

ARE SOCIAL MEDIA USE RELATED TO SELF-EFFICACY
FOR HEALTHY EATING AMONG ACTIVITY TRACKER USERS?

By

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ABSTRACT

Activity trackers are a growing market and a global phenomenon. In health promotion, activity tracker users became important subjects for healthy behavioral changes. To achieve a healthy lifestyle, both physical activity and a balanced diet should be combined, but there is lack of research in the healthy eating habits of activity tracker users in the literature. Bandura (1971) argues that people learn new behaviors by observing and mirroring others. Scholars suggest social media is an effective tool for behavioral changes due to its function as an extended world of people's real life. This study employs quantitative research to examine possible correlations between social media use and self-efficacy for healthy eating. Activity tracker users completed a total of 321 surveys, answering questions about social media usage patterns and healthy eating. Research questions seek to examine different variables of social media usage patterns for healthy eating. Chi-squared tests show there is a significant relationship between viewing others' healthy food photos and eating five portions of fruits and vegetables. Posting personal food photos and seeking nutritional information were not associated with self-efficacy for healthy eating. Among variables, ethnicity and gender emerged as significant in relation to activity tracker users' social media usage patterns. An independent t-test showed that women were more likely to view others' healthy food photos compared to men. The discovery of significant variables offers evidence for developing specific strategies for behavioral changes by using social media in health promotion.

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CHAPTER 1

INTRODUCTION

Tracking health is a worldwide trend (Nuremberg, 2016). In the United States, 69% of adults track health information such as weight, diet, or exercise routine for themselves or loved ones by using tracking devices including activity trackers, paper tracking, or other methods (Fox & Duggan, 2013). In addition, 21% of U.S. adults use a wearable device to monitor their health information (Fox & Duggan, 2013) to achieve their goals towards healthier lifestyles (Nuremberg, 2016). Since 66% of U.S. adults are overweight or obese, and almost 50% of adults have chronic conditions (i.e., diabetes, heart disease, lung disease, and cancer), self-monitoring by using trackers has emerged as a way of improving health outcomes (Fox & Duggan, 2013).

According to the World Health Organization (2015), a healthy lifestyle consists of physical activity and a balanced diet. In terms of using an activity tracker, majority of previous research focused on behavioral changes in physical activity (Abrantes, Blevins, Battle, Read, Gordon, & Stein, 2017; Cadmus-Bertram, Marcus, Patterson, Parker, & Morey, 2015; McMahon, Lewis, Oakes, Wyman, Guan, & Rothman, 2017; Mendoza, Baker, Moreno, Whitlock, Abbey-Lambertz, Waite, Colburn, & Chow, 2017). Use of activity trackers has been found to predict behavioral changes in physical activity. For example, using an activity tracker can improve women's health behavior and encourage them to participate in more daily physical activity (Arigo, Grossman, & Bachman, 2017).

While behavioral changes in physical activity have received tremendous public and scholarly attention, behavioral changes associated with eating habits of activity tracker users have not received adequate attention from scholars. A study found that using an activity tracker in itself did not impact eating behavior as much as physical activity (Maher, Ryan, Ambrosi, & Edney, 2017). In this context, activity tracker users basically want to have a healthier lifestyle and achieved improvements in their physical activity, but there is a research gap that could explore relationships between activity tracker users and their focus on healthy diet. Thus, if users have a supportive tool to balance their diet, they might achieve their goal effectively and more efficiently. Social media can be that effective tool.

To achieve a user's ultimate goal, scholars suggest social media use behaviors that might affect healthy eating behaviors (Laranjo, Arguel, Neves, Gallagher, Kaplan, Mortimer, Mendes, & Lau, 2015; Maher, Lewis, Ferrar, Marshall, De Bourdeaudhuij, & Vandelanotte, 2014). Use of social media has drastically increased (Lozano & Lores, 2013). For example, people likely share their personal life and experiences on social media and often view others' posts (Lozano & Lores, 2013). However, few scholars have examined what specific usage behaviors on social media might affect healthy eating behavior. This study addresses that gap in the literature.

Built upon existing research, this thesis examines whether social media use behaviors are associated with activity tracker users' self-efficacy for healthy eating. Bandura (2004) defines self-efficacy as one's belief in one's capability to control health behavior, self-motivation, and related environments for achieving associated goals. Self-efficacy is considered a core foundation of behavioral changes. If someone's self-efficacy

is high, they are likely to change their behavior as they want. This study attempts to identify relationships between social media use behaviors and self-efficacy for healthy eating. In this way, this study could contribute to the current health promotion and social media intervention literature. To be specific, identifying variables of social media use patterns for healthy eating would help public health educators understand of how people use social media for healthier eating.

Rationale

Studying activity tracker users is meaningful since, recently, they have become a significant growing population with the willingness to change their health behavior (Nuremberg, 2016; Wade, 2017). Recent studies report that activity tracker users' common and ultimate goal is to achieve a healthier lifestyle, but many of them only focus on physical activity, and show no concern for the balanced diet they need. Also, scholars have paid less attention to healthy eating in studies about activity tracker users. Social media is suggested as an effective tool for behavioral changes in health promotion but is not well examined when it comes to testing specific usages of social media and their relationship to healthy eating. In order to fill this research gap, it is essential to assess meaningful variables of social media use and examine relationships between social media use behaviors and self-efficacy for healthy eating. The results of this study could contribute to the field of health promotion and health behavioral changes in studies about activity tracker users and provide academic insights for the health tech industry and health policymakers.

CHAPTER II

LITERATURE REVIEW

Use of Activity Trackers

The wearable device market is significantly growing, and its advertising expenditure is projected to reach \$68.7 million by 2019 (Wade, 2017). The growth of the wearable device market can be partially attributed to the fact that activity trackers have become “more affordable, unobtrusive, and useful in their application” (Evenson, Goto, & Furberg, 2015, p. 2). Also, “mobile health can be an appropriate medium for delivering health-related information and self-knowledge” (Asimakopoulos, Asimakopoulos, & Spillers, 2017, p. 1). With the proliferation of wearable devices, physicians use these devices to follow patients’ health records simultaneously without paper or phone and give patients feedback quickly (Wade, 2017). Activity trackers have become one of the most popular types of wearable devices in recent years. Scholars have researched functions of an activity tracker, motivation to use an activity tracker, and health behavioral changes achieved by using an activity tracker.

Functions of activity trackers. Activity trackers are usually worn on an individual’s wrist, arm, or another part of the body (Fotopoulou & O’riordan, 2017). Early research about activity trackers focused on technical accuracy including data accuracy, reliability, and validity of functions (Evenson et al., 2015). Recently, activity trackers serve a wide variety of functions, such as stepping, climbing, moving distance,

active minutes, break time per each hour, calories burned, and heartbeat (Evenson et al., 2015; Fotopoulou & O’riordan, 2017). Also, users can directly record their daily diet information and keep track of weight (Fotopoulou & O’riordan, 2017). As a result of the evolution of the activity tracker, scholars do not limit their research area to only technical factors associated with the device but extend research topics to people’s potential to use activity trackers in relation to motivation and behavioral changes for a healthy lifestyle.

Motivation to use an activity tracker. Scholars have studied factors that impact users’ motivation for using an activity tracker (Asimakopoulos et al., 2017; Maher et al., 2017). According to Asimakopoulos and colleagues (2017), data, gamification, and content are three major reasons for the use of an activity tracker. In terms of data, users focus on statistics related to movement and sleep that they get from the tracker in order to monitor and encourage their healthy lifestyle (Asimakopoulos et al., 2017). Users prefer to manually set their own goals and see the results through graphic visualizations (Asimakopoulos et al., 2017). Next, “gamification is primarily evidenced by real-time tracking, and large infographic content of goals users are monitoring” (Asimakopoulos et al., 2017, p. 9). Competition among users in gamification is highly relative to self-efficacy, which represents autonomy, competence, and psychological relatedness and are closely associated with an individual’s motivation (Asimakopoulos et al., 2017). Another study also reports that the most significant motivation to use an activity tracker is competing with friends (Maher et al., 2017). In this context, competition positively impacts users’ feelings of autonomy and experience of relatedness toward a healthier lifestyle and well-being (Asimakopoulos et al., 2017). Lastly, content is the central piece of self-efficacy and intention to change behavior among users (Asimakopoulos et al.,

2017). When users feel that they have immediate support and feedback about intrinsic goals, they have motivational relevancy (Asimakopoulos et al., 2017). As the literature shows, activity tracker users learn about themselves while monitoring their health data and competing with and supporting real and virtual friends. In sum, using an activity tracker heavily relies on a user's desire toward a healthier lifestyle and necessitates the need to use activity trackers as research tools to examine health behavioral changes.

Activity tracker users' behavior change. Recent studies have noted that wearable devices encourage users to perform physical activities. Senior adults, adolescent cancer survivors, postmenopausal women, and depressed alcoholic patients are most likely to be affected by these devices according to the literature (Abrantes et al., 2017; Cadmus-Bertram et al., 2015; McMahon et al., 2017; Mendoza et al., 2017). To be more specific, wearable trackers motivate users to frequently monitor their physical activity patterns, improve fitness, and enhance health. Maher et al. (2017) examined users' experiences of wearable activity trackers. Majority of users agreed that their trackers were useful regarding steps (95%), active minutes (76%), sleep (66%), heart rate (63%), stairs climbed (58%), and energy burned (57%) (Maher et al., 2017).

Most of the functions of activity trackers that users mentioned are related to physical activity. In particular, users were satisfied and enjoyed real-time monitoring and long-term monitoring features (Fotopoulou & O'riordan, 2017; Maher et al., 2017; Nuremberg, 2016). Regarding behavioral changes, the majority of users (81.45%) reported that they engaged in more physical activity in their daily lives by wearing an activity tracker (Maher et al., 2017). Contrary to these opinions, only 40.2% of users said that "they had improved their eating patterns as result of using their tracker, and even

fewer [24.1%] reported they had changed their sleeping patterns” (Maher et al., 2017, p. 4). In this context, users pay attention to better health, but their interest in health is not enough to extend their efforts towards healthy eating behaviors. Since a balanced diet is as essential as physical activity for achieving a healthier lifestyle, users also need to pay attention to healthy eating. Healthy eating is defined as a specific combination of food groups. Scholars have also shed light on the advantages of a balanced diet, such as disease prevention, improving physical and mental health, and reducing health care costs.

Healthy Eating Behavior

In the United States, heart disease, cancer, chronic diseases, and diabetes cause 54% of all deaths (Murphy, Xu, Kochanek, Curtin, & Arias, 2017). On a global scale, heart disease and strokes have been the leading causes of death for the last 15 years and caused a combined 15.2 million deaths in 2016 (World Health Organization, 2018). Even though multi-factors are causing diseases, unhealthy eating behavior is one of the most prominent risk factors (Garcia, Faul, Massetti, Thomas, Hong, Bauer, & Lademarco, 2017). To reduce risks of severe diseases, promoting healthy eating has become a crucial topic in today’s public health landscape.

Healthy eating is defined as a diet that contains a balance of food groups, consisting of a variety of whole grains, vegetables and fruits of all colors, limited consumption of dairy and protein products such as red meats and cheese, and avoidance of trans-fat, sugar, and processed foods (“Healthy Eating Plate & Healthy Eating Pyramid,” 2017). However, recent research shows decreased quality of the average American’s diet due to increased intake of sugar, salt, and trans-fat and decreased intake of fruits, vegetables, and whole grains (Grotto & Zied, 2010; Wilkinson, Strickling,

Payne, Jensen, & West, 2016). The fact that unhealthy diets are gradually increasing calls for improved public health and clinical practices (Alissa & Ferns, 2017).

Promoting healthy eating behavior is one of the most vital strategies for disease prevention and a balanced, healthy lifestyle (Alissa & Ferns, 2017; World Health Organization, 2015). Benefits of healthy eating behavior are reducing the risk of harmful health conditions, such as heart disease, stroke, cancer, obesity, diabetes, hypertension, and dental cavities. Additional substantial health benefits include ideal body weight, improved mental health, longevity, and decreasing health care costs (Bandura, 2004; Guenther, Juan, Lino, Hiza, Fungwe, & Lucas, 2008; Kalavana, Maes, & De Gucht, 2010; Philippou, Andreou, Menelaou, Hajigeorgiou, & Papandreou, 2012; Rashad & Grossman, 2004; Trichopoulou & Vasilopoulou, 2000). Since there are a lot of benefits of healthy eating, scholars in health promotion have researched how to improve healthy eating behavior. Social media is an effective tool for behavioral change intervention in health communication.

Social Media Use for Healthy Eating

The internet has enabled people to express their viewpoints online and receive feedback from other users simultaneously (Lozano & Lores, 2013). Notably, social media, including Facebook, Twitter, Instagram, Pinterest, and various types of public or private discussion forums, have posited as both a center for information dissemination and a public sphere where people can engage in discussions, get social support, and achieve their personal goals (Klassen, Douglass, Brennan, Truby, & Lim, 2018). Regarding health promotion study, scholars and clinicians have utilized social media to change health behaviors (Laranjo et al., 2015). Social media is an ideal platform for

interventions and health promotion campaigns, for more exposure to health messages, and for recruitment of participants to be engaged in the interventions (Klassen et al., 2018). Laranjo and colleagues (2015) argued that social media intervention was effective in encouraging health behaviors. However, Maher and colleagues (2014) reported that changing health behaviors through social media needed various approaches in the future. For example, future research can determine, 1) whether long-term intervention is possible, 2) how to increase retention and engagement in social media intervention, and 3) how to achieve better mass dissemination (Maher et al., 2014). Another research project examined the effects of social media use by chronic disease patients and revealed the mechanisms underlying these effects through exploring different ways patients used social media (Merolli, Gray, & Martin-Sanchez, 2013). Using social media stimulates better engagement, positive social interactions, successfully accepting disease-specific knowledge, and psychosocial well-being (Merolli et al., 2013). Merolli and colleagues (2013) also found a long-term benefit of social media use, which was psychosocial management through the ability to promote peer support and share information.

Young adults actively use social media for healthy living purposes (Klassen et al., 2018). To be specific for healthy eating, some users actively share their health-related experience by discussing and posting online. Some passionately discuss healthy food, calorie counting, habits, support, and unhealthy foods (Klassen et al., 2018; Pappa, Cunha, Bicalho, Ribeiro, Silva, Meira, & Beleigoli, 2017). Moreover, active users post their food photos or exercise pictures on social media, particularly regarding their health-related accomplishments (Dennison, Morrison, Conway, & Yardley, 2013; Vaterlaus, Patten, Roche, & Young, 2015).

Users who are less active compared to the above group tend to simply push the like button on posts about healthy eating (Pappa et al., 2017). Some social media users only see and consume health related posts but do not push the like button or write a comment since they do not want to interact with people posting the pictures (Merchant et al., 2014). People feel social media, specifically Facebook, in Merchant and colleagues' research, is too public to post and share personal stories when they are in a weight loss program because their friends can see it (Merchant et al., 2014).

Previous research mentions young adults enjoy social media for learning about nutrition and health-related information (Vaterlaus et al., 2015). Young adults report social media channels are practical for learning about new recipes and healthy diet, and they apply information to their food choices (Vaterlaus et al., 2015). As one of the frequent patterns of social media use, seeking nutritional information through social media could be a meaningful variable for this thesis.

Social media is an effective tool for behavior change. Scholars have emphasized benefits of social media use to achieve a healthier lifestyle. The patterns of social media use for healthy eating were categorized by posting one's own achievements for healthy eating, viewing others' posts about healthy eating, and obtaining healthy diet information. Even though social media use patterns varied, determining what specific actions were valuable for changing behavior was meaningful regarding effective use of social media for health behavioral changes (Klassen et al., 2018). Based on the three major patterns of social media use, this research seeks to discover meaningful variables of social media use and tests whether any variables are associated with self-efficacy for healthy eating.

Social Cognitive Theory in Health Promotion

Scholars apply a variety of health communication models and theories to explore the complex processes through which health behaviors are affected (Bandura, 2004).

Social cognitive theory (SCT) is one of the most applicable theories in health promotion since “societal efforts to get people to adopt healthful practices rely heavily on public health campaign” (Bandura, 2004, p. 148). Moreover, SCT explains why people need to have self-management skills and self-belief—taking control of their health habits—and how social cognitive mechanism works to improve people’s health habits through health communication (Bandura, 2004).

SCT was established by and developed from Bandura’s social learning theory which posits that people attain new behaviors by observing and mirroring the behaviors of others (Bandura, 1971). According to Bandura (2004), SCT provides principles on how to provide health information, motivate and guide people in order to adapt to health behaviors that promote healthy habits, and demote inappropriate habits that negatively affect people’s health (Bandura, 2004). SCT identifies an essential package of determinants for creating and maintaining healthy behaviors—1) knowledge of health benefits and risks about different health circumstances, 2) perceived self-efficacy, which is a belief that one can control one’s health habits, 3) outcome expectations about the predictable costs and benefits to improve various health habits, 4) health goals to engage in the behavior, and 5) perceived facilitators and social support and structural impediments (Bandura, 2004; Stacey, James, Chapman, Courneya, & Lubans, 2015). One of the major arguments of SCT is that personal efficacy plays a focal role in personal behavioral changes (Bandura, 2004). Self-efficacy enhances self-motivation and

motivates action (Bandura, 2004). Additionally, self-efficacy impacts adopting new habits and retaining them (Bandura, 2004).

Scholars have applied the theory to identify the determinants of healthy eating behaviors and physical activity (Chansukree & Rungjindarat, 2017; Young, Plotnikoff, Collins, Callister, & Morgan, 2015), social cognitive theory-based physical activity and/or nutrition behavior change interventions for cancer survivors (Stacey et al., 2015), and the influence of cognitive-perceptual variables on patterns of change in rural midlife and older women's healthy eating (Yates, Pullen, Santo, Boeckner, Hageman, Dizona, & Walker, 2012)

The majority of the research is SCT-based intervention studies, but one study analyzes survey data about social cognitive determinants of healthy eating behaviors in late adolescents (Chansukree & Rungjindarat, 2017). Stacey et al. (2015) mentions that a SCT-based test promises “improving physical activity and diet behavior in cancer survivors, using a range of intervention delivery modes” (p. 335). Stacy et al. (2015) also posit an application of SCT to target eating or physical activity is safe and concluded “meaningful changes to diet and physical activity behavior that can result in health improvements” (p. 335).

Impact of self-efficacy on behavior change. Self-efficacy is defined as one's belief in one's ability to exercise control over one's behavior, health habits, self-motivation, and their environment to achieve their goals (Bandura, 2004). One's self-efficacy impacts their behavior directly by influencing their belief in their ability to use their skills effectively in stressful situations and also affects one's goals, outcome expectations, barriers, and facilitators (Bandura, 2004; Stacy et al., 2015). Since self-

efficacy is the foundation of motivation in determining people's goals and their expected outcomes, individuals would anticipate likely outcomes, overcome difficulties, and express their motivation and devotion to goals when self-efficacy increases (Stacy et al., 2015). Additionally, self-efficacy stimulates an individual's learning and development skills that contribute to improvements in their health behaviors (Bandura, 2004; Stacy et al., 2015).

There are various scales for measuring self-efficacy in health promotion, including scales on health, physical activity, and healthy eating behaviors (Fisk, 2017; Simmonds, Tinati, Barker, & Bishop, 2016; Young et al., 2015). Among them, the "8-Item Self-Efficacy for Healthy Diet Scale" (Simmonds et al., 2016) is appropriate for this thesis. Regarding this scale, Simmonds et al. (2016) followed Bandura's guidelines and created the new questionnaire using a think-aloud study and expert panel consultation. The "8-Item Self-Efficacy for Healthy Diet Scale" was improved with detailed questions focusing on healthy eating behaviors including questions about what the participants eat and how many portions of fruits and vegetables they consume each day (Simmonds et al., 2016). In this scale, self-efficacy for healthy eating is measured by a 5-point Likert scale (Simmonds et al., 2016).

Research Questions

Based on previous research, this thesis focuses on the relationship between social media use and self-efficacy for healthy eating behavior of activity tracker users by exploring the following research questions.

RQa. Is users' posting personal food photos associated with activity tracker users' self-efficacy for healthy eating?

RQb. Is viewing others' healthy food photos associated with activity tracker users' self-efficacy for healthy eating?

RQc. Is seeking nutritional information associated with activity tracker users' self-efficacy for healthy eating?

H. Activity tracker users' self-efficacy for healthy eating is more significantly associated with posting personal food photos compared to viewing others' food photos.

Summary

This chapter reviewed current literature about activity trackers, healthy eating behaviors, social media use, theoretical approach, created research questions, and posed a hypothesis for this thesis. Activity trackers are a growing market, and activity tracker users have become important subjects for health research. Scholars have studied the possibility to improve one's health-related behaviors, such as increasing physical activity. However, exploring healthy eating as an equally important behavior as physical activity to achieve healthier lifestyles has less attention from scholars. Scholars assert that social media use is an effective tool to improve health-related behaviors, but studies rarely attempt to specify which usage behavior is meaningful as a variable for health behavior intervention. This thesis examines whether there is a significant relationship between social media use and self-efficacy for healthy eating and seeks to understand the results by using social cognitive theory approaches.

CHAPTER III

METHODS

In this methodology section, the following is described: research design (i.e., independent variables and a dependent variable, conceptualization, and rationale); materials (i.e., instruments); participants (i.e., sampling and rationale); survey procedure (i.e., respondents recruitment and survey procedure); and data analysis procedures.

Research Design

Variables. This thesis investigated whether social media use focusing on diet photos affected activity tracker users' self-efficacy for healthy eating. In this study, the independent variables were three specific social media usage behaviors, and the dependent variable was self-efficacy for healthy eating. The three independent variables were posting personal food photos, viewing others' healthy food photos, and seeking nutritional information of activity tracker users. Details about variables are explained in the section below.

Conceptualization. Based on the literature review, social media use behaviors were defined as an individual's social media usage patterns such as watching videos, listening to music, photo sharing, reading, writing comments, or sharing feedback (Koçak & Oyman, 2012). In particular, social media use behaviors on healthy eating as independent variables could be categorized into three specific components: active usage, passive usage, and accessing healthy diet information. Scholars have explained that

active usage includes active posting about healthy food, calorie counting, health-related habits, posting about unhealthy food (Klassen et al., 2018; Pappa et al., 2017), posting users' experience and achievements (Dennison et al., 2013), and posting and updating food pictures on social media (Vaterlaus et al., 2015). For the purposes on this thesis, posting personal food photos on social media was used as an active social media usage behavior in order to identify whether a specific usage behavior was related to self-efficacy for healthy eating.

Previous research has showed that less active usage consists of liking posts regarding healthy diet (Pappa et al., 2017), only viewing and valuing health related pictures (Merchant et al., 2014). The users saw health-related posts including either written or photo format contents, but they did not actively post their feedback. In this research, looking at other users' healthy food photos was the second independent variable because all social media users saw and passively consumed content, irrespective of whether social media platforms had a like button or not. Thus, looking at photos was a better way to include most social media users.

The last independent variable was seeking nutritional information. Based on previous research, seeking healthy diet information includes learning new recipes, various types of diets, and nutritional information for users' food choices through social media use (Vaterlaus et al., 2015).

The dependent variable was self-efficacy for healthy eating behavior. Self-efficacy means one's belief in one's ability to control one's behavior and to have the knowledge and skill to achieve personal goals (Bandura, 2004). Thus, self-efficacy for healthy eating behavior indicates the belief that one can achieve a healthy eating behavior

(Bandura, 1986). Healthy eating can have many features including different kinds of diets such as the paleo diet, the Mediterranean diet, and a vegetarian diet. The current study narrowed down healthy eating behaviors to consuming healthy and balanced food groups, containing plenty of complex starchy carbohydrates, fruits and vegetables, adequate consumption of protein products such as white meats and beans, and reduced amounts of fat and sugar (“Eat Well Guide 2016,” 2016; Simmonds et al., 2016).

Rationale. Social media use behaviors, including posting food photos, viewing others’ healthy food photos, and seeking nutritional information were used as independent variables because of the importance of verifying impacts of specific usage behaviors. Even though eating behavioral changes could result from multifactorial reasons, scholars have studied social media use regarding behavioral changes as a tool for intervention. There was less attention on both eating behavioral changes in particular and what specific social media usage behaviors possibly impact eating behavioral changes. Previous research found that eating behavioral changes associated with social media usage needed to be studied in the future (Korda & Itani, 2011).

Previous research studied overall social media use but did not separate each possible action on social media concerning health behaviors. Looking at photos was one of the most common factors in social media usage behavior (Koçak & Oyman, 2012). Interestingly, looking at photos did not have interactions with one posting photos so that could be considered as a passive behavior. Contrary to this, posting personal food photos was an active expression of achievement or action to motivate others, which can be considered as an active usage behavior. Those active and passive behaviors might make a difference among participants in terms of the perceived self-efficacy for healthy eating.

Examining users' behavior to seek nutritional information on social media was valuable because it was a very common and widespread phenomenon. Using the third independent variable, this study determined how the dissemination function of social media impacted eating behavioral changes.

Self-efficacy for healthy eating was a dependent variable. Self-efficacy was a core motivation factor for behavioral changes on social cognitive theory. In order to change eating behaviors, users needed to increase perceived self-efficacy on eating behaviors first, and then behavioral changes progressed. Healthy eating behavior was defined as using balanced food groups, including intake of whole food and complex carbs, fruits and vegetables, white meats, a suitable amount of dairy product, and less intakes of refined sugars and fat in order to measure subjects' eating behaviors objectively through the "8-Item Self-Efficacy for Healthy Diet Scale" (8-SEeD) (Simmonds et al, 2016).

Instruments

The current study was based on a survey to investigate possible relationships between social media use behaviors and activity tracker users' self-efficacy for healthy eating. The survey asked about self-efficacy for healthy eating, participants' social media use behaviors, and demographic information. Questions about self-efficacy for healthy eating were created by using "8-SEeD." The survey questions contained some questions about the participant's current social media usage behaviors and self-efficacy for healthy eating.

The self-efficacy for healthy eating questions included,

- "How likely are you to eat five portions of fruits and/or vegetables each day?"

- “How likely are you to eat baked potatoes, boiled potatoes, or oven chips instead of fried potatoes, roast potatoes, or fried chips?”
 - “How likely are you to eat or drink products with added sugar, such as donuts, cookies, cakes, soda/carbonated drinks, or sugar added to hot drinks or cereal?”
 - “How likely are you to eat brown/multigrain rice or whole wheat pasta instead of white rice or white wheat pasta?”
 - “How likely are you to eat or drink low-fat or non-fat products instead of high-fat or standard products?”
 - “How likely are you to eat vegetable dishes or white meat (such as chicken or turkey) instead of red meat (such as beef, pork, or lamb)?”
 - “How likely are you to eat vegetable dishes or white meat (such as chicken or turkey) instead of processed meat (such as sausages, ham, pies, bacon, or chicken nuggets)?”
 - “How likely are you to eat whole grain bread instead of white wheat bread?”
- (Simmonds, 2016, p. 2508).

These questions were slightly modified for this thesis to increase clarification.

Participants

The population for this thesis was activity tracker users. Regardless of brands or product models, all activity tracker users were the target population of the research with the exception of children. Based on previous research, most of the online surveys achieved 33% response rates (Lindemann, 2018). In order to receive an adequate number of responses, the potential respondents were broadened to access as many activity tracker

users as possible. Purposive sampling and snowball sampling were used to get the most useful and representative data.

Recruitment and Survey Procedure

Recruitment procedure. A total of 302 valid responses were collected from both online and face-to-face recruiting efforts. The online recruitments used Instagram, Facebook, Pinterest, mobile applications including physical activity and healthy diet tracking apps, wearable tech forums, fitness tracker manufacturer's apps, and snowball sampling.

For recruitment on Instagram, the researcher used the hashtags #Fitbit, #Applewatch, and #Samsunggear, because of their comparatively more significant number of posts compared to other brands. The researcher also sent a direct message to those users with the survey link. For Facebook recruitment, the researcher joined activity tracker user groups, including Fitbit Versa user group, Apple Watch Challenges group, and Samsung Gear and Galaxy Watch group to maintain the consistency of brands from Instagram recruitment, and then sent a message to active users to take the survey. Also, the researcher's network was used on Facebook to share the survey link with friends. Pinterest was also used to recruit respondents by posting a research poster and survey link on the platform.

For physical activity and healthy diet tracking applications, MyPlate was used because respondents left comments on a post of the survey invitation about MyPlate as a helpful tool for healthy eating especially since the platform's online communities were active. Strava and Nike Run Club apps were also used as mobile physical activity tracking apps referred to survey respondents' recommendations. Recruitments from

official wearable tech forums were also explored, including Apple Watch, Fitbit, and Samsung, but all recruitment posts were deleted because of online community and forum policies associated with these specific forums. A few other wearable tech forums were used, but the numbers of click views were a lot less compared to the average click views on the forums.

For the recruitment activity on the manufacturer's applications, the researcher focused on Fitbit because of its accessibility and community function. Fitbit provided its own application for users to monitor health data and to communicate among users through several health interest groups, including a daily activity group, a healthy eating group, a yoga group, and so forth. Like Facebook, there were friendship-building activities and sharing people's food photos and workout results. The researcher uses Fitbit's activity tracker, so recruiting through Fitbit was more accessible compared to other brands. Samsung Gear's official app required physical ownership of the product in order to join the app and related Samsung Fitness app, Samsung Health app, but the official app did not provide a message function among friends in the same health activity challenges. Additionally, Apple Watch did not provide a community function on its official application for the Watch. On the Fitbit application, there were both open and closed communities to post texts or photos and also allowed the message function among friends. The researcher posted the survey poster and link through Healthy Eating group, Snacking Tips group, Vegetarian Group, and Daily Activity group respectively and encouraged online Fitbit friends on the applications to take a survey and share the research links with their friends.

Students in the Department of Communication and the Department of Education were recruited using the researcher's affiliation online and through face-to-face contacts. Additionally, emails and social media accounts provided by respondents were used to send the link to other potential respondents.

Survey procedure. The researcher created online survey questions on Qualtrics and an invitation poster for the recruitment of participants, in English and Korean languages. With approval from the Institutional Research Board, both survey posters and links were distributed on Instagram, Facebook, Pinterest, physical activity and healthy diet tracking apps, wearable tech forums, fitness tracker manufacturer's apps, and email addresses received via snowball sampling. Using the online survey link, respondents took the survey on either their personal computer or smartphone. As soon as participants clicked the link, they were asked to consent or decline to participate in the study. Only data from consenting participants is stored for analysis. Invalid data, missing more than 70% of answers, were deleted. The survey took approximately three minutes on average to complete. For the last question, the researcher asked participants if they knew somebody who was using an activity tracker and who would be interested in the survey. Some of the respondents shared contact information such as social media accounts or email addresses; the researcher reached out to suggested contacts to request participation in the study. After all respondents completed the survey, the researcher identified a total of 302 valid responses for the study.

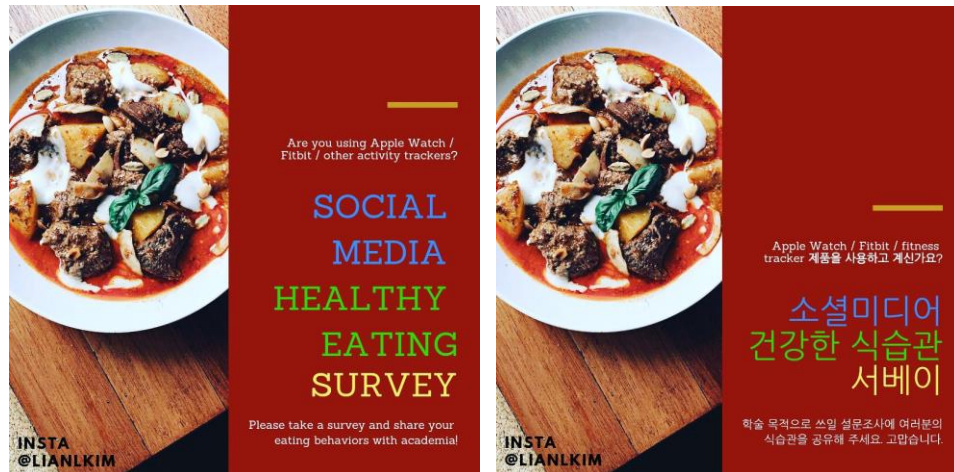


Figure 1. Survey posters: left image in English and right image in the Korean

Method of Data Analysis

The main purpose of this study was to examine whether there is a statistically significant relationship between social media use and self-efficacy for healthy eating. Descriptive statistics were used for independent variables (i.e., posting personal food photos, viewing others' healthy food photos, and seeking healthy diet information) and understanding the usage of social media platforms among activity tracker users.

Cronbach's α was used to determine internal consistency of all self-efficacy 8 scales questions. The chi-squared test was used to examine relationships between each of the independent variables and the dependent variable. Also, the χ^2 test was used to assess associations between independent variables, gender, and race. Independent t-test was used to determine whether there was a difference between gender and other variables. All descriptive statistics and statistical analyses were performed using SPSS except the randomization of raw data, which was completed using Microsoft Excel.

Summary

A survey was used to examine if social media use behaviors of activity tracker users affect self-efficacy for healthy eating behaviors. The researcher collected 302 valid responses through social media platforms, manufacturer's applications, physical activity and healthy eating tracking applications, activity tracker online forums, and online or offline contacts to reach out to participants for purposive and snowball sampling. In this study, the researcher conducted a survey using the "8-Item Self-Efficacy for Healthy Diet Scale" for self-efficacy questions, simplified social media use behaviors, and demographic information.

CHAPTER IV

RESULTS

This thesis aimed to investigate whether social media usage behaviors are associated with self-efficacy for healthy eating. This chapter describes the findings of the project. Once data was collected, the researcher analyzed data using quantitative methods, including frequencies, correlation, and differences between variables. The researcher found relationships between activity tracker users' demographic features and social media usage patterns for healthy eating. At the end, this chapter reports results of χ^2 test and independent t-test to answer research questions.

Descriptions of Participants

The final sample of data consists of 302 records. A total of 321 individuals completed the survey; 19 cases were dropped due to missing data. Among 302 participants, 247 (81.8%) were female, and 46 (15.2 %) were male, and nine (3%) declined to answer. Participant ages ranged from 18 to 71 years (Mean = 35.44, SD = 12.642), which represented a relatively older group compared to populations studied in previous literature. Participants' ethnicities included 220 (72.8%) White/Caucasian (non-Hispanic), 38 (12.6%) Asian, nine (3%) Black or African American, one (0.3%) Native Hawaiian or Pacific Islander, 25 (8.3%) represented other ethnicities, and nine (3%) declined to answer.

The highest education level of the participants indicated that most participants

hold at least a college degree. Only two (0.7%) selected “less than high school,” and 29 (10.3%) were high school graduates. Participants who went to college was 66 (21.9%), and participants who hold a two-year degree was 21 (7%). Holding a four-year degree was the most prominent response and represented 78 (25.8%) out of the total number of participants. Participants who hold a master’s degree were 67 (22.2%), and 24 (7.9%) indicated they had a professional degree. Eight (2.6%) chose a doctorate, and seven (2.3%) declined to answer.

Among 302 participants, 187 (61.9%) used Fitbit, 29 (9.6%) used Apple Watch, 11 (3.6%) used Samsung Gear, 10 (3.3%) used Xiaomi, eight (2.6%) used Garmin, three (1%) used Polar, one - two (less than 1%) used Huawei band, Google Fit, Moto 360, My Zone, Runtastic GPS Sports Watch, Suunto, or TomTom. Participants who chose “other” were 40 (13.2%) and specified their tracking methods. For example, MyPlate application and MyFitnessPal application were frequently mentioned representing 10 and six times, respectively. Others mentioned their smartphone manufacturer’s basic applications or third-party applications such as iPhone Health, Samsung Health, Lose It, Lifesum, Naturally Slim, Pacer, and Weight Watchers. Two participants (0.7%) mentioned they used a traditional pedometer.

Patterns of Social Media Use

Social media platforms used to seek health information. When participants were asked ‘what platform do you use for health-related information,’ participants’ answers included 191 (63.2%) physical activity and healthy diet tracking apps, 159 (52.6%) Instagram, 113 (37.4%) wearable tech forums, 100 (33.1%) Pinterest, 92 (30.5) Facebook, 71 (25.2%) manufacturers’ app, 37 (12.3%) other and specified they searched

for health information using Google, Twitter, YouTube, Reddit, and other third-party applications. Participants were allowed to choose all applicable selections.

Social media platforms used to seek healthy eating information. When participants were asked ‘what social media platforms do you use for healthy eating information,’ 152 (50.3%) answered Instagram, 137 (45.4%) used Pinterest, and 131 (43.4%) chose physical activity and healthy diet applications. The following answers included 92 (30.5%) Facebook, 51 (16.9%) wearable tech forums, including 45 of Fitbit users (14.9%) and three of Apple Watch users (3%) and one Reddit user. Manufacturers’ app was chosen by 33 (10.9%) participants. Participants who chose other was 51 (16.9%) and specified Tumblr, YouTube, Google, and magazine websites.

Frequencies of Independent Variables

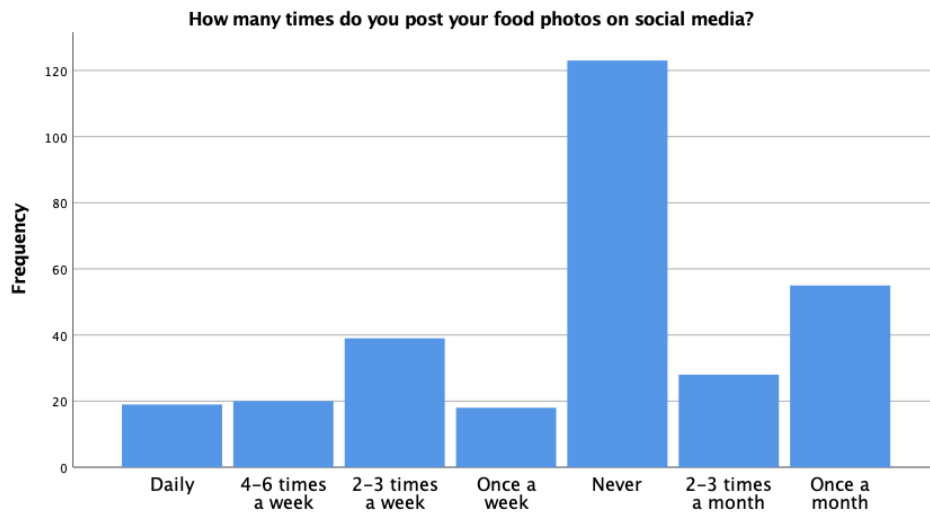


Figure 2. Frequency of posting personal food photos

Posting personal food photos. When participants were asked ‘how many times do you post your food photos on social media,’ 123 (40.7%) answered ‘never,’ and there were no directed patterns for these answers. Continuously, 55 (18.2%) participants

answered, ‘once a month,’ 39 (12.9%) answered ‘2-3 times a week,’ 28 (9.3%) answered ‘2-3 times a month,’ 20 (6.6%) answered ‘4-6 times a week,’ 19 (6.3%) said ‘daily,’ and 18 (6%) answered once a week. (See Figure 2)

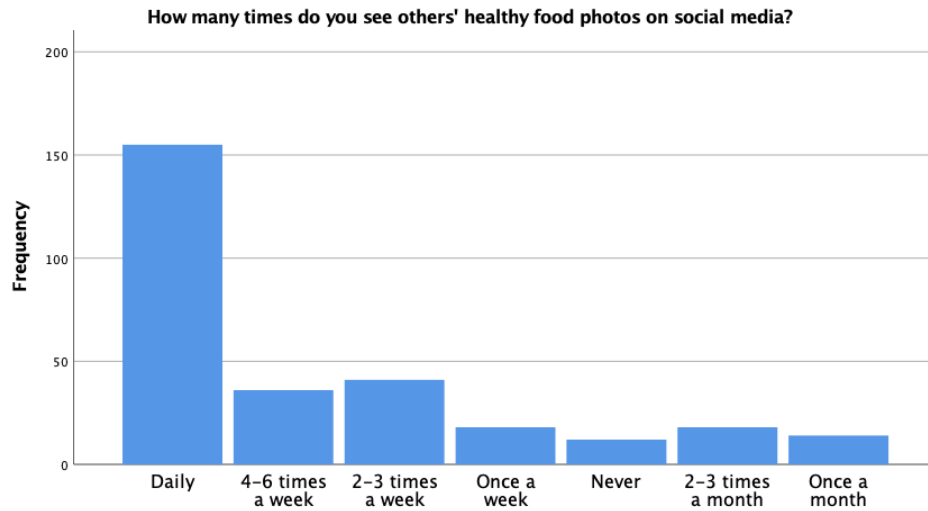


Figure 3. Frequency of viewing others' healthy food photos

Viewing others' healthy food photos. When participants were asked ‘how many times do you see others' healthy food photos on social media,’ 155 (51.3%) answered ‘daily,’ 41 (13.6%) answered ‘2-3 times a week,’ 36 (11.9%) answered ‘4-6 times a week,’ 18 (6%) answered, ‘once a week,’ 18 (6%) answered ‘2-3 times a month,’ 14 (4.6%) answered, ‘once a month,’ and only 12 (4%) answered they have ‘never’ seen others' healthy food photos on social media. Eight participants (2.6%) did not answer this question. (See Figure 3)

Seeking nutritional information. When participants were asked ‘how many times do you get healthy diet, new recipes, or nutrition information through social media,’ 95 (31.5%) answered ‘daily,’ 72 (23.8%) said ‘2-3 times a week,’ 35 (11.6%) answered, ‘once a week,’ 32 (10.6%) answered ‘4-6 times a week,’ 29 (9.6%)

participants answered ‘once a month,’ 22 (7.3%) answered ‘2-3 times a month,’ and only 13 (4.3%) answered they ‘never’ sought nutritional information through social media. Based on these answers, participants mostly experienced viewing others’ healthy food photos and sought nutritional information while using social media. However, much fewer people posted personal food photos. (See Figure 4)

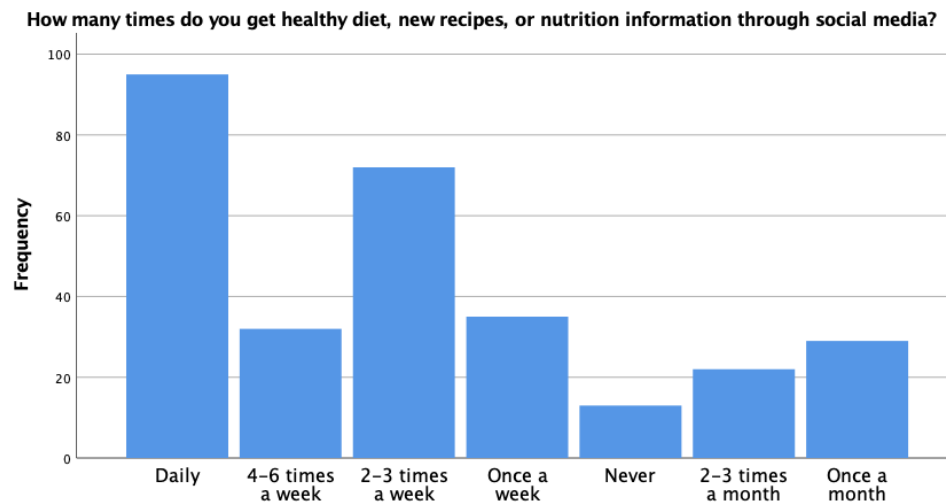


Figure 4. Frequency of seeking nutritional information

Social Media Use and Self-efficacy for Healthy Eating

χ^2 tests. The χ^2 tests were performed to examine the relationship between social media use and self-efficacy for healthy eating. Among three social media use behaviors (i.e., posting personal food photos, viewing others’ healthy food photos, and seeking nutritional information) and eight questions of self-efficacy for healthy eating, there was a statistically significant relationship between viewing others’ food photos and eating five portions of fruits and vegetables. The sample included 110 respondents who were extremely likely to eat five portions of fruits and vegetables daily, 111 who were

somewhat likely to eat five portions, 30 who reported neutral, 29 who were somewhat unlikely to eat five portions of fruit and vegetables, and 14 who were extremely unlikely to eat five portions of fruits and vegetables on a daily basis. The Pearson's Chi-Square test indicated a relationship between viewing others' healthy food photos and eating five portions of fruits and vegetables which was significant ($\chi^2 (24, N = 294) = 48.450, p = .002$). The more often people viewed others' food photos, the more likely they were to eat five portions of fruits and vegetables daily.

χ^2 tests discovered three significant relationships among variables. First, there was a significant relationship between viewing others' food photos and ethnicity ($\chi^2 (24, N = 285) = 57.895, p = .000$). Caucasian/White participants were more likely to view others' healthy food photos using social media. Second, there was a relationship between viewing others' healthy food photos and gender ($\chi^2 (12, N = 288) = 35.497, p = .000$). Women were more likely to view others' healthy food photos compared to men. Lastly, the relationship between seeking nutritional information through social media and gender was also significant ($\chi^2 (12, N = 292) = 31.372, p = .002$). Women were more likely to seek healthy diet information through social media compared to men.

Independent t-tests. An independent t-test was conducted to compare independent variables between gender. There was a significant difference in scores of viewing others' healthy food photos for males ($M=3.56, SD=2.201$) and females ($M=2.12, SD=1.659$) conditions; $t(283) = 5.035, p = .000$. Women scored lower compared to men, which means women more often viewed others' healthy food photos compared to men.

Summary

This chapter described findings of the research project. The purpose of this thesis was to examine whether social media use is associated with activity tracker users' self-efficacy for healthy eating. A total 321 responses were collected, and 302 valid data entries were analyzed. The majority of participants were Fitbit or Apple Watch users, White/Caucasian women, and their ages ranged from 18 to 71. As participants, activity tracker users engaged with various types of social media platforms including Instagram, Pinterest, or physical activity and healthy diet applications to seek general health information and nutritional information. Users commonly viewed others' healthy food photos and sought healthy diet information through social media, but there was relatively no common phenomenon, in terms of posting personal food photos.

χ^2 tests were used to examine the relationship between social media use and self-efficacy for healthy eating. Between social media usage behaviors of posting personal food photos, viewing others' healthy food photos, and seeking nutritional information—and self-efficacy for healthy eating questions showed a statistically significant relationship between viewing others' food photos and eating five portions of fruits and vegetables. For posting personal food photos and seeking nutritional information, there was no significant relationship with self-efficacy for healthy eating. χ^2 tests also discovered three significant relationships among variables: 1) viewing others' healthy food photos and ethnicity, 2) viewing others' healthy food photos and gender, and 3) seeking nutritional information and gender. An independent t-test was performed to compare independent variables between gender. There was a significant difference between viewing others' healthy food photos and gender.

CHAPTER V

DISCUSSION

This thesis examined the relationship between social media use and self-efficacy for healthy eating. This chapter discusses the summary and interpretations of the findings in this thesis and answers to research questions based on social cognitive as the theoretical foundation.

Summary of Findings

Throughout this study, the researcher examined the relationship between social media use behaviors and activity tracker users' self-efficacy for healthy eating. Tested social media usage behaviors included posting personal food photos, viewing others' healthy food photos, and seeking nutritional information through social media. Self-efficacy for healthy eating was estimated using the "8-Item Self-Efficacy for Healthy Diet Scale." Among all possible relationships of variables, there was a significant relationship between viewing others' healthy food photos and eating five portions of fruits and vegetables on a daily basis. Posting personal food photos and seeking nutritional information through social media were not significantly related to self-efficacy for healthy eating. Three unexpected relationships were found: between 1) viewing others' healthy food photos and ethnicity, 2) viewing others' healthy food photos and gender, and 3) seeking healthy diet information through social media and gender.

Interpretation of Findings

Social media use and self-efficacy for healthy eating. This study revealed that participants used various social media platforms including Instagram, Facebook, Pinterest, wearable tech forums, and other health tracking applications to seek health-related information and dietary information. Many respondents often saw others' healthy food photos, but few shared personal food photos as representation of achievements of healthy diet. Through performing χ^2 tests in SPSS, the answers to the research questions emerged. Before any discussion can be had, it is essential to reflect on the research questions as well as hypothesis.

RQa. Is posting personal photos associated with activity tracker users' self-efficacy for healthy eating?

RQb. Is viewing others' healthy food photos associated with activity tracker users' self-efficacy for healthy eating?

RQc. Is seeking nutritional information associated with activity tracker users' self-efficacy for healthy eating?

H. Activity tracker users' self-efficacy for healthy eating is more significantly associated with posting personal food photos compared to viewing others' food photos.

Social media usage behaviors—posting personal food photos, viewing others' healthy food photos, and seeking nutritional information—presented in the Likert-type scale received various frequencies. Across a series of analyses, a significant relationship was found between viewing others' healthy food photos and self-efficacy for healthy eating (RQb). In particular, there was a significant relationship between viewing others'

healthy food photos and eating five portions of fruits and vegetables daily. However, similar results were not obtained from either posting personal food photos (RQa) or seeking nutritional information through social media (RQc). There was no significant relationship between posting personal food photos and self-efficacy for healthy eating. Thus, the assumption that posting personal food photos might be more significantly related to self-efficacy for healthy eating compared to viewing others' food photos, was revealed to be incorrect and could not be statistically tested (H). The frequency of participants posting personal food photos explained that some participants likely posted personal food photos while 40 percent of them never posted.

On the basis of the results examining the relationship between social media use and self-efficacy for healthy eating, social cognitive theory in health promotion suggests a significant variable on using social media for healthy eating behavioral changes. Bandura (1971) argued that people change their old behaviors and create new behaviors through observing and mirroring others.

The result of the correlation between viewing others' healthy food photos and self-efficacy for healthy eating aligns with Bandura's perception and expands his argument because social media is a virtual space very similar to the real world. As such, the societal climate is important for creating and changing health-related behaviors. On social media, people express, share, and ask a variety of health-related information and share experiences (Klassen et al., 2018). As interest in healthy lifestyles grows, people dive into different types of healthy diets, homemade cooking, and nutritional food choices to achieve a healthy lifestyle (Klassen et al., 2018; Pappa et al., 2017). Some could be novices in the process, somewhat knowledgeable, or on the other hand, experts

on health information and experiences. Overall, the environment surrounding people who pursue healthier lifestyles actively motivates activity tracker users and others through social media.

Another benefit of using social media for healthy eating is people can choose what type of environment to participate in. There are a variety of brands of activity trackers, healthy eating groups, and platforms of social media. Joining interest groups, such as healthy eating groups of the brand behind their activity tracker, structures even stronger health-intense environments so that people would maintain goals and receive support from each other as well as encourage healthy eating behaviors.

Previous research showed that about 80% of activity tracker users engaged in more physical activity in their daily lives by using an activity tracker to monitor their data and improve fitness (Maher et al., 2017). However, only 40.2% of users reported their eating pattern changed after using an activity tracker (Maher et al., 2017). Built on literature (Laranjo et al., 2015; Klassen et al., 2018), this study agrees that social media is an effective tool for health behavioral changes and expands the literature about healthy eating behaviors based on findings from this project. People use a variety of social media platforms to attain healthier behaviors and interact with each other by sharing posts, photos, and comments online.

Based on previous research, activity tracker users seemed half successful in achieving a healthier lifestyle due to mostly focusing on physical activity, so adding a healthy and balanced diet will help add efficiency to their goals of health (World Health Organization, 2015). The results of the study showed developing healthy eating behaviors

and provided insight into ways to maintain attention on healthy diets through viewing others' healthy food photos on social media.

The researcher chose two variables, namely posting personal food photos and viewing others' food photos as an active usage pattern and a passive usage pattern, respectively. The researcher compared the variables—posting personal food photos and viewing others' food photos—to determine if the variables had significant associations with self-efficacy for healthy eating and to explore whether active usage was more powerful compared to passive usage. However, the researcher's assumption about posting personal food photos was revealed as incorrect. On the contrary, actual patterns of participants showed that posting personal food photos was not enough to generalize actions of activity tracker users. There was no regular pattern of posting personal food photos and, in fact, the results of the study showed that about 40% of participants never posted personal food photos on social media. This gap between the researcher's understanding and the reality could be explained as a blind spot for the researcher's assumption that most people post personal food photos on social media.

Seeking nutritional information was not significantly associated with self-efficacy for healthy eating. Previous research (Vaterlaus et al., 2015) suggested seeking health information was one of the widely shared usage patterns on social media, but among activity tracker users, there was no direct relationship between seeking healthy diet information and self-efficacy for healthy eating.

There were additional significant findings among variables, including ethnicity and gender. Ethnicity and gender arose as unexpected and important variables for this study. There were significant relationships between viewing others' healthy food photos

and ethnicity, viewing others' healthy food photos and gender, and seeking nutritional information and gender.

Social media use and ethnicity. Regarding ethnicity, White/Caucasians were likely to view others' healthy food photos relatively more compared to the other ethnicities based on the results of the data analysis. Almost 70% of participants were White/Caucasian, which could be interpreted that more White/Caucasian participated in the survey compared to other ethnicities. Based on the results from study participants, more White/Caucasians used activity trackers, including Fitbit, Apple Watch, Samsung Gear and so forth, compared to other ethnicities. The possible reasons of the results could be activity tracker brands' marketing strategies and market prominence for the brands identified above. While collecting data, the researcher used hashtags on Instagram (#Fitbit, #AppleWatch, #SamsungGear, etc), posted on healthy eating and physical activity tracking applications, and identified participants using snowball sampling. The results also mirror the capabilities and design of different activity trackers. For example, as one of the leading companies for activity trackers ("Fitbit - statistics & facts," 2019), Fitbit offers functions that allow users to focus more on health-related functions compared to other brand, such as Apple Watch and Samsung Gear, whose users are relatively more focused on the watch function compared to health-related functions. Hence, the response rate of #Fitbit users could be notably higher compared to any other activity tracker brand when participants were asked about their social media usage patterns for healthy eating as activity tracker users. Additionally, while reaching out to participants on Instagram, majority of participants using hashtag #Fitbit or #Apple Watch were White/Caucasian.

Another possible reason for the significant relationship between social media use and ethnicity is language. Since the data for this study was collected in English and Korean languages, social media users using Chinese, Japanese, French, Arabic, Hindi and other global languages may choose not to participate in the survey. Apple Watch, Samsung Gear from South Korea, and Fitbit occupy the market as the three strongest empires of the wearable device market. Recently, China's Xiaomi Mi Band has been growing rapidly and recorded 21.5% market share in the global wearable device market during the third quarter of the year 2018 (Russey, 2018). Since Xiaomi is based in China, the majority of Xiamoi's users could be those of Asian descent, who speak their native languages instead of English. It was challenging to find and contact potential participants whose primary languages were not English because other language speakers posted in their native languages on social media while key word searches were in English. The selection of languages for this study could be considered as a limitation for this study but still be valid in explaining a potential reason behind the relationship between social media use and ethnicity discovered in the results for this thesis.

Social media use and gender. Gender emerged as an important variable. There was a significant relationship between gender and viewing others' healthy food photos, and an association between gender and seeking healthy diet information. In both cases, women viewed others' healthy food photos more and tended to seek nutritional information through social media as compared to men. The relationships could be interpreted as women's higher interest in health information compared to men. Where did the differences come from? These gender differences could be explained by the gender role in society as a social norm. Bandura (1971) explains that people learn appropriate

behaviors by observing how others act and through mirroring others' behaviors. In the real world, the traditional perception within mainstream culture continues to assert that women are responsible for cooking and housework and that men's responsibility in the home is financial provision even though, in recent decades, more women work, and men are more involved in housework. This traditional concept reflects in social media as a mirror of real life. People who use social media repeated their behavior and built a virtual world similar to real life. By observing others' healthy diet images and information, particularly for women, other women might represent their interests in or desires for healthy diet information and ultimately achieve healthy lifestyles. The search mechanism of social media—displaying similar content that users have already seen online—could also reinforce the difference in the results for men and women. This environment could encourage users to view others' healthy food photos and healthy eating information. As a result, the significant relationship between gender and viewing others' healthy food photos and seeking healthy diet information might be influenced by social pressures and beauty standards surrounding women.

Implications of Findings

This thesis explored what specific usage patterns of social media are significant for creating and changing healthy eating behaviors among activity tracker users. At an individual level, if activity tracker users want to use social media as a motivational and encouraging tool for a healthy diet, then the hashtags of their own activity tracker can be helpful in creating a motivational environment for healthy eating behaviors. Since activity tracker users using the same brands feel support and also compete with each other, joining a healthy diet group and viewing others' healthy food photos and

nutritional information would help encourage and maintain activity tracker users' healthy eating behaviors.

This study discovered a meaningful variable—viewing others' healthy food photos—and a significant relationship between this variable and self-efficacy for healthy eating. Viewing others' food photos exposed the possibility of creating and maintaining healthy eating by using social media. The result contributed to the current literature of behavioral change studies about using social media in health promotion. Additionally, health educators could more frequently post food photos to motivate people to achieve healthy eating behaviors through online health promotion. As for a more practical application, the health technology industry could set a camera on an activity tracker in order for users to take and share personal healthy food photos easily and engage in viewing others' healthy food photos through healthy eating applications.

Summary

The research investigated statistical relationships between social media use and self-efficacy for healthy eating. There are significant relationships between viewing others' food photos and eating fruits and vegetables on a daily basis, between viewing others' food photos and ethnicity, between viewing others' food photos and gender, and between seeking nutritional information and gender. The results of the study supported Bandura's social cognitive theory that people learn and build a new habit from their environment. In this context, social media as an extended reality is indirectly related to people's perceptions of their environment. Even though posting personal food photos as an active use of social media was not related to self-efficacy for healthy eating, this research found that viewing others' healthy food photos was a meaningful variable for

healthy eating research and also found that ethnicity and gender differences of activity tracker users impacted healthy lifestyle choices.

CHAPTER VI

CONCLUSION

The purpose of this research project was to examine whether social media use is associated with self-efficacy for healthy eating. This chapter identifies limitations of the research project and makes recommendations for future research.

Limitations

Even though this study found a meaningful relationship between viewing others' healthy food photos and self-efficacy for healthy eating as well as a connection to ethnicity and gender variables, there are some limitations.

First, the Cronbach's α for "8-Item Self-Efficacy for Healthy Diet Scale" was .61. Ideally, Cronbach's α should be above .70 for a reliable item set of questionnaires, but the α of this research was less than .70. The possible explanation for the small number could be attributed to the fact that the questions were developed in the U.K. and for British people, so the scales might not perfectly fit those needed for global participants. Also, one of the questions—"How likely are you to eat or drink low-fat or non-fat products instead of high-fat or standard products?"—might be controversial. To be more specific in terms of consuming milk, whether drinking whole milk or low-fat milk could be a user's nutrition-wise choice, and the question may not have clearly reflected a global perception of healthy eating. Previous literature defines healthy eating as eating complex carbs, white meat, fruits and vegetables, less sugar, restricting milk and dairy products, and no

processed food. The guidance from literature does not point out whether low-fat milk is healthier compared to whole milk. The scales should be developed in a clearer and more reliable way, not only for specific populations but also for general populations in future research.

The second limitation is the lack of representation of various ethnicities. This research aimed to collect data from all around the world through social media, but about 70% of respondents were White/Caucasian and therefore failed to represent an adequate portion of the global population. As mentioned in the discussion section, this research also only used English and Korean languages. In turn, other activity tracker users using languages outside the two mentioned above were not effectively represented. It was hard to find and contact potential participants whose languages were not English or Korean because other language speakers posted and used their native language on social media while searching for key words was in English and Korean.

The last limitation is posting food photos. The survey question did not indicate whether posting food photos, included healthy food, unhealthy food, homemade healthy food, or homemade food including unhealthy ingredients. If there were follow up questions asking if participants posted healthy food or homemade healthy food, there might be a significant relationship between posting healthy food photos and self-efficacy for healthy eating.

Future Research

Future research can develop more suplicated and consistent questions for healthy eating when it comes to collecting data from global participants. Since global participants might have different understandings of healthy eating, common nutritional information

and cultural differences might be considered when developing questions and collecting data. In addition, future research can test whether viewing others' healthy food photos impact healthy eating, explore how it works, and develop a strategy for health promotion.

This research revealed a significance of viewing others' healthy food photos on healthy lifestyles. Future research can evaluate what types of food photos impact healthy eating behavioral changes. For example, researchers can compare homemade healthy food to food from restaurants, examine photos with text compared to those without text, and assess the context of language used to help determine what types of messages of food photos could be most effective. Researchers can then conduct eating behavioral change interventions through social media by using the most effective strategies for image design. Researchers can also attempt to represent more recent features and market share of wearable devices in the future studies. Since the market is rapidly growing, updated and more represented research about the population could be meaningful to existing literature.

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VIII. APPENDICES

APPENDIX A

Invitation Message for Recruitment

A group of researchers at West Texas A&M University is working on a study that attempts to explore the effect of social media use on healthy eating of activity tracker users. The study is for research purpose only. You may participate in the survey if you have reached the age of 18. If you're interested, please click the following link for more information.

Survey link: https://wtamuw.az1.qualtrics.com/jfe/form/SV_5dxJCVu6EG0Pfor

APPENDIX B

Informed Consent Form

We invite you to participate in a research study being conducted by investigators from West Texas A&M University. The purpose of the study is to explore activity tracker users' social media use and healthy eating. All the data will be collected for research purpose only. We plan to involve approximately 300 respondents in this study.

If you agree to participate, we would like you to complete the following online survey. The survey will collect information about: 1) basic demographics; 2) your social media use patterns; 3) your eating patterns; and 4) your activity tracker brand; Answering these survey questions involves no more than minimal risk, and the survey questions are not likely to cause discomfort to you.

Feel free to skip any questions that you prefer not to answer. It will take approximately five minutes to complete the survey. Due to ethical concerns, only individuals above the age of 18 will be involved in the study. If you have not reached the age of 18, please quit the survey.

We will not collect your name or any identifying information about you. It will not be possible to link you to your responses. The original data will be downloaded in the password-protected computer. We will randomize the data and use new case IDs rather than the original data while data analysis procedure. Therefore, unauthorized individuals are not likely to have access to survey participants' responses.

Taking part in this research study is completely voluntary with no benefit. If you do not wish to participate in this study, or if you are offended by some of the survey questions, feel free to close the browser and exit the survey at any time. Refusal to participate will involve no penalty.

This research has been approved by the Institutional Review Board at West Texas A&M University. If you have any concerns about this study or your rights, you can contact the primary investigator, Dr. Li Chen at 1-806-651-2416, email: lichen@wtamu.edu or Dr. Angela Spaulding, vice president of research/dean of graduate school, at 1-806-651-2731, email: aspaulding@wtamu.edu

Thank you again for your participation. Should you have any questions regarding this study and/or wish to request a copy of a descriptive report of the survey findings, please contact me (co-investigator, Lyounghée Lian Kim) at 1-806-678-6118, email: lkim2@buffs.wtamu.edu. I sincerely thank you for your time.

Below is a question pertaining to your understanding and agreement in this study. Please circle the appropriate answer below.

YES / NO I understand and agree to participate in this survey.

APPENDIX C

Survey Questionnaire

Social Media Use Behaviors and Self-efficacy for Healthy Eating

Questions adapted from the “8-Item Self-Efficacy for Healthy Diet Scale” (Simmonds et al, 2016)

Social Media Use Behaviors

1. What social media platforms do you use regarding health-related information?

(Select all applicable platforms)

- Facebook
- Instagram
- Pinterest
- The manufacturer's app
- Physical activity and healthy diet tracking applications
- Wearable tech forums (Please specify) _____
- Others (Please specify) _____

2. What social media platforms do you use regarding healthy eating, nutrition information, new recipes, or diet-related information?

(Select all applicable platforms)

- Facebook
- Instagram
- Pinterest
- The manufacturer's app
- Physical activity and healthy diet tracking applications

- Wearable tech forums (Please specify) _____
- Others (Please specify) _____

3. How many times do you post your own food photos on social media?

- Daily
- 4-6 times a week
- 2-3 times a week
- Once a week
- Never

4. How many times do you see others' healthy food photos on social media?

- Daily
- 4-6 times a week
- 2-3 times a week
- Once a week
- Never

5. How many times do you get healthy diet, new recipes, or nutrition information through social media?

- Daily
- 4-6 times a week
- 2-3 times a week
- Once a week
- Never

Self-efficacy for healthy eating behaviors

6. How likely are you to eat five portions of fruits and/or vegetables each day?
- Extremely likely
 - Somewhat likely
 - Neither likely nor unlikely
 - Somewhat unlikely
 - Extremely unlikely
7. How likely are you to eat baked potatoes, boiled potatoes, or oven chips instead of fried potatoes, roast potatoes, or fried chips?
- Extremely likely
 - Somewhat likely
 - Neither likely nor unlikely
 - Somewhat unlikely
 - Extremely unlikely
8. How likely are you to eat or drink products with added sugar, such as donuts, cookies, cakes, soda/carbonated drinks, or sugar added to hot drinks or cereal?
- Extremely likely
 - Somewhat likely
 - Neither likely nor unlikely
 - Somewhat unlikely
 - Extremely unlikely

9. How likely are you to eat brown/multigrain rice or whole wheat pasta instead of white rice or white wheat pasta?
- Extremely likely
 - Somewhat likely
 - Neither likely nor unlikely
 - Somewhat unlikely
 - Extremely unlikely
10. How likely are you to eat or drink low-fat or non-fat products instead of high-fat or standard products?
- Extremely likely
 - Somewhat likely
 - Neither likely nor unlikely
 - Somewhat unlikely
 - Extremely unlikely
11. How likely are you to eat vegetable dishes or white meat (such as chicken or turkey) instead of red meat (such as beef, pork, or lamb)?
- Extremely likely
 - Somewhat likely
 - Neither likely nor unlikely
 - Somewhat unlikely
 - Extremely unlikely

12. How likely are you to eat vegetable dishes or white meat (such as chicken or turkey) instead of processed meat (such as sausages, ham, pies, bacon, or chicken nuggets)?

- Extremely likely
- Somewhat likely
- Neither likely nor unlikely
- Somewhat unlikely
- Extremely unlikely

13. How likely are you to eat brown/multigrain rice or whole wheat pasta instead of white rice or white wheat pasta?

- Extremely likely
- Somewhat likely
- Neither likely nor unlikely
- Somewhat unlikely
- Extremely unlikely

Demographic Information

14. What is your gender?

- Male
- Female
- Prefer not to answer

15. What is your age?

- _____

16. What is your ethnicity?

- White or Caucasian
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or Pacific Islander
- Other

17. What is your highest education level?

- Less than high school
- High school graduate
- Some college
- 2 year degree
- 4 year degree
- Professional degree
- Masters
- Doctorate

18. What brand are you using for your activity/healthy eating tracking?

- Fitbit
- Apple Watch
- Samsung Gear
- Jawbone
- Garmin
- Moov Now
- Huawei Band
- TomTom
- Amazfit
- Polar
- Xiaomi
- Others

19. Would you be willing to share contact information (ex. either a social media account or an email address) of someone who might be interested in taking the survey? The information will be collected for research purpose only, and the data will be destroyed right after sharing the survey link. Please include a social media account or an email address below. You may skip this question, if you do not want to share.
