44 (participants who reported steps on at least 50% of the days of the study), n = 37 (participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check).

*p < .05

Table 11

Hypothesis Three, Descriptive, Comparison of Weekly Averages

	Week 2	Week 3	Test Statistic	p value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk p
$n = 52$	Mdn = 7923.64	Mdn = 7786.00	$T(20) = 104.00$	.970	$r = .005$	10	10		.003*
$n = 46$	Mdn = 7898.00	Mdn = 7781.00	$T(17) = 77.00$	.981	$r = .004$	8	9		.043*
$n = 45$	Mdn = 7898.00	Mdn = 7781.00	$T(17) = 77.00$	.981	$r = .004$	8	9		.043*
$n = 44$	Mdn = 7898.00	Mdn = 7781.00	$T(17) = 77.00$	.981	$r = .004$	8	9		.043*
$n = 37$	$M = 7503.27$ $SD = 1367.34$	$M = 7695.60$ $SD = 2501.338$	$t(14) = -0.366$	.720	$d = .09$		$M = -192.32$ $SD = 2033.92$	-1318.67, 934.02	.280
	Week 3	Week 4	Test Statistic	p value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk p
$n = 52$	Mdn = 7781.00	Mdn = 7150.33	$T(18) = 68.00$	.446	$r = .13$	7	11		.000*
$n = 46$	$M = 7450.16$ $SD = 2548.45$	$M = 7058.41$ $SD = 1450.19$	$t(14) = 0.916$	.375	$d = .19$		$M = 391.76$ $SD = 1655.68$	-525.13, 1308.64	.238
$n = 45$	$M = 7450.16$ $SD = 2548.45$	$M = 7058.41$ $SD = 1450.19$	$t(14) = 0.916$	.375	$d = .19$		$M = 391.76$ $SD = 1655.68$	-525.13, 1308.64	.238
$n = 44$	$M = 7450.16$ $SD = 2548.45$	$M = 7058.41$ $SD = 1450.19$	$t(14) = 0.916$	.375	$d = .19$		$M = 391.76$ $SD = 1655.68$	-525.13, 1308.64	.238
$n = 37$	$M = 7927.76$ $SD = 2353.00$	$M = 7247.07$ $SD = 1362.05$	$t(11) = 1.462$	.172	$d = .21$		$M = 680.68$ $SD = 1612.30$	-343.72, 1705.09	.354

Note. CI = confidence interval. n = 52 (all recruited participants), n = 46 (participants who returned the Fitbit Zip), n = 45 (participants who responded to the manipulation check), n = 44 (participants who reported steps on at least 50% of the days of the study), n = 37 (participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check).

*$p < .05$

Table 12

Hypothesis Three, Descriptive, Comparison of Days

	Day	Week 2	Week 3	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
n = 52	Monday	*M* = 8320.81 *SD* = 3564.02	*M* = 8211.94 *SD* = 3726.52	*t*(15) = 0.140	.890	*d* = .03		*M* = 108.88 *SD* = 3107.56	-1547.03, 1764.78	.302
	Tuesday	*M* = 9038.28 *SD* = 4507.89	*M* = 8635.72 *SD* = 4475.38	*t*(17) = .343	.736	*d* = .08		*M* = 402.56 *SD* = 4983.08	-2075.47, 2880.58	.316
	Wednesday	*M* = 9225.65 *SD* = 2593.02	*M* = 8181.71 *SD* = 3916.43	*t*(16) = 0.856	.405	*d* = .21		*M* = 1043.94 *SD* = 5030.60	-1542.55, 3630.44	.848
	Thursday	*M* = 9007.75 *SD* = 3045.33	*M* = 10480.94 *SD* = 4015.14	*t*(15) = -1.284	.219	*d* = .32		*M* = -1473.19 *SD* = 4591.02	-3919.57, 973.20	.935
	Friday	*M* = 8687.44 *SD* = 2935.02	*M* = 6543.75 *SD* = 3490.76	*t*(15) = 1.953	.070	*d* = .48		*M* = 2143.69 *SD* = 4391.00	-196.11, 4483.49	.544
	Saturday	*M* = 5498.33 *SD* = 3733.10	*M* = 5212.08 *SD* = 4519.68	*t*(11) = 0.162	.874	*d* = .05		*M* = 286.25 *SD* = 6125.74	-3605.86, 4178.36	.769
	Sunday	*M* = 4833.69 *SD* = 2321.02	*M* = 4803.23 *SD* = 3199.21	*t*(12) = 0.033	.974	*d* = .01		*M* = 30.46 *SD* = 3328.27	-1980.79, 2041.72	.781
n = 52	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 8735.57 *SD* =3674.10	*M* = 5905.00 *SD* = 3308.49	*t*(13) = 2.668	.019*	*d* = .11		*M* = 2830.57 *SD* = 3970.01	538.32, 5122.82	.512
	Tuesday	*Mdn* = 10345.00	*Mdn* = 8296.50	*T*(16) = 45.00	.234	*r* = .21	4	12		.018*
	Wednesday	*Mdn* = 7641.50	*Mdn* = 7697.00	*T*(16) = 43.00	.196	*r* = .23	7	9		.010*
	Thursday	*M* = 10947.33 *SD* = 3634.11	*M* = 10129.75 *SD* = 3708.27	*t*(11) = 0.745	.472	*d* = .22		*M* = 817.58 *SD* = 3800.47	-1597.12, 3232.28	.557
	Friday	*Mdn* = 7206.00	*Mdn* = 7164.50	*T*(15) = 65.00	.776	*r* = .05	9	6		.008*

(table continues)

	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Saturday	*M* = 5644.00 *SD* = 4473.00	*M* = 5987.82 *SD* = 3485.58	*t*(10) = -0.241	.814	*d* = .07		*M* = -343.82 *SD* = 4729.95	-3521.44, 2833.80	.099
	Sunday	*M* = 5167.50 *SD* = 3408.66	*M* = 5391.86 *SD* = 3878.99	*t*(13) = -0.156	.878	*d* = .04		*M* = -224.36 *SD* = 5382.43	-3332.08, 2883.37	.976
n = 46	Day	Week 2	Week 3	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 8247.53 *SD* = 3662.55	*M* = 8417.93 *SD* = 3761.84	*t*(14) = .012	.991	*d* = .003		*M* = 9.60 *SD* = 3190.26	-1757.11, 1776..31	.475
	Tuesday	*M* = 8552.56 *SD* = 4407.47	*M* = 91757.31 *SD* = 4480.33	*t*(15) = -.0581	.570	*d* = .14		*M* = -604.75 *SD* = 4162.41	-2822.74, 1613.24	.308
	Wednesday	*M* = 8769.80 *SD* = 2308.96	*M* = 8323.20 *SD* = 3589.88	*t*(14) = 0.409	.689	*d* = .10		*M* = 446.60 *SD* = 4429.14	-1895.42, 2788.62	.678
	Thursday	*M* = 9245.20 *SD* = 2994.98	*M* = 10707.87 *SD* = 4048.47	*t*(14) = -1.192	.253	*d* = .31		*M* = -1462.67 *SD* = 4751.96	-4094.22, 1168.88	.933
	Friday	*M* = 8409.71 *SD* = 2863.42	*M* = 6919.07 *SD* = 3343.91	*t*(13) = 1.296	.217	*d* = .35		*M* = 1490.64 *SD* = 4302.21	-993.38, 3974.66	.139
	Saturday	*M* = 5478.27 *SD* = 3941.63	*M* = 5669.55 *SD* = 4439.35	*t*(10) = -.0103	.920	*d* = .03		*M* = -191.27 *SD* = 6186.05	-4347.12, 3964.57	.470
	Sunday	*M* = 5002.92 *SD* = 2338.97	*M* = 5129.75 *SD* = 3107.00	*t*(11) = -0.128	.900	*d* = .04		*M* = -126.83 *SD* = 3425.43	-2303.25, 2049.58	.700
n = 46	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 9013.54 *SD* = 3667.71	*M* = 5951.00 *SD* = 3438.92	*t*(12) = 2.738	.018*	*d* = .76		*M* = 3062.54 *SD* = 4032.23	625.89, 5499.19	.686
	Tuesday	*Mdn* = 10499.00	*Mdn* = 8408.20	*T*(14) = 35.00	.272	*r* = .21	3	11		.010*
	Wednesday	*Mdn* = 7644.00	*Mdn* = 8171.50	*T*(14) = 35.00	.272	*r* = .21	6	8		.004*

(table continues)

	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Thursday	*M* = 10776.08 *SD* = 3873.60	*M* = 9681.42 *SD* = 3893.77	*t*(11) = 1.077	.305	*d* = .31		*M* = 1094.67 *SD* = 3522.19	-1143.23, 3332.56	.542
	Friday	*Mdn* = 7406.00	*Mdn* = 7350.50	*T*(13) = 46.00	.972	*r* = .007	8	5		.006*
	Saturday	*M* = 6190.40 *SD* = 4310.67	*M* = 6324.10 *SD* = 3480.95	*t*(9) = -0.086	.934	*d* = .03		*M* = -133.70 *SD* = 4931.39	-3661.40, 3394.00	.054
	Sunday	*M* = 5496.92 *SD* = 3307.77	*M* = 5384.69 *SD* = 4037.28	*t*(12) = 0.074	.942	*d* = .02		*M* = 112.23 *SD* = 5446.70	-3179.18, 3403.639	.822
n = 45	Day	Week 2	Week 3	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 8170.14 *SD* = 3712.68	*M* = 8139.93 *SD* = 3836.14	*t*(13) = 0.034	.973	*d* = .009		*M* = 30.21 *SD* = 3316.43	-1884.64, 1945.06	.575
	Tuesday	*M* = 8962.50 *SD* = 4706.28	*M* = 8307.69 *SD* = 4592.17	*t*(15) = 0.527	.606	*d* = .13		*M* = 654.81 *SD* = 4974.26	-1995.79, 3305.41	.236
	Wednesday	*M* = 9084.21 *SD* = 2377.84	*M* = 8384.64 *SD* = 3810.20	*t*(13) = 0.613	.550	*d* = .16		*M* = 699.57 *SD* = 4267.54	-1764.43, 3163.58	.576
	Thursday	*M* = 8848.64 *SD* = 3086.20	*M* = 10425.21 *SD* = 3705.34	*t*(13) = -1.570	.140	*d* = .42		*M* = -1576.57 *SD* = 3757.07	-3745.83, 592.70	.999
	Friday	*M* = 9111.4 *SD* = 2896.40	*M* = 6075.57 *SD* = 3364.50	*t*(13) = 2.972	.011*	*d* = .80		*M* = 3035.86 *SD* = 3822.54	828.79, 5242.93	.161
	Saturday	*M* = 4793.36 *SD* = 2961.32	*M* = 5658.55 *SD* = 4454.11	*t*(10) = -0.588	.569	*d* = .18		*M* = -865.18 *SD* = 4876.14	-4141.01, 2410.65	.298
	Sunday	*M* = 4833.69 *SD* = 2321.02	*M* = 4803.23 *SD* = 3199.21	*t*(12) = 0.033	.974	*d* = .009		*M* = 30.46 *SD* = 3328.27	-1980.79, 2041.72	.811
n = 45	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 8738.83 *SD* = 3802.75	*M* = 5318.58 *SD* = 3165.87	*t*(11) = 3.009	.012*	*d* = .87		*M* = 3420.25 *SD* = 3937.27	918.63, 5921.87	.655

(table continues)

	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Tuesday	*Mdn* = 10345.00	*Mdn* = 8382.00	*T*(14) = 40.00	.433	*r* = .15	4	10		.014*
	Wednesday	*Mdn* = 7639.00	*Mdn* = 7354.00	*T*(14) = 36.00	.300	*r* = .20	7	7		.020*
	Thursday	*M* = 10491.54 *SD* = 3847.98	*M* = 9794.69 *SD* = 3750.30	*t*(12) = 0.686	.506	*d* = .52		*M* = 696.85 *SD* = 3664.62	-1517.66, 2911.35	.557
	Friday	*Mdn* = 6082.00	*Mdn* = 7010.00	*T*(13) = 54.00	.552	*r* = .12	8	5		.019*
	Saturday	*M* = 6178.30 *SD* = 4329.17	*M* = 5571.60 *SD* = 3373.70	*t*(9) = 0.516	.618	*d* = .16		*M* = 606.70 *SD* = 3716.94	-2052.24, 3265.64	.143
	Sunday	*M* = 4780.08 *SD* = 3211.03	*M* = 5784.69 *SD* = 3736.30	*t*(12) = -0.770	.456	*d* = .21		*M* = -1004.61 *SD* = 4706.52	-3848.74, 1839.50	.687
n = 44	Day	Week 2	Week 3	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 8170.14 *SD* = 3712.68	*M* = 8139.93 *SD* = 3836.14	*t*(13) = 0.034	.973	*d* = .009		*M* = 30.21 *SD* = 3316.43	-1884.64, 1945.06	.575
	Tuesday	*M* = 8962.50 *SD* = 4706.28	*M* = 8307.69 *SD* = 4592.17	*t*(15) = 0.527	.606	*d* = .13		*M* = 654.81 *SD* = 4974.26	-1995.79, 3305.41	.236
	Wednesday	*M* = 9084.21 *SD* = 2377.84	*M* = 8384.64 *SD* = 3810.20	*t*(13) = 0.613	.550	*d* = .16		*M* = 699.57 *SD* = 4267.54	-1764.43, 3163.58	.576
	Thursday	*M* = 8848.64 *SD* = 3086.20	*M* = 10425.21 *SD* = 3705.34	*t*(13) = -1.570	.140	*d* = .42		*M* = -1576.57 *SD* = 3757.07	-3745.83, 592.70	.999
	Friday	*M* = 9111.4 *SD* = 2896.40	*M* = 6075.57 *SD* = 3364.50	*t*(13) = 2.972	.011*	*d* = .80		*M* = 3035.86 *SD* = 3822.54	828.79, 5242.93	.161
	Saturday	*M* = 4793.36 *SD* = 2961.32	*M* = 5658.55 *SD* = 4454.11	*t*(10) = -0.588	.569	*d* = .18		*M* = -865.18 *SD* = 4876.14	-4141.01, 2410.65	.298
	Sunday	*M* = 4833.69 *SD* = 2321.02	*M* = 4803.23 *SD* = 3199.21	*t*(12) = 0.033	.974	*d* = .009		*M* = 30.46 *SD* = 3328.27	-1980.79, 2041.72	.811
n = 44	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 8738.83 *SD* = 3802.75	*M* = 5318.58 *SD* = 3165.87	*t*(11) = 3.009	.012*	*d* = .87		*M* = 3420.25 *SD* = 3937.27	918.63, 5921.87	.655

(table continues)

	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Tuesday	*Mdn* = 10345.00	*Mdn* = 8382.00	*T*(14) = 40.00	.433	*r* = .15	4	10		.014*
	Wednesday	*Mdn* = 7639.00	*Mdn* = 7354.00	*T*(14) = 36.00	.300	*r* = .20	7	7		.020*
	Thursday	*M* = 10491.54 *SD* = 3847.98	*M* = 9794.69 *SD* = 3750.30	*t*(12) = 0.686	.506	*d* = .52		*M* = 696.85 *SD* = 3664.62	-1517.66, 2911.35	.557
	Friday	*Mdn* = 6082.00	*Mdn* = 7010.00	*T*(13) = 54.00	.552	*r* = .12	8	5		.019*
	Saturday	*M* = 6178.30 *SD* = 4329.17	*M* = 5571.60 *SD* = 3373.70	*t*(9) = 0.516	.618	*d* = .16		*M* = 606.70 *SD* = 3716.94	-2052.24, 3265.64	.143
	Sunday	*M* = 4780.08 *SD* = 3211.03	*M* = 5784.69 *SD* = 3736.30	*t*(12) = -0.770	.456	*d* = .21		*M* = -1004.61 *SD* = 4706.52	-3848.74, 1839.50	.687
n = 37	Day	Week 2	Week 3	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 8320.81 *SD* = 3564.02	*M* = 8211.94 *SD* = 3726.52	*t*(15) = 0.140	.890	*d* = .04		*M* = 108.86 *SD* = 3107.56	-1547.03, 1764.78	.302
	Tuesday	*M* = 9038.28 *SD* = 4507.89	*M* = 8635.72 *SD* = 4475.38	*t*(17) = 0.343	.736	*d* = .08		*M* = 402.56 *SD* = 4983.08	-2075.47, 2880.58	.316
	Wednesday	*M* = 9225.65 *SD* = 2593.02	*M* = 8181.71 *SD* = 3916.43	*t*(16) = 0.856	.405	*d* = .21		*M* = 1043.94 *SD* = 5030.60	-1542.55, 3630.44	.848
	Thursday	*M* = 9007.75 *SD* = 3045.33	*M* = 10480.94 *SD* = 4015.14	*t*(15) = -1.284	.219	*d* = .32		*M* = -1473.19 *SD* = 4591.02	-3919.57, 973.20	.935
	Friday	*M* = 8687.44 *SD* = 2935.02	*M* = 6543.75 *SD* = 3490.76	*t*(15) = 1.953	.070	*d* = .49		*M* = 2143.69 *SD* = 4391.00	-196.11, 4483.49	.544
	Saturday	*M* = 5498.33 *SD* = 3733.10	*M* = 5212.08 *SD* = 4519.68	*t*(11) = 0.162	.874	*d* = .05		*M* = 286.25 *SD* = 6125.74	-3605.86, 4178.36	.769
	Sunday	*M* = 4780.08 *SD* = 3211.03	*M* = 5784.69 *SD* = 3736.30	*t*(12) = -0.770	.456	*d* = .21		*M* = -1004.61 *SD* = 4706.52	-3848.74, 1839.50	.687

(table continues)

n = 37	Day	Week 3	Week 4	Test Statistic	*p* value	Effect size	Increase	Decrease	CI (95%)	Shapiro-Wilk *p*
	Monday	*M* = 8735.57 *SD* = 3674.10	*M* = 5905.00 *SD* = 3308.49	*t*(13) = 2.668	.019*	*d* = .71		*M* = 2830.57 *SD* = 3970.08	538.32, 5122.82	.512
	Tuesday	*Mdn* = 10354.00	*Mdn* = 8211.00	*T*(16) = 45.00	.324	*r* = .18	4	12		.018*
	Wednesday	*Mdn* = 7644.00	*Mdn* = 7927.50	*T*(15) = 35.00	.156	*r* = .26	6	9		.018
	Thursday	*M* = 10491.54 *SD* = 3847.98	*M* = 9794.69 *SD* = 3750.30	*t*(12) = 0.686	.506	*d* = .19		*M* = 696.85 *SD* = 3664.62	-1517.66, 2911.35	.557
	Friday	*Mdn* = 7206.00	*Mdn* = 7164.50	*T*(15) = 65.00	.776	*r* = .05	9	6		.008*
	Saturday	*M* = 5644.00 *SD* = 4473.00	*M* = 5987.82 *SD* = 3485.58	*t*(10) = -0.241	.814	*d* = .07		*M* = -343.82 *SD* = 4729.95	-3521.44, 2833.80	.099

Note. CI = confidence interval. n = 52 (all recruited participants), n = 46 (participants who returned the Fitbit Zip), n = 45 (participants who responded to the manipulation check), n = 44 (participants who reported steps on at least 50% of the days of the study), n = 37 (participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check).

*p < .05

Table 13

Hypothesis Three, Descriptive, Comparison of Averages Minus Thursday, Saturday, and Sunday (n = 37)

Week 2	Week 3	Test Statistic	p value	Effect size	Decrease	CI (95%)	Shapiro-Wilk p
M = 34280.33 SD = 7092.06	M = 34430.17 SD = 12042.71	$t(11) = -0.070$	.945	d = .02	M = -149.83 SD = 7418.22	-4863.15, 4563.48	.233
Week 3	Week 4	Test Statistic	p value	Effect size	Decrease	CI (95%)	Shapiro-Wilk p
M = 36186.73 SD = 10464.06	M = 30470.82 SD = 3672.83	$t(10) = 2.091$	.063	d = .63	M = 5715.91 SD = 9065.25	-374.21, 11806.03	.847

Note. CI = confidence interval.

*p < .05

Table 14

Hypothesis Four, Comparison of Weekly Averages

	Week	Levene's Test *p*	t	Df	*P*	Mean Difference	CI (95%)	
n = 52	week3	.496	.718	43	.476	546.75448	-988.16850	2081.67746
	week4	.381	1.216	43	.231	712.92231	-469.60091	1895.44553
n = 46	week3	.496	.718	43	.476	546.75448	761.10920	-988.16850
	week4	.381	1.216	43	.231	712.92231	586.36773	-469.60091
n = 45	week3	.496	.718	43	.476	546.75448	761.10920	-988.16850
	week4	.381	1.216	43	.231	712.92231	586.36773	-469.60091
n = 44	week3	.435	.752	42	.456	585.44589	778.46926	-985.56867
	week4	.364	1.076	41	.288	659.76154	613.14728	-578.51452
n = 37	week3	.980	1.137	35	.263	923.58095	812.06286	-724.99430
	week4	.260	.832	34	.411	563.16285	676.61656	-811.88744

Note. n = 52 (all recruited participants), n = 46 (participants who returned the Fitbit Zip), n = 45 (participants who responded to the manipulation check), n = 44 (participants who reported steps on at least 50% of the days of the study), n = 37 (participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check).

Table 15

Hypothesis Four, Comparison of Days, T-test

	Day	Levene's Test *p*	t	df	*P*	Mean Difference	CI (95%)	
n = 52	dec2	.313	.558	38	.580	746.631	-1962.185	3455.447
	dec3	.786	-.627	40	.534	-702.355	-2964.735	1560.026
	dec5	.308	-1.189	32	.243	-1644.176	-4460.613	1172.260
	dec7	.098	1.758	33	.088	1557.161	-244.677	3358.999
	dec8	.983	.041	37	.968	50.695	-2469.737	2571.127
	dec9	.999	1.571	43	.123	1398.798	-396.672	3194.267
	dec10	.257	-1.806	37	.079	-1883.995	-3998.120	230.131
	dec11	.845	.618	33	.541	840.224	-1926.363	3606.810
	dec13	.355	-.148	26	.883	-170.542	-2537.558	2196.475
	dec14	.157	1.102	27	.280	1267.176	-1092.850	3627.203
	dec15	.134	-.179	26	.859	-279.744	-3487.231	2927.744
n = 46	dec2	.472	.920	36	.364	1268.222	-1528.600	4065.043
	dec3	.545	-.435	37	.666	-493.896	-2794.601	1806.809
	dec5	.261	-.896	30	.377	-1270.243	-4165.752	1625.266
	dec7	.111	2.086	32	.045*	1831.340	42.927	3619.754
	dec8	.984	.191	36	.850	242.636	-2335.798	2821.070
	dec9	.815	1.857	39	.071	1705.711	-152.132	3563.554
	dec10	.440	-1.575	34	.125	-1789.600	-4098.796	519.596
	dec11	.929	.847	31	.404	1167.974	-1644.548	3980.496
	dec13	.348	.270	24	.790	313.726	-2088.498	2715.951

(table continues)

	Day	Levene’s Test *p*	t	df	*P*	Mean Difference	CI (95%)	
	dec14	.096	1.064	26	.297	1268.357	-1182.148	3718.863
	dec15	.200	-.159	25	.875	-257.220	-3588.107	3073.667
n = 45	dec2	.327	.287	35	.776	410.449	-2491.325	3312.224
	dec3	.713	-.445	35	.659	-535.735	-2982.466	1910.996
	dec5	.257	-1.656	28	.109	-2473.866	-5534.077	586.345
	dec7	.114	1.215	30	.234	1079.619	-734.995	2894.234
	dec8	.934	.022	33	.982	30.690	-2786.314	2847.695
	dec9	.979	1.144	38	.260	1096.049	-843.419	3035.516
	dec10	.347	-1.724	33	.094	-2002.938	-4366.136	360.261
	dec11	.980	.760	31	.453	1087.833	-1832.438	4008.104
	dec13	.524	-.231	24	.819	-268.774	-2665.281	2127.733
	dec14	.173	1.333	25	.195	1550.335	-845.532	3946.203
	dec15	.050	-.615	23	.544	-1027.378	-4481.978	2427.222
n = 44	dec2	.313	.558	38	.580	746.631	-1962.185	3455.447
	dec3	.872	-.540	39	.592	-619.007	-2937.583	1699.569
	dec5	.308	-1.189	32	.243	-1644.176	-4460.613	1172.260
	dec7	.098	1.758	33	.088	1557.161	-244.677	3358.999
	dec8	.983	.041	37	.968	50.695	-2469.737	2571.127
	dec9	.761	1.344	41	.186	1224.374	-615.389	3064.137
	dec10	.250	-1.716	35	.095	-1889.810	-4125.415	345.796
	dec11	.845	.618	33	.541	840.224	-1926.363	3606.810
	dec13	.355	-.148	26	.883	-170.542	-2537.558	2196.475
	dec14	.157	1.102	27	.280	1267.176	-1092.850	3627.203
	dec15	.134	-.179	26	.859	-279.744	-3487.231	2927.744

(table continues)

	Day	Levene's Test *p*	t	df	*P*	Mean Difference	CI (95%)	
n = 37	dec2	.410	.644	33	.524	959.690	-2071.633	3991.014
	dec3	.595	-.591	33	.558	-742.905	-3299.467	1813.658
	dec5	.242	-1.355	26	.187	-2114.021	-5321.446	1093.404
	dec7	.154	1.552	29	.131	1371.833	-435.678	3179.344
	dec8	.936	.184	32	.855	262.839	-2639.432	3165.110
	dec9	.877	1.444	34	.158	1424.597	-580.002	3429.197
	dec10	.521	-1.463	29	.154	-1939.167	-4650.874	772.541
	dec11	.810	1.011	29	.320	1470.628	-1503.577	4444.834
	dec13	.532	.237	22	.815	279.833	-2166.990	2726.657
	dec14	.108	1.299	24	.206	1575.310	-926.987	4077.606
	dec15	.082	-.603	22	.553	-1049.833	-4660.754	2561.087

Note. n = 52 (all recruited participants), n = 46 (participants who returned the Fitbit Zip), n = 45 (participants who responded to the manipulation check), n = 44 (participants who reported steps on at least 50% of the days of the study), n = 37 (participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check).

Table 16

Hypothesis Four, Comparison of Days, Nonparametric Tests

	Day of the Week	Median	Test Statistic (T)	Significance Level	Effect size (*r*)
n = 52	Dec 4	9521.50 (38)	92	.011*	.41
	Dec 6	4719.00 (29)	92.00	.599	.10
	Dec 12	7010.00 (38)	201.00	.550	.10
n = 46	Dec 4	9563.00 (37)	80.00	.007*	.44
	Dec 6	4879.50 (28)	76.00	.353	.18
	Dec 12	7125.00 (36)	177.00	.623	.07
n = 45	Dec 4	9435.00 (34)	70.00	.014*	.42
	Dec 6	4558.50 (26)	70.00	.517	.13
	Dec 12	6789.00 (34)	158	.629	.08
n = 44	Dec 4	9521.50 (38)	92.00	.011*	.41
	Dec 6	4719.00 (29)	92.00	.599	.10
	Dec 12	7010.00 (38)	201.00	.550	.10
n = 37	Dec 4	9521.50 (38)	59.00	.009*	.42
	Dec 6	4719.00 (25)	55.00	.267	.22
	Dec 12	7010.00 (32)	136.00	.704	.07

Note. n = 52 (all recruited participants), n = 46 (participants who returned the Fitbit Zip), n = 45 (participants who responded to the manipulation check), n = 44 (participants who reported steps on at least 50% of the days of the study), n = 37 (participants who returned the Fitbit Zip, reported steps on at least 50% of the days, and responded to the manipulation check).

Table 17

Hypothesis Four, Comparison of Averages Minus Thursday, Saturday, and Sunday (n = 37)

Week	Levene's Test *p*	t	df	*p*	Mean Difference	CI (95%)	
week three	.850	-.351	26	.728	-1557.83077	-10678.77732	7563.11578
week four	.0074*	-.258	13.310	.800	-919.76515	-8600.08794	6760.55764

APPENDIX A

NORMATIVE FEEDBACK

Figure 1. Descriptive Feedback, Participant Physical Activity above the Norm

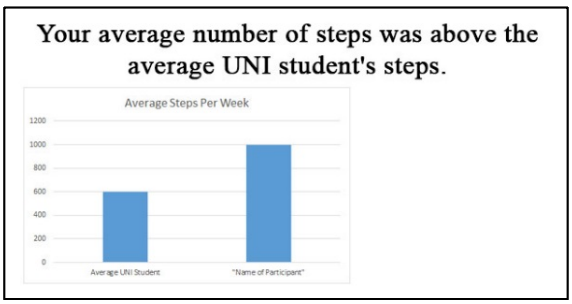


Figure 2. Descriptive Feedback, Participant Physical Activity below the Norm

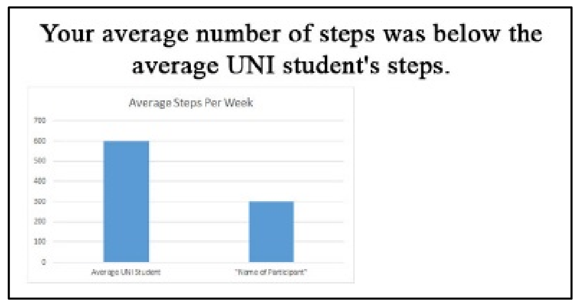


Figure 3. Descriptive plus Injunctive Feedback, Participant Physical Activity above the Norm

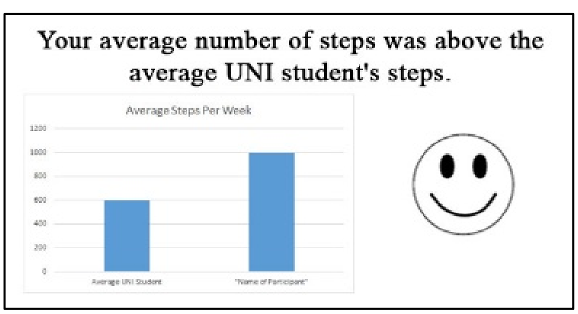
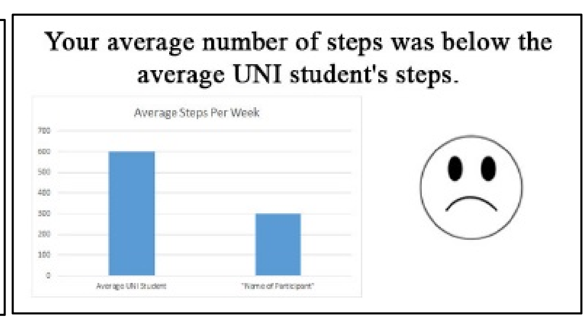
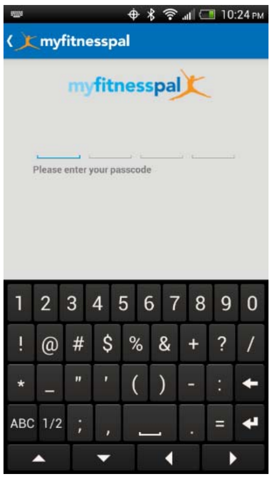


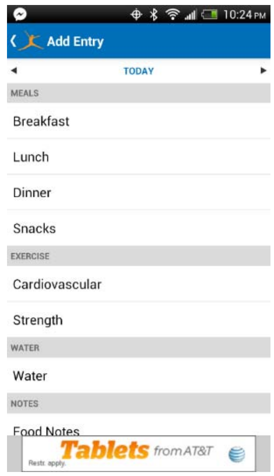
Figure 4. Descriptive plus Injunctive Feedback, Participant Physical Activity below the Norm

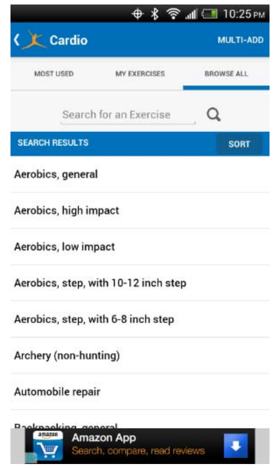


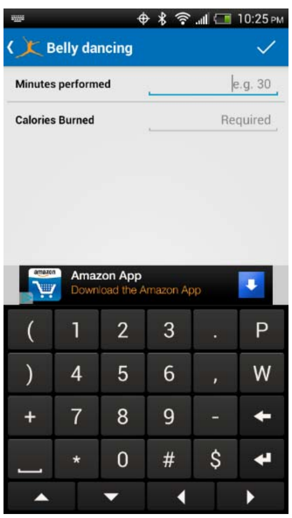
APPENDIX B

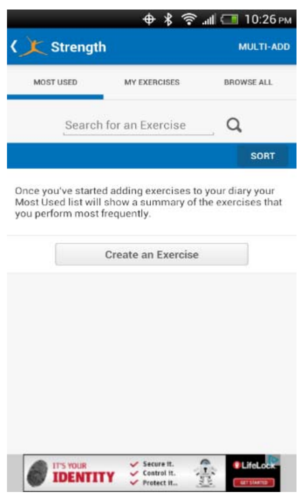
MYFITNESSPAL APPLICATION

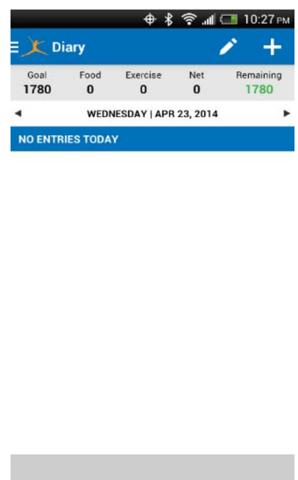












APPENDIX C

DEMOGRAPHICS SHEET

1) Age: ___________

2) Race/Ethnicity (Check all that apply):

□ African American □ Asian □ White

□ Hispanic □ Pacific Islander □ Other ______________________

3) Gender: □ Woman □ Man □ Transgender □ Prefer Not to Answer

4) Major: ________________________________

5) Year in School:

□ Freshman □ Junior □ Other ________________________

□ Sophomore □ Senior

6) Is English your native language? □ Yes □ No

7) What is the language that you speak/read most? _______________________________

8) What is your cell phone number?

9) What is your current cell phone carrier? (Verizon, US Cellular, AT&T, etc.)

10) What is the model of your current cell phone? (IPhone, EVO, etc.)

Do you have any pre-existing health conditions such as asthma, diabetes, cardiovascular disease, or juvenile rheumatoid arthritis? □ Yes □ No

If yes, what conditions? _______________________________

9) Do you currently record your physical activity such as using a smartphone applications (e.g. FitStar, Endomondo, Map My Fitness, etc.), diary, or timecard (e.g. fitness instructor)?

□ Yes □ No

If yes, what do you use to monitor physical activity (smartphone application, paper diary, etc.)? _______________________________

APPENDIX D

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE LONG (IPAQ-L)

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spend being physically active in a **usual week**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you do in a **usual week**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you do outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?

☐ Yes

☐ No → ***Skip to PART 2: TRANSPORTATION***

The next questions are about all the physical activity you do in a **usual week** as part of your paid or unpaid work. This does not include traveling to and from work.

2. During a **usual week**, on how many days do you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you do for at least 10 minutes at a time.

_____ **days per week**

☐ No vigorous job-related physical activity → ***Skip to question 4***

3. How much time do you usually spend on one of those days doing **vigorous** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

4. Again, think about only those physical activities that you do for at least 10 minutes at a time. During a **usual week**, on how many days do you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

_____ **days per week**

☐ No moderate job-related physical activity → ***Skip to question 6***

5. How much time do you usually spend on one of those days doing **moderate** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

6. During a **usual week**, on how many days do you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you do to travel to or from work.

_____ **days per week**

☐ No job-related walking → ***Skip to PART 2: TRANSPORTATION***

7. How much time do you usually spend on one of those days **walking** as part of your work?

_____ **hours per day**

_____ **minutes per day**

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. During a **usual week**, on how many days do you **travel in a motor vehicle** like a train, bus, car, or tram?

_____ **days per week**

☐ No traveling in a motor vehicle → ***Skip to question 10***

9. How much time do you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

_____ **hours per day**
_____ **minutes per day**

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10. During a **usual week**, on how many days do you **bicycle** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No bicycling from place to place → ***Skip to question 12***

11. How much time do you usually spend on one of those days to **bicycle** from place to place?

_____ **hours per day**

_____ **minutes per day**

12. During a **usual week**, on how many days do you **walk** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No walking from place to place → ***Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY***

13. How much time do you usually spend on one of those days *walking* ***from place to place?***

_____ **hours per day**
_____ **minutes per day**

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in a **usual week** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you do for at least 10 minutes at a time. During a **usual week**, on how many days do you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

_____ **days per week**

☐ No vigorous activity in garden or yard → ***Skip to question 16***

15. How much time do you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

_____ **hours per day**
_____ **minutes per day**

16. Again, think about only those physical activities that you do for at least 10 minutes at a time. During a **usual week**, on how many days do you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

_____ **days per week**

☐ No moderate activity in garden or yard → ***Skip to question 18***

17. How much time do you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

_____ **hours per day**
_____ **minutes per day**

18. Once again, think about only those physical activities that you do for at least 10 minutes at a time. During a **usual week**, on how many days do you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ **days per week**

☐ No moderate activity inside home → ***Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY***

19. How much time do you usually spend on one of those days doing **moderate** physical activities inside your home?

_____ **hours per day**
_____ **minutes per day**

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you do in a **usual week** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during a **usual week**, on how many days do you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ **days per week**

☐ No walking in leisure time → ***Skip to question 22***

21. How much time do you usually spend on one of those days **walking** in your leisure time?

_____ **hours per day**
_____ **minutes per day**

22. Think about only those physical activities that you do for at least 10 minutes at a time. During a **usual week**, on how many days do you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ **days per week**

☐ No vigorous activity in leisure time → ***Skip to question 24***

23. How much time do you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ **hours per day**
_____ **minutes per day**

24. Again, think about only those physical activities that you do for at least 10 minutes at a time. During a **usual week**, on how many days do you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ **days per week**

☐ No moderate activity in leisure time → ***Skip to PART 5: TIME SPENT SITTING***

25. How much time do you usually spend on one of those days doing **moderate** physical activities in your leisure time?
_____ **hours per day**
_____ **minutes per day**

PART 5: TIME SPENT SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. During a **usual week**, how much time do you usually spend **sitting** on a **weekday**?

_____ **hours per day**
_____ **minutes per day**

27. During a **usual week**, how much time do you usually spend **sitting** on a **weekend day**?

_____ **hours per day**
_____ **minutes per day**

This is the end of the questionnaire, thank you for participating.

APPENDIX E

MANIPULATION CHECK

1. How do your number of steps compare to the typical UNI student this week? (Below Average, Average, Above Average)

2. Was this graphic easy to read? If no, why not?

3. Would you use this type of feedback function if it were a regular part of a fitness-related smartphone application?

APPENDIX F

COMPLIANCE QUESTIONS

1. How often did you wear the Fitbit Zip?
2. How often did you record your physical activity in the MyFitnessPal application?
3. How many messages did you receive from the research team?
4. How many messages did you respond to?
5. Did you have any technical difficulties with the Fitbit Zip or MFP application?

APPENDIX G

DEBRIEFING STATEMENT

UNI Health Study

This debriefing statement will provide you with additional information about the nature and purpose of the study you just participated in. If you have additional questions or concerns about the study after having read this statement, you are welcome to contact the experimenter at researchermehn@gmail.com or Dr. Schwab at nicholas.schwab@uni.edu.

The general aim of this research is to better understand how to increase physical activity by providing feedback about one's own level of physical activity in comparison to other's level of physical activity. The initial survey on Qualtrics was used to provide a baseline for past physical activity. The Fitbit Zip and MyFitnessPal application were used to measure the amount of physical activity during the four weeks of the study. Using the Fitbit Zip information, the experimenter calculated the average number of steps for everyone participating in the study. This average was used as the comparison average. Feedback about your amount of physical activity in comparison to this average was distributed using a picture message sent via email. There were two types of feedback. One type of feedback simply described the relationship between your amount of physical activity and the comparison average. The other type of feedback described this relationship and included evaluative information (a smiley face or a frowning face).

Because one of the goals of this experiment was to influence the amount of physical activity in relation to other's physical activity, it is understandable that some people may have negative thoughts or feelings about his or her amount of physical activity in comparison to the average. We encourage you to contact the experimenter if you feel this would help. The experimenter will be able to talk with you more about the purpose of the experiment if needed.

Resources to increase physical activity such as personal trainers and fitness classes are also available through UNI at the Wellness and Recreation Center (WRC). More information about services offered at the WRC can be obtained by contacting Wellness and Recreation Services (WRS) at 273-6275 or at wrs@uni.edu. Similar resources (e.g. fitness classes, trainers, etc.) are available through the Cedar Falls Recreation Center; located at 110 E 13th Street in Cedar Falls. The Cedar Falls Recreation Center can be contacted at 273-8636.

The contact information for the primary investigator is located on the copy of the informed consent statement, in case you need to contact Dr. Schwab in the future regarding this experiment.

We appreciate your willingness to participate in this research project, as much of the research in psychology is dependent on participation by individuals such as yourself. You may now uninstall the MyFitnessPal application from your phone. Thank you.

APPENDIX H

MYFITNESSPAL AND FITBIT ZIP PROTOCOL FALL 2014

Greet participants as they arrive, ensure that they are here for the correct study, introduce yourself and your role in today's orientation and make sure everyone is seated and ready for the orientation to begin.

First make sure that all participants completed the Qualtrics survey and downloaded the MFP app on their phones. Then, introduce the participants to the timeline of the study, the tasks to be completed, and the equipment. Starting with the timeline you'll explain that the study occurs over a 4 week period of time starting on the Friday after they leave the orientation all the way through Monday, December 5. After giving them basic information on the study timeline, you'll explain the specific tasks within the study (e.g. "wearing" the Fitbit Zip, logging activities in MFP, etc.). Introduce the Fitbit Zip and how to log an activity in MFP app.

Participants will have an opportunity to ask any questions they might have about the study. Remember that we are NOT disclosing any specific hypotheses during the orientation, though we are also not actively trying to deceive anyone. After you have addressed any questions the participants have you can provide them with the consent form to wear the Fitbit Zip. They will sign and return one copy of the consent form and they can keep the second copy.

Each participant will be provided a Fitbit Zip in the silicon case and the USB dongle. Sync Fitbit to MFP. Sync the Fitbit Zip to the MFP application. Once again if anyone has any questions this will be the last time to address such issues. If there are no questions you can excuse the participants and the orientation is over.

Begin your presentation by giving the participants a quick timeline of the study.

"Welcome to the UNI Physical Activity Study. I want to thank you for coming to the orientation today. This meeting today is meant to give you a stronger sense of what the study is about and what you would be asked to do should you participate. This orientation should not last more than 30 minutes and will likely end faster than that. I'll give you a quick overview of the study now and after I've told you more about the study you can read our consent form and if you feel comfortable with participating you can sign that and you will officially begin your participation.

As you read on Qualtrics, this study will investigate how often students at the University of Northern Iowa engage in physical activity and the different types of physical activity UNI students engage. We would like you to help us by participating over the next 4 weeks starting today after you have signed a consent form. If you consent to join the study you'll receive a pedometer, and starting tomorrow you'll have three tasks to complete each day.

The first task is simple. We ask you to put on the Fitbit Zip at the start of each morning and wear it during your daily activities. The Fitbit Zip can be worn on a belt or in your pocket. It is a wireless activity tracker that tracks number of steps, distance, and calories burned so essentially a pedometer. The Fitbit Zip uploads the information wirelessly to Mac or PC computers via a dongle that plugs into the computer's USB port. The Fitbit Zip also syncs to supported mobile phones using Bluetooth. The Fitbit Zip will automatically connect to any computer with the Fitbit's wireless dongle within 20 feet to upload your data. If you have a personal computer, we recommend leaving the dongle plugged into your USB port. If you do not have a personal computer, remember to upload your data weekly.

Second, we ask that you record any physical activity that you engage in using the MyFitnessPal mobile application. To do this, go to your MyFitnessPal app. Click on "Add to Diary." You can choose "cardio" or "strength" and search for your exercise there. For example, say you ran for 30 minutes. Type in "running" in the search field and then click the magnifying class icon. You have several options to choose from. Once you select the activity, you can then enter the number of minutes and then click the check mark in the upper right hand corner.

Third, we ask that you respond to messages we send you via the MyFitnessPal application. We will send you two messages during the four weeks. To view messages, go to the main menu and click on "messages." That will take you to your inbox. To view a message, just click on the message. To reply to the message, click on the arrow in the upper right hand corner. From here, you can enter the text of your message. You will receive a third message at the end of the study with instructions about how to return the pedometer and information about the study.

All of your data is handled with absolute confidentially; this means that it is stored on a password protected computer and only the principal investigator and designated researchers involved in the project have access to your data. Also, we guarantee you that your data will at no point be linked to you as a person (via your name or other identifying information), but it will be linked to any responses you have provided in the online survey study earlier this year. The analysis will be completely anonymous and any identifying information (names) will not be processed.

We are completely aware that the quality of this research depends on your collaboration in this project: the more you are willing to wear the Fitbit Zip and log physical activity, the better are the data we get; that's why we are committed to doing everything possible to make you feel comfortable with wearing it.

"Now, that is a lot of information and I would like to provide you some time to ask any questions you might have. Please keep in mind that if you do want to participate but have questions about the equipment or what you need to do I can answer those types of questions later. Right now I'd like to just address any questions you might have that would affect whether you choose to participate. [Give them a moment to think.]

Alright, if you would like to participate in the study I'll now give everyone a copy of the consent form. After you have read the consent form sign it if you wish to participate. If you do not wish to participate you are more than welcome to leave and thank-you for your time. If you do choose to sign please return the signed copy to me and keep a copy for your own records.

[After everyone has consented, hand out Fitbit Equipment]

Now I would like everyone to sync their Fitbit Zip to the MyFitnessPal application. To do this, go to the main menu. Click on "setting." Then click on "steps" and click on "Fitbit" then "connect." Before you complete the orientation today, I would like to take a minute and go over the equipment and procedures with you quickly one more time. To help ensure the best data quality we have created these a handouts you can take with you. It explains the Fitbit Zip and MyFitnessPal application procedures.

[Go over the Fitbit & MFP handout with them and then give them each a copy]

APPENDIX I

MYFITNESSPAL PROTOCOL

1. Download app using apple store or google play
2. Sign up using assigned username
3. Use preferred email address
4. Pick what your goal is
5. Pick your level of activity
6. Choose male or female, enter your birthdate, click “**Next**” located in the **top right hand corner**
7. Enter height and weight, click “**Next**” located in the **top right hand corner**
8. Enter in your email, password, assigned username, country, zip (50614), and uncheck newsletter click “**Next**” located in the **top right hand corner**
9. Uncheck the meal reminders and then click “**start tracking now**”
10. Click on the **3 bars in the upper left hand corner**
11. Click on “**Settings**”
    a. Click on “**Diary setting**” change to diary sharing (locked with a key: passcode = researcher); uncheck all the other boxes
    b. Next go to “**Sharing and privacy**”
        i. Under “**News Feed Sharing**” uncheck all boxes
        ii. Under “**Email Settings**” check “only sends me a message”
        iii. Under “**Facebook Settings**” uncheck all boxes
        iv. Under “**Require Passcode**” enter four digits of your choosing
    c. Next go to “**Push notifications**” uncheck all except “**sends me a message**”
12. Under the main menu (3 bar button) click on “**Friends**” and then click on “**Friends**” in the middle (between news and requests)
    a. Click on the **plus sign top right hand corner**)
    b. Click on “**Email**” and then enter in “**researchermehn**”
    c. Click “**Send**”
13. Under the main menu (3 bar button) click on “**Reminders**”
    a. Click on the **plus sign top right hand corner**
    b. Choose “**Breakfast**”
    c. And set the time to when you usually wake up. This will serve as your reminder to wear your pedometer

If receive an email to confirm MFP, please confirm

APPENDIX J

FITBIT ZIP AND MYFITNESSPAL APP INFORMATION SHEET

Fitbit Zip

The Fitbit Zip wireless activity tracker is a pedometer that tracks number of steps, distance, and calories burned. The Fitbit Zip uploads the information wirelessly to Mac or PC computers via a dongle that plugs into the computer's USB port. The Fitbit Zip also syncs to supported mobile phones using Bluetooth.

How to wear the Fitbit Zip

The Fitbit Zip can be worn on a belt or in your pocket. Please attach the Fitbit to your belt or pocket at the start of each day. The Fitbit Zip does not need to be turned on and will automatically connect to any computer with the Fitbit's wireless dongle within 20 feet. You may change the screen display by gently tapping the screen.

How to take care of the Fitbit Zip

The Fitbit Zip is an electronic device and thus should be handled carefully (e.g., avoid dropping it, keep it out of hot places, etc.). Please do not take the Fitbit out of its silicon casing.The Fitbit Zip is sweat and splash-proof; however, it is not waterproof and should not be submerged. The Fitbit is battery powered and does not need to be charged.

MyFitnessPal App

The MFP (Version 2.10) mobile application software is a free, self-report diary application that can be accessed on a mobile phone. The application is available for both Android and iPhone operating systems. The application enables users to record and track food consumption and physical activity. The physical activity diary feature enables users to choose from over 350 physical activities such as bowling, chin ups, or chopping wood and report the number of minutes of each physical activity.

How to log an activity

Go to your MyFitnessPal app. Click on "Add to Diary." You can choose "cardio" or "strength" and search for your exercise there. For example, say you ran for 30 minutes. Type in "running" in the search field and then click the magnifying class icon. You have several options to choose from. Once you select the activity, you can then enter the number of minutes and then click the check mark in the upper right hand corner.

How to check and respond to messages

To view messages, go to the main menu and click on "messages." That will take you to your inbox. To view a message, just click on the message. To reply to the message, click on the arrow in the upper right hand corner. From here, you can enter the text of your message.

If you have any questions concerning the Fitbit Zip or MyFitnessPal app, do not hesitate to contact us ***researchermehn@gmail.com*** *at or* ***ehnm@uni.edu****. Thank you very much for your collaboration! We highly appreciate your participation in this research!*