INTENTION TO PARTICIPATE IN WORKSITE HEALTH PROMOTION PROGRAMS WITH DIFFERENT PROGRAM FEATURES

by

LU MENG

(Under the Direction of Matthew Lee Smith)

ABSTRACT

As the workforce ages and occupational sitting increases, more employees are at risk of chronic diseases such as obesity, diabetes, and heart disease. Rising employee health problems lead to increasing health care costs and indirect costs due to work productivity loss. Multifaceted health promotion interventions are being adopted in the workplace for health promotion and disease prevention. Three main factors identified in previous literature to be associated with worksite health program success were employee-level characteristics, organizational characteristics, and program characteristics. The goal of the present study is to investigate how employee- and worksite-level characteristics affect employees' desired features of worksite health promotion programs. Cross-sectional online surveys were distributed through Amazon Mechanical Turk. Four hundred full-time employed U.S. Mturk users completed the survey and received a $2 incentive. Data were collected on their intention to participate in different types of programs, employee- and worksite-level characteristics such as worksite social support, work autonomy, physical effort at work, and perceived benefits of worksite health promotion. The findings of study 1 identified co-worker support, work autonomy,

physical effort at work, and gender to be common or distinct factors associated with intention to participate in three types of worksite physical activity programs. The findings of study 2 identified supervisor support, perceived benefits of worksite health promotion, and perceived importance of learning health information to be associated with interest in different worksite health topics and intention to participate in two types of conversation-based programs (group discussion and individual consultation). Results also suggested the importance of confidentiality of employees' health information, and choosing the optimal conversation-based format for delivering sensitive health topics at worksites. These studies highlighted tailorable strategies for introducing interventions into worksites based on employee and workplace characteristics.

INDEX WORDS: Worksite health promotion, physical activity, chronic disease, program implementation

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CHAPTER 1

INTRODUCTION

Employees health status

In 2016, the Bureau of Labor Statistics reported that approximately 159 million adults were in the workforce (*The Employment Situation-Octorber 2015*, 2015). As the population grows older, longer working years and a larger aging workforce are expected. It is estimated that by 2016, one-third of the total U.S. workforce will be 50 years or older (Heidkamp, 2013). In addition, the modern workforce has become increasingly sedentary over the past 60 years, which may result in risk factors for multiple chronic health conditions (Alicia et al., 2012; Beunza et al., 2007; Duncan, 2006; Warren et al., 2010). Chronic conditions, such as cardiovascular diseases, obesity, arthritis, and diabetes, are among the most prevalent, costly, and preventable health problems in the U.S. and often develop from age 45.

As people age, they become more likely to develop chronic conditions that may reduce their functional capacity and negatively affect accomplishing their work responsibility (Stanton, 2006). It is estimated that approximately 70% of American adults are classified as overweight or obese, and 133 million Americans are living with one or more chronic conditions (Bodenheimer, Chen, & Bennett, 2009; *Fighting obesity in the workplace*, 2013). High potential risks for chronic disease are a public health challenge associated with increased work productivity loss, and higher costs for employers, private payers, and public health insurance programs (*Fighting obesity in the workplace*, 2013).

Employee health effects on work and economy

Workforce health is closely related to employees' daily work life and impacts employers, the health care industry, and the national economy. An increasing research has estimated the economic burden of chronic conditions and their influence on the workplace (DeVol et al., 2007; Thorpe, 2006; Zhang, Bansback, & Anis, 2011). More than 75% of all medical expenses are related to the treatment of employees with one or more chronic conditions (Stanton, 2006). A study at the Milken Institute calculated that seven chronic conditions (i.e., cancer, heart disease, hypertension, mental disorders, diabetes, pulmonary conditions, and stroke) cost the U.S. economy more than $1.1 trillion per year, which will result in a projected illness burden of $4.2 trillion per year by 2023 (DeVol et al., 2007).

Employers are the ultimate healthcare purchasers for the majority of Americans, spending more than $14,000 per employee per year on total health-related costs (Goetzel et al., 2014). Indirect costs are widely referred to as work productivity losses. Many studies revealed the negative influence of different health problems on individual's ability to work (Kessler, Greenberg, Mickelson, Meneades, & Wang, 2001; Ward, 2015). A multiemployer research study demonstrated that health-related workforce absence and job performance (absenteeism and presenteeism) costs are significantly greater than medical and pharmacy costs alone, on average 2.3 to 1(Loeppke et al., 2009). Over 68% of the population aged 18-64 obtains their insurance through their employer; therefore, companies and organizations have a clear incentive to prioritize the overall health of their employees.

Workplace health promotion interventions and programs

As employees spend more time at work, employers are taking a greater role in providing preventive health programs to enhance employee health. Since the mid 1970's, employers have provided a variety of health promotion and disease prevention programs. The concept of workplace wellness started in the late 70s, and began to increase in popularity following the prevalence and rise of aerobic exercise videos in the early 80's (Vesely, 2012). Currently, workplace health care is multifaceted, including health insurance, onsite health centers, health screenings, and health promotion programs. Providing free health screenings for employees would help reduce health risk factors and deliver efficient treatment in the early disease stages (Goetzel, 2002). Timely referral services to hospital care and educational programs to offer diseases self-management strategies could potentially improve employee health status and work productivity (Parkinson, Peele, Keyser, Liu, & Doyle, 2014).

Recent research identifies the workplace as an effective setting for employee health promotion programs. Evidence also shows that employees can achieve a range of benefits by participating in workplace health promotion programs (Goldgruber & Ahrens, 2010). According to the Wellness Councils of America, more than 81% of businesses with more than 50 employees have some type of health promotion program (Aldana, 2001). Workplace health promotion programs focused on prevention, risk factor reduction, and disease management can produce substantial benefits to employees as well as employers, such as reducing chronic disease progression, absenteeism, and healthcare costs while improving productivity, job satisfaction, and retention (Aldana et al., 2005; Chapman, 2012; Goetzel, 2002; Goetzel et al., 2014).

Participation and determinants of participation

Unfortunately, employee participation rates in worksite health promotion programs are typically less than 50%, which hinder program effectiveness and success (Robroek, Van Lenthe, Van Empelen, & Burdorf, 2009). Barriers to participation in worksite health promotion interventions include lower perceived value and interest, ineffective recruitment methods, and many worksite-related factors (Grigsby, 2013; Rongen, et al., 2014). One of the most common barriers of worksite health promotion programs is that participants feel no interest in the program (Linnan et al., 2008; Nöhammer, Stummer, & Schusterschitz, 2014). For increasing program participation, it is important to explore employees' interest, needs, and intended participation prior to worksite program planning and implementation. Understanding how employees' interests and intended participation are connected with work organization characteristics could inform future worksite health promotion practices.

To date, most worksite intervention research focuses on intervention effectiveness, with far less research identifying determinants, facilitators, and barriers of participation in worksite programs. Based on limited existing studies about factors associated with workplace health promotion participation and success, determinants can be classified into three different categories: (1) i*ndividual characteristics* (i.e., sociodemographic factors, psychological and physical factors, health behavior and beliefs); (2) o*rganizational characteristics* (i.e., social support, work climate, workload); and (3) p*rogram characteristics* (i.e., treatment regimen, time and location, patient-practitioner relationship) (Sloan & Gruman, 1988).

Among those determinants, *program characteristics* are closely related to program designing and developing. It is difficult to change worksite and individual factors that have already existed for a long time within an organization. But, understanding these factors and their relation with preferences for desired program components may benefit program development and effectiveness, which has the potential to enhance worksite health promotion participation rates.

Purpose of the current study and research objectives

This dissertation research conducted a comprehensive cross-sectional survey to investigate how the individual- and worksite- level characteristics affect employees' interests and intended participation of workplace health promotion program (see Figure 1.1). This exploratory study can potentially inform researchers and practitioners about designing an appropriate workplace health promotion program for the targeted worksite based on worksite and individual level characteristics.

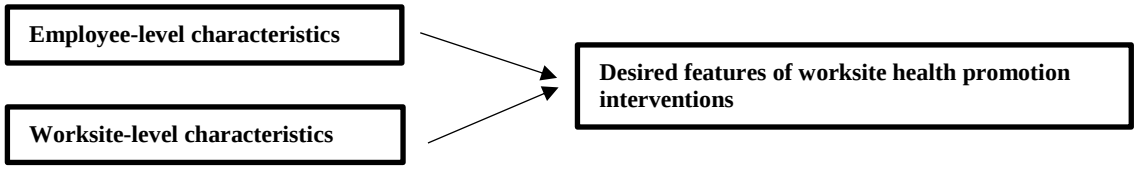

Figure 1.1 Dissertation Purpose

Objective of manuscript 1

Three common types of workplace physical activity programs were chosen for investigation in the current study, including individual-based physical activity (e.g., physical activity breaks, onsite fitness center time), group-based physical activity (e.g., Yoga classes, aerobic exercises sessions), and team-based sports (e.g., soccer, basketball). The intended participation for these three types of worksite physical activity program were measured as outcome variables.

Objective 1 (Figure 1.2): To explore and compare predictor variables (employee- and worksite- level factors) that are associated with intended participation in three main worksite physical activity programs.

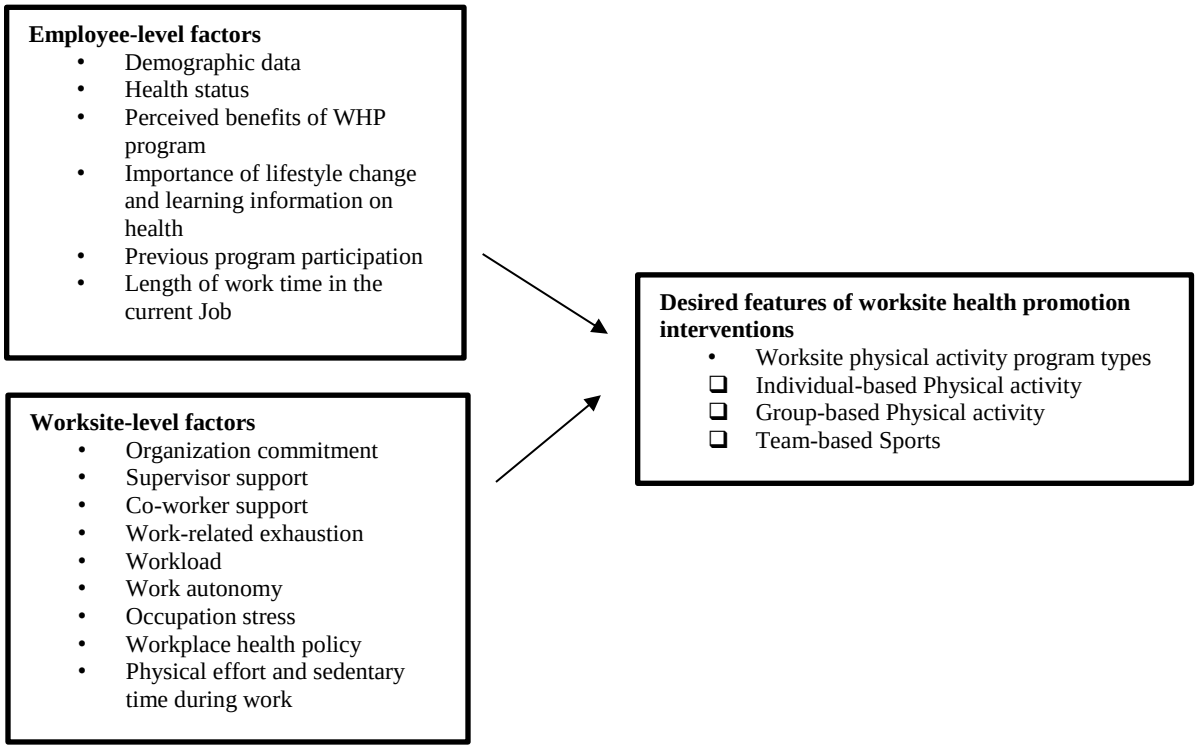

Figure 1.2 Structure of Study 1

Objectives of manuscript 2

Selecting optimal delivery formats is important for efficient health information distribution at worksite. The selection of delivery formats (e.g., group-based or individual-based conversation) may depend on sensitivity and specificity of the targeted health topics. For example, when seeking information about mental health or chronic conditions, individual consultation maybe favored by employees more than group discussion. And, interest in different health topics may be associated with individual- and worksite- level factors. Three common health topics with different levels of sensitivity

were chosen, including general health (e.g., healthy eating, healthy habits), stress and anxiety, and chronic conditions (e.g., diabetes, hypertension, arthritis). This study examined employees' intended participation in worksite conversation-based health programs by health topics and formats.

Objective 1 (Figure 1.3): To investigate the unique and common factors associated with employees' interest in learning about different health topics at their worksite (topics include: general health, stress and anxiety, and chronic diseases).

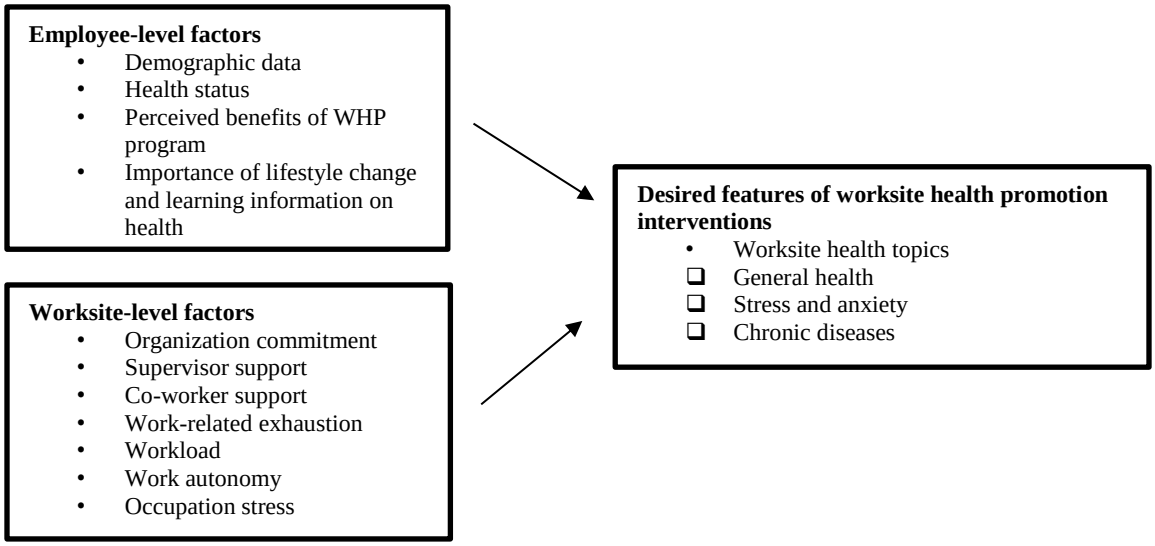

Figure 1.3 Structure of Study 2 Objective 1

Objective 2 (Figure 1.4): To investigate whether employees' intentions to participate in worksite interventions differ by health topics based on two conversation-based delivery formats (i.e., group discussions and individual consultations).

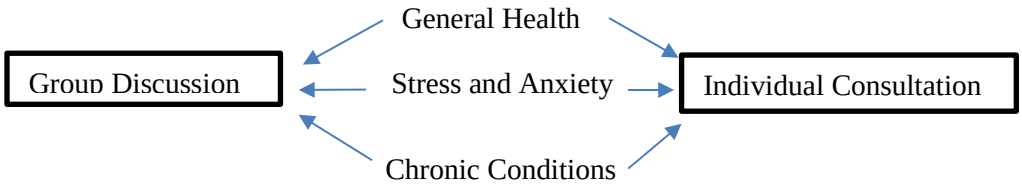

Figure 1.4 Structure of Study 2 Objective 2

Objective 3 (Figure 1.5): To investigate worksite- and individual-level factors associated with employees' intention to participate in worksite interventions by format (i.e., group versus individual).

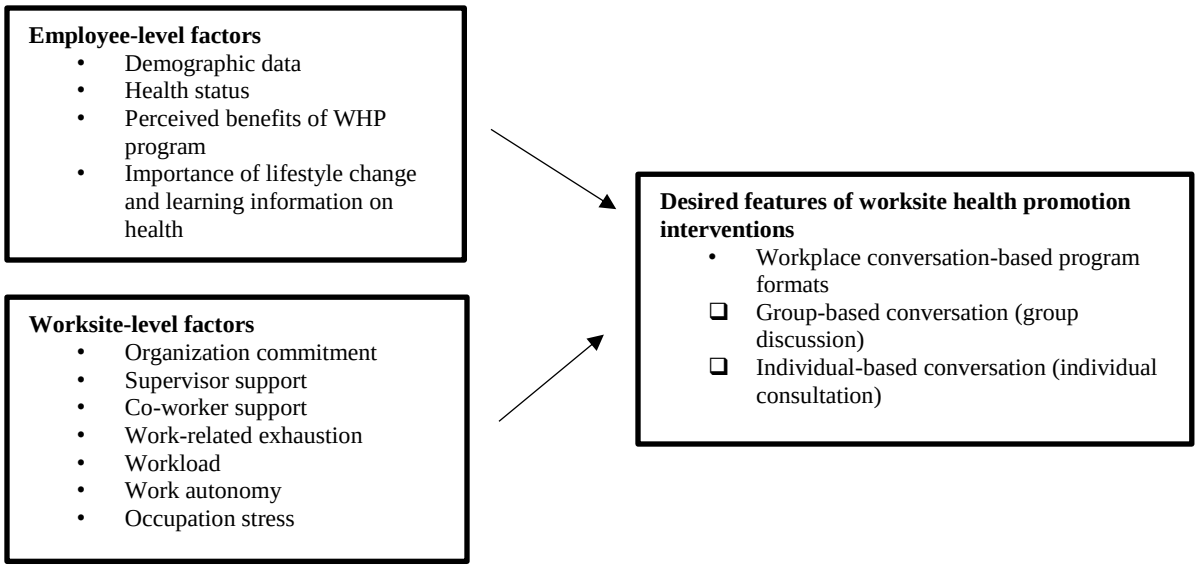

Figure 1.5 Structure of Study 2 Objective 3

CHAPTER 2

LITERATURE REVIEW

Components and characteristics of workplace health promotion

Goals and targeted health problems

A workplace wellness program is an employment-based activity or employer-sponsored benefit aimed at promoting health-related behaviors (primary prevention or health promotion) and disease management (secondary prevention) (Mattke, Schnyer, & Van Busum, 2013). A growing number of organizations or vendors provide services to employers seeking to help employees and their families better manage their own health. Participation in workplace health promotion interventions allows employees to develop knowledge, coping skills, and self-management. It also helps build a social support network among co-workers, families, and supervisors. Workplace health interventions are gaining prevalence in the workplace with the goal of reducing chronic disease progression, absenteeism, and healthcare costs as well as improving productivity, job satisfaction, and retention (Goetzel et al., 2014). Worksite health promotion could target changing daily risky behavior such as sedentary work lifestyle. The most common chronic diseases targeted by worksite health promotion included overweight and obesity, diabetes, and cardiovascular diseases (Fries & McShane, 1998).

Intervention components and characteristics

Instructional Education/Consultation components: Workplace health promotion interventions often incorporated educational and informative components,

which could be delivered in group- or individual-based formats, such as group discussion, presentation or individual health coaching (Leung, Chan, Sea, & Woo, 2017). Most group sessions were held on-site at the worksite and during lunch breaks (Malarkey, Jarjoura, & Klatt, 2013). Almost all instructional interventions included educational materials, such as brochures, mails, books, or videotapes. Health topics covered by group education and consultation included general health (healthy eating and physical activity), mental health, self-care, chronic disease, and healthy habits (smoking cessation/substance abuse) (Linnan et al., 2008). Education sessions and health consultations were usually conducted by health professionals, including trained health coach, nutritionist, physician, registered dietitian, cooking instructor, nurse, psychologist, physical therapist, health educator, pharmacist, researcher, exercise physiologist, and behavior health specialist (Carpenter et al., 2014; Malarkey et al., 2013; Mauceri et al., 2011).

Physical activity components: Physical activity topics were often addressed in consultations or education, and many interventions included actual physical activity exercises or distributed exercise tracking tools to reinforce behavioral change (Meng et al., 2017). To encourage physical activity, environmental change and distribution of small tracking devices could be utilized to facilitate behavior changes and reduce sedentary time. In addition, group-based exercise sessions were incorporated into many worksite health promotion programs (Malarkey et al., 2013; White & Jacques, 2007). In some organizations with enough resources, on site exercise rooms and one-on-one fitness training could be provided for employees (Hughes et al, 2007). In addition, distributing free fitness center memberships was another strategy to encourage more physical activity (Aldana et al., 2006).

Environmental change components: With the support from upper management, many worksite health promotion studies featured environmental changes. Common worksite environmental changes were classified into two main types: facilitated physical activity and facilitated diet change. To facilitate physical activity, some interventions installed treadmill desks and distributed exercise equipment (e.g., pedal machines) to participants (Carr et al., 2013; John et al., 2011; Koepp et al., 2013). To facilitate healthy diet changes, those programs included an organizational policy related to cafeteria management, which made low-fat vegan menu options available for participants (Levin, Ferdowsian, Hoover, Green, & Barnard, 2010; Mishra et al., 2013; Stites et al., 2015). Stites and colleagues designed an online pre-ordering system to allow participants to order their lunch prior to mealtime while viewing the nutrient content of the food choices (Stites et al., 2015). Making the nutrition information and low-fat/calories food available to employees was the main purpose of interventions making environmental changes to facilitate diet change.

Worksite health policy making: Previous studies also addressed the importance of worksite macrosocial determinants (e.g., policy and environment) of participation in worksite health promotion programs (Linnan et al., 2001). Worksite health policy making usually utilized together with health promotion programs to facilitate healthy behavior changes. Policy making and environmental change complements each other to increase health awareness and contribute to create a culture of worksite health (Kahn-Marshall & Gallant, 2012). Worksite health policies could be implemented for many purposes: reducing unhealthy behavior (e.g., smoking free worksite) (Emmons et al., 2000); providing monetary rewards for healthy behaviors or healthy employees (Poole,

Kumpfer, & Pett, 2001); or encouraging healthy behaviors (e.g., 30 minute physical activity break policy, healthy food provided at meetings) (Biener et al., 1999; Lara et al., 2008; Yancey et al., 2004). Worksite health policy implementation is relatively low cost but yields high effectiveness (Kahn-Marshall & Gallant, 2012).

Health risk assessment: Health risk Assessment or appraisal often utilize subjective (survey) or objective (biometric screening) to assess health risk factors, and provide feedback to employees for healthy behavior change. Employees at work environment may perceive themselves as being in good to excellent health, and usually overestimate their health status. The biometric measures provide objective assessment for their health status, and motivate health risk reduction and worksite health program participation (Meng, et al., 2017; Rula & Hobgood, 2010). Health risk assessments with feedback is useful as a gateway to a broader worksite health promotion programs (Soler et al., 2010).

Multi-component interventions: Multi-components are defined based on the three components described above (instructional education/consultation, environmental change, and physical activity). That is, a multi-component intervention had to include at least two of the three categories. Multi-component interventions were widely implemented to better reinforce behavioral changes. For example, in Carr et al. study, interventions had physical activity-based components facilitated by environmental changes (treadmill & pedal-machine) (Carr et al., 2013), and Aldana's study combined education/consultation components with physical activity-based group sessions, one-on-one training, or free fitness facility memberships (Aldana et al., 2006). Some studies have shown that employees prefer multi-component interventions, which are also more likely

to be successful (Goldgruber & Ahrens, 2010; Katz et al., 2005). Additional elements in such interventions can assist and supplement education and consultation components by adding worksite environmental changes to facilitate physical activity and healthy diet. However, they may also increase program costs.

Technology-based interventions: The growth of mobile device applications and Internet access has increased the number of technology-based workplace health promotion interventions. This can help reduce the common barriers to participation such as time, place, and costs (Anderson et al., 2009; Carr et al., 2008; Tate, Jackvony, & Wing, 2003). In worksites where it may be difficult for employees to attend face-to-face interventions together or those that lack regularly scheduled break times, telephonic health coaches, and online modules and forums could be considered as intervention delivery choices. Those strategies could be applied in the modern workplace where employees work through telecommuting and virtual teams. Telephone/cellphone communications were often used for one-on-one health consultation, but other phone functions (such as sending text messages) were also used as reminders for attending appointments or sessions (Touger-Decker et al., 2010). The internet was often used to facilitate communication among participants and health professionals, in the form of weekly email for individual support and self-monitoring reminders, or online interactive message boards (Kullgren et al., 2013; Mishra et al., 2013; Salinardi et al., 2013; Touger-Decker et al., 2010). Program websites were created along with the intervention as a comprehensive resource offering eLearning modules and other session materials and tools (Carpenter et al., 2014; Merrill, Aldana, & Bowden, 2010). Computer-based technology was designed to facilitate the intervention, such as online lunch pre-ordering

systems (Stites et al., 2015). In a physical activity-based intervention, pedal machines were distributed to sedentary employees. Carr and colleagues utilized a personal computer interface and software package that accompanied the pedal machine, which allowed for objective monitoring of individual pedal activity (Carr et al., 2013).

Other characteristics (duration, incentives, facilitators, paid administrative leave): Other characteristics that are crucial for worksite health promotion interventions include program duration, incentives, and time/place arrangement. The duration of program refers to the length of the intervention periods. Many studies had an intervention period greater than 1 month but less than 1 year. And longitudinal studies usually collected and analyzed data from multiple years when programs were delivered in cycles or on a repeated basis (John et al., 2006; Merrill et al., 2010). Maintenance periods could be added after interventions, and varied from 3 to 12 months and depended on the design and duration of the intervention period.

Incentives were frequently utilized in health promotion programs, and can be classified into many different types, including financial incentives or other types of incentives such as paid leave time, health devices, and free water bottles. Financial incentives were given to employees for different purposes including participating in the intervention and achieving health goals, compensating control group participants, and completing data collection. In some studies, participants were given a limited time of administrative leave at no cost as an incentive for encouraging continuous participation (Barham et al., 2011). Having sufficient available time to participate onsite programs is important for increasing participation (Crump, Earp, Kozma, & Hertz-Picciotto, 1996;

Rost & Connell, 1990). In another diabetes study, participants were awarded a free Boehringer Mannheim Advantage glucose monitor as an incentive (Fouad et al., 1997).

For encouraging participation, most worksite health promotion programs planned educational sessions or group activity based on the convenience of their participants. Aldana et al. and Barham et al. provided employee participants paid administrative leave for participating in worksite health promotion programs on site (Aldana et al., 2006; Barham et al., 2011). Some other studies provided repeated sessions and multiple schedules for the employees convenience (Ard et al., 2010).

Factors associated with worksite health promotion success

Individual characteristics

Previous research suggested individual- and worksite-level factors can predict worksite health promotion (WHP) program participation, which in turn determines program effectiveness and success. Many individual characteristics were tested and identified in previous studies to be associated with program preference, interest, and participation.

Among social-demographic variables, age and gender's association with WHP participation were widely studied. Age may be related to employees' health status, acceptance of newer technologies, workload, and health topic preferences. It is suggested that younger employees have higher expectations for behavior changing such as weight management, physical activity and stress management, whereas older employees are more interested in blood pressure control or disease management (Bertera, 1990). In terms of gender, most studies reported higher participation among women. However,

female employees are associated with higher participation and interest for educational programs but not for physical activity programs (Robroek et al., 2009).

Health-related determinants (e.g., weight, physical activity level, smoking, cholesterol level, and blood pressure) are widely tested with the participation and interests of WHP programs. However, there is no consistent evidence to suggest there is higher participation among less healthy workers. Perceived health risks have been reported to be associated with program participation (Sloan & Gruman, 1988). Prior health knowledge, employee attitudes towards healthy behavior, perceived WHP benefits and perceived importance of making a lifestyle change are all tested and identified to be associated with program interest, willingness to participate and actual program participation (Hannon et al., 2012).

Worksite characteristics

Worksite characteristics refer to the way work processes are structured and managed, such as job design, work scheduling, worksite policies, and worksite management. Worksite characteristics have a wide impact on employees' work, health and quality of life, relationship between different levels of employees, and ultimately impact on the organization itself. The success of worksite health promotion builds on supportive worksite environment and characteristics. Worksite related factors were closely related with worksite health promotion program planning, implementation and program participation. Various worksite factors were examined in recent studies. Listed below are potential factors raised in the published literature.

Organization administration and management commitment: Management support refers to the degree of decision makers' support for the programs as indicated by

beliefs about the program, percentage of employees being supported in participation, and stated support for the program (Crump et al., 1996). Support and feedback from upper management of work organizations are crucial for program development and implementation. Jorgensen's study suggested organizational commitment was positively associated with employees' program participation (Jørgensen, Villadsen, Burr, Punnett, & Holtermann, 2016).

WHP readiness: The readiness of both employers and employees to adopt and implement WHP, and their willingness to commit resources to WHP is a key factor in determining program reach and impact. WHP readiness was defined, discussed and validated in recent WHP literature (Hannon et al., 2012). Lack of dedicated time, facilities, and resources will make it hard for practitioners to reach all employees in need.

Work autonomy, available timing, and alternative offers: Available timing of workplace health promotion programs is important for increasing program accessibility and the participation rate. Worksite health promotion programs have higher participation and completion rates when participants are allowed to join the program on paid work time or programs are offered during multiple alternative times (Nöhammer, Schusterschitz, & Stummer, 2010). Based on Jorgensen's study in 2015, employees are more likely to participate in worksite health programs during working hours than leisure time (Jørgensen et al., 2016). Work autonomy and supervisors' permission to participate during work hours highly increase program success. This could also serve as an incentive for employees to participate and complete the program. In addition, work autonomy could provide employees more control, increase employees' loyalty to employers, and reduce reported symptoms of stress and costs due to absenteeism (Halpern, 2005).

However, the degree of flexibility and autonomy should be controlled in a range and combined with fixed work times to better enhance work efficiency (Pierce & Newstrom, 1983).

Workplace social support: Social support (both supervisor support and co-worker support) is highly associated with program success, and has been addressed in many studies (Crump et al., 1996; Jørgensen et al., 2016; Linnan et al., 2008; Sloan & Gruman, 1988). Social support from supervisors and coworkers influences an employee's healthy behavior and attitude toward participating in health programs. Strengthening perceived benefits among employees and communication are advisable for increasing program participation (Nöhammer, Schusterschitz, & Stummer, 2013). Supervisor support was identified as an important factor among all worksite organization characteristics for WHP program planning, implementation, and program participation (Nöhammer et al., 2014). A positive work environment is the foundation to creating an optimal atmosphere for healthy lifestyle adoption and worksite health program completion. In addition, creating a culture of health in work organizations increases perceived health beliefs among employees, and fosters positive employee attitudes towards healthy behavior (such as regular physical activity and decision to quit smoking). It is suggested these employees would be favorably disposed to a worksite health program (Bertera, 1990).

Workload and job demands: High workload and job demand are other potential reasons tightly linked with an employees' time commitment for a workplace health program (Jørgensen et al., 2016). When analyzing reasons for terminating participation in worksite health programs, job conflict is often listed as the most common reason.

Workload and job demands determine whether participants have the time and energy for a worksite health program. High workload increases stress-produced negative health conditions which in turn affects employees' participation in health promotion programs (Sloan & Gruman, 1988).

Low interest in worksite health promotion programs: There is the concern that work organizations' evaluation process may not properly value worksite health programs. Businesses are usually measured based on some form of earnings, these figures are compared to previous performances and industry peers (Rosenbaum & Pearl, 2009). Unfortunately, the health of employees is not a typical evaluation measurement. Upper management may be evaluated by the performance of short term rather than long-term goals. While a work organization may verbally support worksite wellbeing programs, this conflict may prevent a company's decision maker from providing the full resources necessary for overall effectiveness. Employees are also evaluated based on short-term production and performance indicators. Since promotions and pay increases are based on these evaluations, it is highly unlikely that employees will prioritize worksite health promotion program engagement if there is a perception that this activity may negatively impact their evaluation.

Work environment and policy change: Health promotion programs are more effective when the workplace environment and climate facilitates health interventions and behavior changing. For example, implementing a policy change toward a smoke free environment to facilitate a smoking cessation program, encouraging stair usage and a physical activity break to facilitate a worksite physical activity program; and

implementing food management in the cafeteria/vending machine to facilitate a worksite healthy eating program (Kahn-Marshall & Gallant, 2012).

Workplace Discrimination and illness disclosure at work: Employees with stigmatizing illnesses in the workplace may have reasonable concerns about being discriminated against (Vickers, 1998). In organizational life, colleagues may have the perception of reduced functionality for sick co-workers. Employees concealing an illness and personal situation may make their job more difficult. However, studies have shown in general that employees are concerned about sharing health related information with their employers (Munir, Leka, & Griffiths, 2005). Their concerns and fears may hinder worksite health promotion programs reaching and helping employees in need.

Program characteristics

Different work settings have unique characteristics. Topics, components and characteristics of worksite health promotion programs should match the needs and characteristics of a worksite and the employees within the worksite. Worksite characteristics vary because of differences in organizational goals, job responsibility and employee populations. Heath needs of employees in different worksites vary as well. One of the barriers to participating in WHP programs is the imbalance of what is gained and lost by participating in these programs (Nöhammer et al., 2014). Thus, choosing a proper health topic for a program to meet special needs is essential for attracting employees' attention, guaranteeing participants' perceived benefits from the program, and potentially increasing program participation rates.

For example, white-collar employees with a sedentary working environment, higher workload and lower work autonomy are more vulnerable to developing mental

health related health problems such as stress, anxiety and sleep problems. Stress management, physical activity-based components such as Yoga and Tai chi were frequently implemented for these worksites (Hartfiel et al., 2012; Malarkey et al., 2013; Tamima et al., 2009). These settings include university staff and faculty departments, administrative departments and the IT industry. Employees with job responsibilities that may contain potential harm to their physical health such as fire fighters, coal miners may need more knowledge on occupational safety and injury prevention. Workers in the manufacturing field doing repetitive movements may need ergonomic and injury prevention interventions (Ahram & Karwowski, 2012). A comprehensive needs assessment to explore the preference of programs among targeted employees may benefit program development and effectiveness.

Choosing optimal program components and delivery formats for a worksite is also related with a worksite's size, resources and affordability. In some worksites with the ability to provide an employee fitness center, gym membership, or health coach/personal trainer, physical activity interventions are feasible and manageable. Whereas in some small work settings with a small sample of participants, office environmental changes to facilitate physical activity could be practical, such as providing sit-stand tables, treadmill desks and pedal machines (Carr et al., 2013; D. John et al., 2011). Medium to big worksites with employee cafeterias are more convenient and feasible to implement healthy eating by recording purchase transactions, and implementing food management utilizing food labels and nutritional notifications (Mishra et al., 2013). Workplaces equipped with enough computers and internet access could offer health-related online courses for employees.

CHAPTER 3

STUDY 1: INTENTION TO PARTICIPATE IN DIFFERENT TYPES OF WORKSITE PHYSICAL ACTIVITY PROGRAM

[1] Meng, L. To be submitted to *Journal of Occupational and Environmental Medicine*

Abstract

Introduction

To reduce prolonged occupational sitting, many worksites allow employees to participate in onsite physical activity exercises and provide different types of these programs. There is a lack of research to explain why employees favor one worksite physical activity program over another. This study identified three common types of physical activity programs and compared individual and worksite factors associated with employees' intended participation in these programs.

Method

Cross-sectional survey data were collected online from 400 full-time employed adult Amazon Mechanical Turk users. Analyses were performed using SPSS version 24. One-way ANOVA and chi-square tests were conducted to compare sample characteristics, and ordinal logistic regression models were developed to assess factors associated with intended participation in three types of worksite physical activity programs.

Results

Intended participation in individual-based physical activities was highest among all the different types of worksite physical activities. Employees who reported greater co-worker support and higher levels of physical effort at worksites reported greater intent to participate in worksite group- and team- based physical activities ($p<0.05$). Work scheduling autonomy was positively associated with intent to participate in individual-based physical activities (Beta=0.18, $p<0.05$). Male employees favored team-based sports

at worksites (Beta=0.55, $p<0.01$), while female employees favored less competitive group-based exercise sessions (Beta=-0.43, $p<0.05$).

Conclusion

Workplace social support is the foundation of implementing successful group- and team-based physical activity programs. Workplace physical activity program planning and development should be based on employee- and worksite-level factors (e.g., work autonomy, gender composition) to meet employees' needs and enhance program efficiency.

Introduction

Sedentary behavior and prolonged occupational sitting are reported to be associated with the increased risk of various adverse health conditions (Ishizaki et al., 2004; Nam et al., 2016). The sedentary modern workforce contributes to the increasing prevalence of obesity in the U.S. (Mummery, Schofield, Steele, Eakin, & Brown, 2005) Encouraging physical activity can reduce the risk of being obese and developing chronic diseases such as heart disease and diabetes. In response to the increase of direct and indirect health costs due to chronic diseases, employers are taking a greater role in introducing workplace health promotion programs to increase physical activity among employees at the worksite (Chu et al., 2016).

There are many strategies to increase physical activity in the workplace. Some worksite physical activity interventions provide facilities and resources and allow employees to participate in actual onsite exercises (Conn, Hafdahl, Cooper, Brown, & Lusk, 2009; Meng, Wolff, et al., 2017). Worksite physical activity interventions can be delivered in different formats. Three common types of worksite physical activity programs most notably referenced in the current literature include individual-based physical activity at the worksite, group-based physical activity with co-workers, and team-based sports with co-workers (Barr-Anderson, AuYoung, Whitt-Glover, Glenn, & Yancey, 2011; Brinkley, McDermott, & Munir, 2017; Dishman et al., 1998).

Worksite individual-based physical activity (PA) programs do not require a strict schedule or organization; rather, employees are allowed to exercise during work hours for a short amount of time based on their own work schedule (e.g., physical activity breaks, onsite fitness center time) (Barr-Anderson et al., 2011; Pedersen, Cooley, & Mainsbridge,

2014; Taylor et al., 2013). Worksite group-based PA programs are more organized and require employees to participate together at the same time and location. Group-based PA requires more socialization compared with individual-based PA, such as onsite yoga classes, dancing clubs, or aerobic exercises sessions (Gram, Holtermann, Søgaard, & Sjøgaard, 2012; Hartfiel et al., 2012; Tamima et al., 2009). Compared with group-based PA, team-based sports are more competitive than group-based PA and may be seasonal, such as soccer, softball, and basketball (Brinkley et al., 2017).

The success and effectiveness of worksite health promotion programs are determined by employees' intention to participate in the program and their actual participation in the program (Glasgow, McCaul, & Fisher, 1993; Rongen, Robroek, van Ginkel, Lindeboom, Altink, et al., 2014). Individuals self-select into different program types based on a variety of factors and characteristics. For enhancing program effectiveness and participation, it is important to understand whether the physical activity program is suitable for the worksite considering the employee-level and worksite-level factors (Wong, Koh, & Lee, 1998). However, there is a lack of evidence that explains why employees favor one program over another. The present study compared factors associated with employees' intent to participate in different types of worksite physical activity programs. Identifying individual and worksite factors influencing intent to participate can inform employers and practitioners about better physical activity program development and delivery strategies to tailor interventions to meet the needs of their employees and increase participation.

Methods

Study Participants and Procedures

Data were collected through Amazon Mechanical Turk (Mturk). Mturk (https://www.mturk.com) provides a service for researchers to use its web user interface to post tasks known as "HITs" (human intelligence tasks), which might include tasks such as completing a questionnaire, translation, and evaluating photographs. Mturk users worldwide ("workers") can log on the system, browse among tasks and complete them for monetary payments at their convenience. In total, 400 U.S. participants on Mturk completed the survey and were compensated with a $2.00 monetary incentive. Inclusion criteria for the present study: Amazon Mechanical Turk users, more than 18 years old, reside in the United States, and full-time employees who commute to a worksite with more than 5 co-workers. Surveys took participants approximately 5-10 minutes to complete. Institutional Review Board approval for this study was obtained at The University of Georgia.

Data and Measures

Dependent Variables

Intent to participate in different types of worksite physical activity programs were assessed by a series of three questions. Participants were asked, "If you were allowed to do the following things on work time, please rate how likely you would be to: (1) Participate in team-based sports with my coworkers; (2) Participate in group-based physical activity with your co-workers (aerobic exercise classes, yoga classes, etc.); and (3) Participate in individual-based physical activity alone (individual walking/physical activity break, onsite fitness center time, etc.)." Responses were scored as "4=very

likely," "3=somewhat likely," "2=somewhat unlikely," and "1=very unlikely." Based on the frequency distribution of the dependent variables, we collapsed response "very unlikely" and "somewhat unlikely" into one category. The dependent variables were treated ordinally in analyses.

Independent Variables

Perceived Benefit of Worksite Health Promotion (WHP)

A three-item WHP perceived benefits scale (Cronbach coefficient alpha=0.82) developed by Hannon et al. (2012) was used to assess participants' perceived benefits of implementing WHP at their worksite. Participants were asked to rate their level of agreement on items such as: "Health promotion at worksites like mine would improve employee health." Responses were scored on a 5-points Likert scale from "1=strongly disagree" to "5=strongly agree." The final score was calculated using the average of the three items, and treated as a continuous variable in the analysis.

Supervisor Support on Health

A three-item supervisor support on health scale (Cronbach coefficient alpha=0.91) developed and revised by Butts et al. (2013) was used to assess participants' perceived supervisor support on health. Participants were asked to rate their level of agreement on items such as: "My supervisor encourages me to take steps to prevent personal physical illness." Responses were scored on a 5-points Likert scale from "1=strongly disagree" to "5=strongly agree." The final score was calculated using the average of the three items, and treated as a continuous variable in the analysis.

Work Scheduling Autonomy

A three-item work scheduling autonomy scale (Cronbach coefficient alpha=0.91) developed by Breaugh et al. (1985) was used. Participants were asked to rate their level of agreement on items such as: "I have control over the scheduling of my work." Responses were scored on a 7-points Likert scale from "1=strongly disagree" to "7=strongly agree." The final score was calculated using the average of the three items, and treated as a continuous variable in the analysis.

Co-worker Support

A four-item co-worker support scale (Cronbach coefficient alpha=0.88) developed by Ducharme and Martin, and modified and validated by Woo et al. (2012) was used. Participants were asked to rate level of agreement on items such as: "My coworkers really care about me" and "I feel close to my coworkers." Responses were scored on a 7-points Likert scale from "1=strongly disagree" to "7=strongly agree." The final score was calculated using the average of the four items, and treated as a continuous variable in the analysis.

Work-related Exhaustion

A three-item scale was used from the Quality Work Competence (QWC) psychosocial questionnaire developed and validated by Anderzen and Arnetz (2005). Participants were asked to rate the frequency of the following statements occurs: "(1) I feel emotionally drained after work; (2) I feel worn out after work; and (3) I feel tired when I think about work." Responses were scored as "1=never," "2=a few times per year," "3=a few times per month," "4=a few times per week," and "5=daily." The final

score was calculated using the average of the three items, and treated as a continuous variable in the analysis.

Occupational Stress

A six-item Perceived Stress Scale (Cronbach coefficient alpha=0.88) adapted by DeJoy et al. (2010) was used. Participants were asked to rate the frequency of the following items occurred in the last month, such as: (1) “Been upset because of something that happened unexpected at work; and (2) “Felt nervous and stressed because of work.” Responses were scored from “1=never” to “5=very often.” The final score was calculated using the average of the six items, and treated as a continuous variable in the analysis.

Workload

Workload was assessed by the five-item Quantative Workload Inventory (QWI) scale developed by Spector and Jex (1998). Participants were asked to rate the frequency of the following items occurred, such as: (1) “Your job require you to work very fast”; and (2) “You have to do more work than you can do well.” Responses were scored as “1=Less than once per month or never;” “2=Once or twice per month;” “3=Once or twice per week;” “4=Once or twice per day;” and “5=Several times per day.” The final score was calculated using the average of the five items, and treated as a continuous variable in the analysis.

Importance of Lifestyle Change and Learning Health Information

Importance of life change and learning health information were separately assessed by two single items developed and adapted from Toker et al (2015). Participants were asked: “How important is it for you to (1) make a lifestyle change to improve your

health? and (2) learn more about health-related information to improve your health?" Responses were scored from "1=not important at all" to "4=very important," and treated as two continuous variables in the analyses.

Organizational Commitment on Employee Health

Perceived organizational commitment on employees' health was measured by a single item from Toker et al (2015)' study. Participants were asked: "How committed do you think your organization is to the health of all its employees?" Responses were scored from "1=Not committed at all" to "4=Very committed," and treated as a continuous variable in the analyses.

Physical Effort and Sedentary Time During Work

Physical effort and sedentary time during work were separately assessed by two single items developed from Choi et al. (2010). Participants were asked: (1) "How often does your job require you to sit for long periods of time during your work-shift?" and (2) "How often does your job require a lot of physical effort during your work-shift?". Responses were scored from "1=never" to "5=all the time," and treated as two continuous variables in the analyses.

Previous Program Participation and Workplace Health Policy

Participants were also asked whether they had ever participated in a worksite health promotion program, and whether they were aware of any policies implemented in their workplace to create a healthier work environment for employees. Responses for those two items are "Yes" and "No," and they were treated as categorical variables in the analyses.

Length of Work Time in the Current Job

Length of work time was assessed by one question: "How long have you been working for your current job?". Responses were scored as "1=less than 1 year," "2=1-4 years," "3=5-9 years," "4=10-15 years," and "5=15 or more years." Length of work was treated as a continuous variable in the analyses.

General Health

Participants were asked to self-report their general health status with response choices ranging from "1=poor" to "5=excellent." Self-reported general health was treated as a continuous variable in the analyses.

Personal Characteristics

To identify sociodemographic characteristics of participants, variables in the study included gender; race/ethnicity (i.e., White, African-American, others); education (i.e., high school, some college, college, and graduate school); marital status (i.e., unmarried or married); and income level. Income level was treated as a continuous variable, and other sociodemographic variables were treated as categorical variables.

Statistical Analyses

In total, 400 participants were included in the analyses without omitting any cases, all of the participants finished survey and provided complete data. All statistical analyses were performed using SPSS version 24. Frequencies were calculated for all major study variables. Pearson's chi-squared tests were performed to assess the independence between categorized independent variables and dependent variable. One-way ANOVA were used to examine mean differences of continuous independent variables between dependent variable response categories. A series of three proportional

odds models were fitted to examine relationships between the intent to participate in different types of worksite physical activity programs and independent variables.

Results

Table 3.1 shows sample characteristics of the respondents based on intention to participate in different types of worksite physical activity programs. Of the 400 participants in this study, 68% (n=272) reported intent to participate in group-based worksite physical activity, 86.5% (n=346) reported intent to participate in individual-based worksite physical activity, and 63.3% (n=253) reported intent to participate in team-based worksite physical activity. Approximately 52% of participants were males, and most were White (83.5%). About 45.8% of participants reported being married, 60% had an education level of college graduate or above, and the average household income level was between $60,000 to $79,999. About 31.5% of participants reported having participated in a worksite health promotion program and 31.8% were aware of health policies at their worksite.

Table 3.2 shows the results of a series of ordinal regression models, revealing common and distinct factors that influence intent to participate in three different types of worksite physical activity. The most common factors associated with intent to participate a worksite physical activity program was perceived benefits of worksite health promotion at their worksite, supervisor support, co-worker support, physical effort at work, and gender.

Across levels of intent to participate in a worksite group-based physical activity program, participants who perceived greater benefits of health promotion at their worksite (Beta=0.76, $p<0.001$), reported higher coworker support (Beta=0.30, $p=0.004$),

and had a job requiring more physical effort (Beta=0.30, p=0.008) reported higher intent to participate in a group-based worksite physical activity program. Relative to female participants, male participants (Beta=0.43, p=0.04) reported less intent to participate in group-based worksite physical activity programs.

Across levels of intent to participate in an individual-based physical activity program, participants who perceived greater benefits of health promotion at their worksite (Beta=0.61, p<0.001) and reported higher work autonomy (Beta=0.18, p=0.013) reported higher intent to participate in individual-based worksite physical activities. Participants who had lower supervisor support (Beta=-0.47, p<0.001) reported higher intent to participate in a worksite individual-based physical activity. Relative to participants who were never aware of any health-related policies at their worksite, those who were aware of health-related policies at worksite (Beta=0.51, p=0.047) reported higher intent to participate in a team-based physical activity program at worksite.

Across levels of intention to participate in a team-based physical activity program, participants who had higher supervisor support (Beta=0.27, p=0.016) and coworker support (Beta=0.33, p=0.001), perceived higher importance of learning health-related information (Beta=0.36, p=0.037), and had a job requiring more physical effort (Beta=0.26, p=0.018) reported higher intent to participate in team-based worksite physical activity programs. Relative to female participants, male participants (Beta=0.55, p=0.008) reported higher intent to participate in team-based worksite physical activities. Relative to participants who never participated in any worksite health promotion programs, those who participated before (Beta=0.52, p=0.033) reported higher intent to participate in a worksite team-based physical activity program. Participants who reported

shorter length of work years in the current worksite (Beta=-0.26, p=0.008) reported higher intent to participate in a team-based physical activity program at their worksite.

Discussion

This study aimed to understand factors associated with employees' intent to participate in different types of worksite PA programs. Results suggest individual-based worksite physical activity programs were the most welcomed among the three types of worksite physical activity programs. The desire for privacy and not being publicly sweaty at work may explain the favor for worksite individual-based physical activity programs (Bredahl et al., 2015). In addition, individual-based worksite programs have the potential to overcome the complicated relationships at workplaces because of less demands on social interactions and support. However, successful individual-based programs are still in need of upper management support for effective policy implementation and establishment of onsite facilities and healthy environments (Hannon et al., 2012).

Coworker support was found positively associated with intent to participate in worksite group- and team-based PA programs, but not associated with intent to participate in individual-based PA programs. Our findings reinforce previous studies about relationships between co-worker support and intention to participate in worksite health promotion programs (Crump et al., 1996; Jørgensen et al., 2016; Nöhammer et al., 2014; Sloan & Gruman, 1988). In addition, the present study may indicate workplaces with lower coworker support may be better suited for individual-based PA programs as an option for encouraging PA among employees.

Work scheduling autonomy was identified as a distinct factor that was only significantly associated with intent to participate in worksite individual-based physical

activity programs. Work autonomy is the foundation of implementing individual-based PA programs at worksites (e.g., physical activity breaks, onsite fitness center time). Similarly, Heaney et al. also discussed fitness center participation's association with specific job characteristics such as flexible scheduling and work autonomy (Heaney & Inglish, 1995).

Our findings showed that intent to participate in a worksite group- and team-based PA program increases with the increasing of supervisor support; however, the opposite direction was observed for individual-based programs at worksites. Supervisor support was identified as an important predictor of WHP participation in previous literature (Nöhammer et al., 2014), and our finding suggests group- or team-based PA programs that require more workplace social interactions need more supervisor's support. We did not observe the same positive effect of supervisor's support on individual-based PA programs in the present study. However, the lack of support from upper management and supervisors was identified as one of the barriers for participation in a workplace booster break study (Taylor et al., 2013). In addition, individual-based physical activities require higher levels of work schedule autonomy, which often builds upon permission and encouragement from supervisors and leadership.

We found employees who had higher levels of physical effort at worksites reported more intent to participate in worksite PA programs. On the contrary, employees who had jobs requiring less physical effort did not favor worksite physical activity programs. In previous studies, Macniven et al. reported that worksite health promotion programs predominantly reached motivated participants instead of at-risk participants (Macniven, Rosen, Engelen, & Bauman, 2014). Freak-Poli et al. also found employees

who started with better health were more likely to respond positively to the program (Freak-Poli, Wolfe, Walls, Backholer, & Peeters, 2011). In addition, occupational sitting was positively related with leisure time sitting, which adds more health risks for developing chronic diseases (Macera et al., 2005; Probert, Tremblay, & Gorber, 2008). Reaching and motivating inactive employees is a challenge for current workplace interventions. Future worksite health promotion efforts need to be better targeted to reach and encourage inactive employees to adopt healthy lifestyles and reduce chronic diseases risks (Goetzel et al., 2007; Nöhammer et al., 2013).

We found male participants favored team-based sports at worksites relative to their female counterparts. Previous studies also suggested females are more influenced than males by their perceptions of support, and less interested in competitive team sports (Daigle, 2003). However, females were more likely to participate in general workplace health promotion than males (Sloan & Gruman, 1988). Workplace PA program should consider the gender composition of the targeted worksite. In addition, we found length of work time at the current worksite was negatively associated with intent to participate in worksite team-based sports. A possible explanation is that employees with longer time in the workforce may be older. Age composition of the targeted employees should also be considered in worksite PA program development.

Employers' perceived benefits of workplace health promotion were identified as an important indicator for WHP program adoption at their worksites (Hannon et al., 2012). In this study, we tested WHP perceived benefits among employees and found higher perceived benefits of health promotion was associated with higher intent to participate in worksite PA programs. Most studies investigated and emphasized experts'

or employers' opinions on implementing workplace health promotion. However, it is important to consider that the employees are the targeted population and are the ones who choose to participate or not. Therefore, their perspectives and perceptions about the effects of the program should also be taken into consideration in workplace program planning, development, and delivery (Goetzel et al., 2007; Nöhammer et al., 2013).

Our finding also suggested previous program participation and awareness of worksite policies may increase the intent to participate in worksite PA programs. Employees who were previously exposed to worksite health promotion and health policies showed more intent for future program participation (Rost & Connell, 1990). This also reflects whether their worksite has created a culture of worksite health to facilitate and encourage WHP program participation (Kent, Goetzel, Roemer, Prasad, & Freundlich, 2016).

This study was not without limitations. Data were collected through Mturk. Mturk users tend to be skillful on using technologies for completing tasks online, which cannot present the greater working population. Due to our limited budget, we only had 400 American Mturk users complete our survey; therefore, the results may not be able to be generalized for the entire American workforce. Future studies may collect data through multiple methods from real workplaces. In addition, age was not collected in the present study, which could be an important demographic variable in the models. Based on our preliminary findings, future studies may consider adding interactions between the predictor variables into the models to further explore the factors associated with intended participation.

However, this study was unique in that it is among the first studies to examine and compare factors associated with intent to participate in three different types of worksite physical activity programs. The findings will potentially inform employers and practitioners of better PA program development strategies to match employee needs, and potentially enhance program participation and success.

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Table 3.1 Comparison of sample characteristics based on different types of intention to participate in three types of worksite physical activity programs

		Individual-based PA					Group-based PA					Team-based PA				
Variables	Total (n = 400)	Unlikely (n=54)	Somewhat likely (n=146)	Very likely (n=200)	X2 or F	P	Unlikely (n=128)	Somewhat likely (n=153)	Very likely (n=119)	X2 or F	P	Unlikely (n=143)	Somewhat likely (n=150)	Very likely (n=103)	X2 or F	P
Gender (%)					10.874	0.004				4.381	0.112				0.948	0.623
Male	51.8	44.1	50	65			57.8	52.3	44.5			48.1	54.8	50.5		
Female	48.3	55.9	50	35			42.2	47.7	55.5			51.9	45.2	49.5		
Race (%)					9.322	0.054				15.993	0.003				1.791	0.774
African American	6.8	5.6	7.8	6.8			6.3	4.6	10.1			7.4	4.8	8		
White	83.5	90.2	80.5	78.6			89.8	86.3	73.1			85.2	84.9	82		
Other	9.8	4.2	11.7	14.6			3.9	9.2	16.8			7.4	10.3	10		
Education (%)					4.907	0.556				3.272	0.774				4.233	0.645
Graduate School	21.5	23.1	16.9	26.2			19.5	20.3	25.2			27.8	18.5	22		
College	39	35.7	42.2	38.8			36.7	41.2	38.7			42.6	37.7	39		
Some College	32.3	32.9	33.1	30.1			36.7	30.1	30.3			25.9	35.6	31.5		
High School	7.3	8.4	7.8	4.9			7	8.5	5.9			3.7	8.2	7.5		
Marital Status (%)					2.652	0.265				2.091	0.351				0.772	0.68
Married	45.8	40.6	47.4	50.5			43	43.8	51.3			44.4	48.6	44		
Not Married	54.3	59.4	52.6	49.5			57	56.2	48.7			55.6	51.4	56		
Previous Program Participation (%)					7.877	0.019				0.286	0.239				8.483	0.014
Not have been participated into WHP	68.5	76.9	65.6	61.2			74.2	66	65.5			85.2	67.8	64.5		
Have been participated into WHP	31.5	23.1	34.4	38.8			25.8	34	34.5			14.8	32.2	35.5		
Awareness of health policy at worksite (%)					4.602	0.1				7.409	0.025				6.59	0.037
Did not aware any health policy at worksite	68.3	74.8	63.6	66			75.8	68.6	59.7			77.8	72.6	62.5		
Aware health policies at worksite	31.8	25.2	36.4	34			24.2	31.4	40.3			22.2	27.4	37.5		

Perceived benefit of implementing WHP	3.97 (±0.82)	3.44 (±1.06)	3.84 (±0.85)	4.2 (±0.61)	23.918	<0.001	3.57 (±0.95)	3.99 (±0.7)	4.37 (±0.56)	34.499	<0.001	3.72 (±1.03)	4.01 (±0.63)	4.25 (±0.61)	13.958	<0.001
Supervisor support on health	2.36 (±1.06)	2.47 (±1.19)	2.41 (±1.03)	2.3 (±1.05)	0.818	0.442	2.09 (±1.05)	2.42 (±0.96)	2.59 (±1.14)	7.388	0.001	1.98 (±0.97)	2.44 (±0.99)	2.77 (±1.12)	19.261	<0.001
Work autonomy	4.43 (±1.66)	3.99 (±1.77)	4.38 (±1.63)	4.59 (±1.64)	2.875	0.058	4.32 (±1.78)	4.44 (±1.62)	4.54 (±1.59)	0.573	0.564	4.41 (±1.81)	4.31 (±1.63)	4.65 (±1.48)	1.27	0.282
Co-work support	5.18 (±1.2)	4.78 (±1.54)	5.13 (±1.14)	5.33 (±1.11)	4.876	0.008	4.82 (±1.38)	5.16 (±1.13)	5.61 (±0.93)	14.201	<0.001	4.77 (±1.41)	5.31 (±0.95)	5.57 (±1.06)	15.59	<0.001
Work-related exhaustion	2.92 (±1.08)	2.98 (±1.17)	2.88 (±1.02)	2.93 (±1.1)	0.172	0.842	2.95 (±1.08)	2.93 (±1.12)	2.88 (±1.02)	0.14	0.87	3.09 (±1.21)	2.9 (±0.98)	2.71 (±1)	3.908	0.021
Work stress	2.49 (±0.94)	2.58 (±0.86)	2.47 (±0.92)	2.47 (±0.98)	0.309	0.735	2.45 (±0.86)	2.49 (±0.98)	2.52 (±0.97)	0.167	0.846	2.54 (±1.04)	2.49 (±0.87)	2.4 (±0.9)	0.622	0.538
Workload	3.22 (±1.01)	3.16 (±1.13)	3.19 (±0.92)	3.26 (±1.04)	0.308	0.735	3.15 (±1.04)	3.23 (±0.97)	3.29 (±1.03)	0.631	0.533	3.19 (±1.08)	3.24 (±0.93)	3.23 (±1.04)	0.083	0.921
General Health	3.42 (±0.9)	3.31 (±1.1)	3.34 (±0.84)	3.5 (±0.88)	1.802	0.166	3.28 (±0.97)	3.42 (±0.91)	3.55 (±0.79)	2.874	0.058	3.29 (±1)	3.36 (±0.84)	3.67 (±0.79)	5.982	0.003
Importance of make healthier life change	3.2 (±0.81)	2.91 (±0.98)	3.11 (±0.79)	3.35 (±0.74)	7.958	<0.001	2.97 (±0.91)	3.23 (±0.72)	3.41 (±0.73)	9.864	<0.001	3.13 (±0.86)	3.21 (±0.76)	3.28 (±0.81)	1.027	0.359
Importance of learning health information	3.06 (±0.83)	2.74 (±0.99)	2.96 (±0.81)	3.22 (±0.76)	9.164	<0.001	2.81 (±0.92)	3.03 (±0.74)	3.37 (±0.74)	15.12	<0.001	2.91 (±0.92)	3.03 (±0.76)	3.31 (±0.74)	7.383	0.001
Organizational commitment to employee health	2.49 (±0.94)	2.35 (±0.85)	2.41 (±0.94)	2.58 (±0.95)	1.935	0.146	2.29 (±0.92)	2.49 (±0.93)	2.69 (±0.92)	5.764	0.003	2.23 (±0.93)	2.53 (±0.92)	2.78 (±0.9)	10.932	<0.001
Physical effort at worksite	2.45 (±1.19)	2.48 (±1.31)	2.52 (±1.14)	2.39 (±1.19)	0.576	0.563	2.22 (±1.2)	2.46 (±1.18)	2.67 (±1.14)	4.618	0.01	2.19 (±1.18)	2.51 (±1.21)	2.72 (±1.11)	6.456	0.002
Sedentary at Worksite	3.34 (±1.38)	3.28 (±1.57)	3.35 (±1.33)	3.35 (±1.37)	0.063	0.939	3.46 (±1.42)	3.34 (±1.39)	3.21 (±1.33)	1.014	0.364	3.49 (±1.39)	3.41 (±1.34)	3.03 (±1.41)	3.676	0.026
Income	6.59 (±2.92)	6.07 (±3.03)	6.77 (±2.96)	6.6 (±2.86)	1.11	0.331	6.28 (±2.96)	6.66 (±2.86)	6.82 (±2.95)	1.139	0.321	6.37 (±2.89)	6.55 (±2.89)	6.94 (±3.02)	1.162	0.314
Length of work	2.78 (±1.06)	2.59 (±0.98)	3.01 (±1.1)	2.65 (±1.04)	5.994	0.003	2.82 (±1.08)	2.74 (±1.04)	2.77 (±1.09)	0.205	0.815	2.87 (±1.12)	2.76 (±1.05)	2.67 (±1)	1.055	0.349

Table 3.2 Ordinal regression results revealing factors associated with higher intention to participate in three different types of worksite physical activity programs

	Individual-based Physical Activity					Group-based Physical Activity					Team-based Physical activity				
	Beta	S.E.	P	95% CI		Beta	S.E.	P	95% CI		Beta	S.E.	P	95% CI	
Predictors				Lower	Upper				Lower	Upper				Lower	Upper
Perceived benefit of implementing WHP	0.61	0.15	<0.001	0.32	0.91	0.76	0.16	<0.001	0.44	1.07	0.27	0.15	0.072	-0.02	0.56
Supervisor support on health	-0.47	0.12	<0.001	-0.70	-0.23	0.07	0.11	0.514	-0.15	0.30	0.27	0.11	0.016	0.05	0.49
Work autonomy	0.18	0.07	0.013	0.04	0.32	0.03	0.07	0.675	-0.11	0.17	-0.03	0.07	0.675	-0.17	0.11
Co-work support	0.12	0.10	0.244	-0.08	0.31	0.30	0.10	0.004	0.09	0.50	0.33	0.10	0.001	0.13	0.54
Work-related exhaustion	0.23	0.14	0.105	-0.05	0.51	0.10	0.14	0.468	-0.18	0.38	-0.08	0.14	0.564	-0.35	0.19
Work stress	-0.27	0.16	0.099	-0.59	0.05	0.03	0.16	0.842	-0.28	0.35	0.03	0.16	0.852	-0.28	0.34
Workload	0.18	0.13	0.151	-0.07	0.43	-0.03	0.12	0.828	-0.27	0.21	-0.05	0.12	0.695	-0.29	0.19
General Health	0.21	0.13	0.094	-0.04	0.45	0.13	0.12	0.302	-0.11	0.36	0.15	0.12	0.220	-0.09	0.38
Importance of make healthier life change	0.26	0.17	0.130	-0.08	0.59	0.14	0.17	0.405	-0.19	0.47	-0.16	0.17	0.343	-0.49	0.17
Importance of learning health information	0.22	0.17	0.213	-0.12	0.55	0.13	0.17	0.453	-0.21	0.46	0.36	0.17	0.037	0.02	0.70
Organizational commitment to employee health	0.04	0.14	0.799	-0.25	0.32	0.09	0.14	0.541	-0.19	0.36	0.10	0.14	0.469	-0.17	0.37
Physical effort at worksite	-0.12	0.11	0.292	-0.34	0.10	0.30	0.11	0.008	0.08	0.52	0.26	0.11	0.018	0.05	0.48
Sedentary at Worksite	-0.06	0.10	0.580	-0.25	0.14	-0.03	0.10	0.802	-0.22	0.17	-0.09	0.10	0.381	-0.27	0.11
Income	0.03	0.04	0.462	-0.05	0.11	0.05	0.04	0.192	-0.03	0.13	0.05	0.04	0.260	-0.03	0.13
Length of work	-0.17	0.10	0.103	-0.37	0.03	-0.06	0.10	0.552	-0.26	0.14	-0.23	0.10	0.020	-0.43	-0.04
Gender: Female	Reference	.	.	.	.	Reference	.	.	.	.	Reference	.	.	.	.
Gender: Male	0.21	0.22	0.322	-0.21	0.64	-0.43	0.21	0.040	-0.84	-0.02	0.55	0.21	0.008	0.14	0.97
Race: Black	Reference	.	.	.	.	Reference	.	.	.	.	Reference	.	.	.	.
Race: White	-0.31	0.43	0.475	-1.14	0.53	-0.37	0.41	0.364	-1.18	0.43	-0.15	0.41	0.710	-0.95	0.65
Race: Other	0.13	0.53	0.808	-0.91	1.17	0.68	0.51	0.181	-0.32	1.68	0.63	0.50	0.209	-0.35	1.62
Education: High School	Reference	.	.	.	.	Reference	.	.	.	.	Reference	.	.	.	.

Education: Some College	-0.28	0.45	0.534	-1.15	0.60	-0.13	0.42	0.759	-0.95	0.69	0.32	0.42	0.458	-0.52	1.15
Education: College	-0.52	0.46	0.258	-1.41	0.38	-0.10	0.43	0.815	-0.93	0.74	0.40	0.43	0.356	-0.45	1.25
Education: Graduate School	-0.94	0.49	0.054	-1.91	0.02	-0.10	0.46	0.826	-1.00	0.80	0.29	0.46	0.528	-0.62	1.20
Not Married	Reference	.	.	.	.	Reference	.	.	.	.	Reference	.	.	.	.
Married	-0.24	0.23	0.297	-0.68	0.21	-0.02	0.22	0.943	-0.44	0.41	0.04	0.22	0.858	-0.39	0.47
Have participated in WHP	Reference	.	.	.	.	Reference	.	.	.	.	Reference	.	.	.	.
Have not participated in WHP	-0.41	0.25	0.110	-0.90	0.09	0.00	0.24	0.986	-0.47	0.48	-0.52	0.24	0.033	-0.99	-0.04
Aware health policy at worksite	Reference	.	.	.	.	Reference	.	.	.	.	Reference	.	.	.	.
Not aware health policy at worksite	-0.51	0.26	0.047	-1.01	-0.01	-0.30	0.25	0.230	-0.78	0.19	0.24	0.25	0.340	-0.25	0.72

CHAPTER 4

STUDY 2: EMPLOYEES' INTENTION TO PARTICIPATE IN WORKSITE HEALTH PROMOTION PROGRAMS: AN EXAMINATION BY TOPIC AND FORMAT

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Abstract

Introduction

Workplace health promotion programs cover a variety of health topics. There is a lack of research about optimal formats for efficient health information dissemination at workplaces. In the context of three common health topics with different levels of sensitivity and two conversation-based delivery formats (group discussion, individual consultation), this study examined employees' intent to participate in worksite health promotion programs by health topics and formats.

Method

We analyzed cross-sectional survey data from 400 full-time employed Amazon Mechanical Turk adult users. A series of three binary logistic regression models were built to compare factors with employees' interest in different health topics. Two sets of ANOVA models were developed to examine intended program participation by health topics in each format. Two linear regression models were used to compare factors associated with intent to participate in two conversation-based formats.

Results

Participants who reported higher supervisor support were more likely to be interested in worksite health programs about mental or physical conditions ($p<0.02$). Intended participation in worksite group discussions significantly decreased with an increase of the health topic's sensitivity ($p<0.05$). Coworker support and supervisor support were strong predictors that positively associated with intent to participate in worksite group discussions.

Conclusion

Program planners need to be aware of health topic's content and sensitivity when considering the optimal delivery method. Workplace social support is the foundation of participation in group-based format. A workplace with well-established regulations for health information confidentiality and sufficient supervisor support related to health may enhance the success of worksite programs targeting mental and physical health conditions.

Introduction

Workplaces have been identified as effective settings for health information dissemination and health promotion (Goetzel et al., 2014). Current workplace health promotion programs cover a variety of health topics such as healthy eating, weight management, mental health, and disease prevention and management (Aldana et al., 2005; Ausburn, LaCoursiere, Crouter, & McKay, 2014; Iriyama, 2014; Shimazu, Umanodan, & Schaufeli, 2006). These health topics could be delivered to employees in a variety of formats including lectures/presentations, group discussions, online forums, and individual consultations (Meng, Wolff, et al., 2017). For conversation-based worksite health promotion programs, group discussion and individual consultation are among the most common delivery formats for distributing different health information topics (Smith et al., 2015).

Health topics of worksite programs differ in terms of content and level of sensitivity. Topic sensitivity could be a barrier to employee participation, despite the importance of the topic or need for the program. For example, a barrier for participating in worksite health promotion programs could be the fear of exposing personal health information in the absence of confidentiality (Toker, Heaney, & Ein-Gar, 2015). The protection of confidentiality is an important component when implementing health promotion programs (Linnan et al., 2001; Pronk, 2014). In some worksite interventions, group-based discussions were encouraged to increase interaction between participants, social support, and understanding of health materials (Mishra et al., 2013). However, it may also increase the possibility of revealing health conditions to co-workers when sharing personal experiences and opinions, and increases concerns of confidentiality

when health topics are related to mental or physical illness (Robroek, van de Vathorst, Hilhorst, & Burdorf, 2012). On the other hand, individual consultations are more personalized and private, which can communicate health information and encourage healthy behaviors through a supportive and productive relationship with a health coach or professional (Merrill et al., 2010; Terry, Seaverson, Grossmeier, & Anderson, 2011).

There's a lack of research about optimal formats for delivering health information at the workplace to enhance program participation and success. In the present study, we identified three common health topics with different levels of sensitivity in worksite health promotion, including general health (e.g., healthy eating and healthy habits), stress and anxiety management, and chronic disease management (e.g., obesity, diabetes, arthritis, hypertension, heart diseases). The purpose of this study was to examine employees' intent to participate in worksite health promotion programs by topics and two conversation-based formats (i.e., group discussions and individual consultations).

First, employees' interest in learning different health topics in a worksite setting may be associated with worksite-level and individual-level factors. Our 1st study objective was to investigate the unique and common factors associated with employees' interest in learning different health topics at their worksite (topics include: general health, stress and anxiety, and chronic diseases).

Second, to effectively distribute health information to employees at worksites, different delivery formats should be considered (e.g., group discussion or individual consultation). The selection of an optimal delivery format is based on worksite and individual factors as well as the health topic. The 2nd study objective was to investigate whether employees' intentions to participate in worksite interventions differ by health

topics based on two conversation-based delivery formats: group discussions and individual consultations.

The 3rd study objective was to investigate worksite- and individual-level factors associated with employees' intent to participate in worksite interventions by format.

Findings from this study can inform employers and practitioners about strategies for developing conversation-based worksite health promotion programs and ensure the effectiveness and success in distributing potentially sensitive health information at work.

Methods

Study Participants and Procedures

Amazon Mechanical Turk (Mturk) (https://www.mturk.com) was used for data collection. A network of human workers uses the website to search for and complete tasks, and receive monetary compensation for their work. Researchers are able to enlist Mturk users world-widely for human intelligence tasks such as surveys, translations, or evaluating photographs. In May of 2017, a total of 400 U.S. participants completed the cross-sectional survey and were compensated by a $2.00 monetary incentive. To be eligible for the study, the participant must have been an Amazon Mechanical Turk user (18 years and older), residing in the United States, and a full-time employee who commute to a worksite with more than 5 co-workers. Surveys took participants approximately 5-10 minutes to complete. Institutional Review Board approval for this study was obtained at The University of Georgia.

Data, Measures, and Analyses for Objective 1

Dependent Variables for Objective 1

Interest in learning different health topics at the worksite was assessed by a series of three questions. Participants were asked: "If the following health programs were offered at your workplace, and you could participate on your work time, how interested would you be? (1) General health such as healthy eating and healthy habits; (2) Stress and Anxiety; and (3) Common chronic diseases such as obesity, diabetes, arthritis, hypertension, heart diseases, etc." Responses were scored from "1=not interested at all" to "4=very interested." The dependent variables were dichotomized into "interested" and "not interested" in the binary logistic regression analyses.

Independent Variables for Objective 1

Independent variables for objective 1 include various individual- and worksite-level factors that are potentially related with interest in different types of worksite health topics. Table 4.1 presents source and descriptive information for each scale used for accessing independent variables.

Demographic Variables for Objective 1

To identify sociodemographic characteristics of participants, variables in the current analysis for objective 1 included gender; race/ethnicity (i.e., White, African-American, others); education (i.e., high school, some college, college, and graduate school); marital status (i.e., unmarried or married); and income level. Income level was treated as a continuous variable; others were treated as categorical variables.

Data Analysis for Objective 1

In total, 400 participants with complete data were included in the analyses. All statistical analyses were performed using SPSS version 24. Prior to logistic regression analyses, binary correlations were checked for all worksite-level factors. Three logistic regression models were fitted to examine relationships between interest in different health topics and independent variables.

Data, Measures, and Analyses for Objective 2

Dependent Variables for Objective 2

Intent to learn about different health topics through worksite group discussions were assessed by a series of three questions. Participants were asked: "If you were allowed to do the following things on work time, please rate how likely you would be to: (1) Share ideas about "(the health topic)" with my co-workers in a group discussion; (2) Listen to other coworkers' opinions about "(the health topic)" in a group discussion; and (3) Ask questions about "(the health topic)" in a group discussion." Responses were scored from "1= very unlikely" to "4=very likely." The mean of those three items was calculated as the score for intention to participate in learning "(the health topic)" in a worksite group discussion format.

Similarly, intentions to learn about different health topics through individual consultations were assessed by a series of three questions. Participants were asked: "If you were allowed to do the following things on work time, please rate how likely you would be to: (1) Talk to a health coach/counselor individually about issues related to "(the health topic);" (2) Get advice about "(the health topic)" from a health coach/counselor individually; and (3) Contact a health coach/counselor for questions

about "(the health topic)"." Responses were scored from "1= very unlikely" to "4=very likely." The mean of those three items was calculated as the score for intention to participate in learning "(the health topic)" through an individual consultation format.

Data Analysis for Objective 2

We excluded participants who indicated low/no interests in each health topic. Out of the 400 participants, 304 participants indicated interest in general health, 280 participants indicated interest in stress and anxiety, and 225 participants indicated interest in chronic diseases. (N=348 participants indicated interest in at least one health topics.) A flow chart was created to document participants involved in each analysis. (Figure 4.1) These data were included in the analyses for objective 2. We also listed the descriptive information for the items assessing intent to participate in each health topic by format, including Cronbach's alpha, mean, and standard deviation. Two sets of one-way ANOVA were used to examine mean differences of intention to participate in different topics delivered in the same format. A graph was generated to compare means and trends of intent to participate in different health topics delivered by format (i.e., group discussion or individual consultation).

Data, Measures, and Analyses for Objective 3

Dependent Variables for Objective 3

The grand mean of employees' intent to participate in the three health topics delivered by worksite group discussions were calculated as their intent to participate in a group discussion. The grand mean of employees' intent to participate in the three health topics delivered by individual consultations were calculated as their intent to participate in an individual consultation. Thus, only participants who indicated interest in all three

health topics were included in the objective 3. A total of 221 participants were omitted from the analyses because they only indicated interest in one or two of the three health topics.

Independent Variables for Objective 3

Worksite and individual factors included in the current analysis were: perceived benefit of worksite health promotion, supervisor support on health, work autonomy, co-worker support, work stress and exhaustion, workload, general health, importance of life change, importance of learning information, and organizational commitment on employee health. Table 2 lists the descriptive information of measurements used.

Data Analysis for Objective 3

Out of the 400 participants, 179 participants indicated interest in all three health topics (see Figure 4.1), which was the number of participants included in analyses for this objective. All statistical analyses were performed using SPSS version 24. Two linear regression models utilizing the "forward" method were fitted to compare the selected worksite-level factors associated with employees' intent to participate in worksite group discussions and individual consultations.

Results

Objective 1: Factors Associated with Interest in Health Topics at Worksites

Table 4.2 presents binary correlations between each pair of worksite-level factors. Work stress and work-related exhaustion were highly associated and both using 4-point Likert scales. Thus, those two variables were collapsed into one variable in the logistic regression analyses by calculating the mean of the two variables.

Table 4.3 presents the results of a series of three binary logistic regression analyses. Perceived benefits of implementing worksite health promotion (WHP) at their worksite ($p<0.001$) and perceived importance of learning health information ($p\leq0.012$) were positively associated with interest in all three health topics. Supervisor support related to health was positively associated with interest in the topic of stress and anxiety, and chronic diseases. In addition, employees who reported higher levels of workload (OR=1.44, P<0.05), worse self-reported general health (OR=0.63, P<0.01), and achieved lower levels of education (OR=0.487, P<0.05) were more likely to indicate interest in the topic of chronic diseases.

Objective 2: Intentions to Participate in Worksite Interventions Differs by Health Topic

Table 4.4 shows the mean, standard deviation, and Cronbach's alpha for the items assessing intent to participate in different health topics delivered by worksite group discussion and individual consultation. The reliability tests were all over 0.84.

Table 4.5 presents results of two sets of ANOVA tests for group discussion and individual consultation formats. When health topics were delivered through worksite group discussions, there was a statistically significant difference of intention to participate in different health topics ($F=3.026$, $p<0.05$), with highest intention to participate in general health discussion and lowest in chronic diseases discussion. When health topics were delivered through individual consultations, no statistically significant difference in the intention of participation was detected ($F=0.231$, $p=0.794$). As shown in Figure 4.2, with the increase of health topic sensitivity, intention to participate in worksite group discussion went down dramatically compared with individual consultation.

Objective 3: Factors Associated with Intention to Participate in Worksite Interventions by Format

Table 4.6 illustrates the final two models selected by forward linear regression for worksite factors associated with intent to participate in worksite group discussions and individual consultations. For intent to participate in worksite group discussions, a significant regression equation was established with four predictors: Importance of learning health information, co-worker support, perceived WHP benefits, and supervisor support ($F(4, 174)=12.111$, $p<0.001$), with an R-square of 0.218. For intention to participate in individual consultations, a significant regression equation was established with two predictors: Perceived WHP benefits and importance of learning health information ($F(2, 176)=13.603$, $p<0.001$), with an R-square of 0.134. Importance of learning health information and perceived WHP benefits were predictive of both intent to participate in group discussion and individual consultation. Co-worker support and supervisor support were only predictive of intent to participate in group discussions.

These analyses reinforce the findings of objective 1; that perceived benefits of implementing WHP at their worksite and perceived importance of learning health information were strong predictors of intent to participate in both formats. However, both co-worker support and supervisor support were strong predictors and positively associated with intent to participate in worksite group discussions.

Discussion

The purpose of this study was to examine employees' intent to participate in conversation-based worksite health promotion programs by topic and format. This study

is among the first studies to investigate how detailed designing features of workplace health promotion could potentially affect participation.

We found most participants indicated interest in participating in worksite health promotion programs about general health (n=304), followed by stress and anxiety (n=280), and chronic diseases (n=225). The working population in general is healthier than the general population, which may contribute to the decreased interests in mental health and chronic conditions (Shah, 2009). However, when health promotion programs are delivered through a worksite group discussion format, the targeted health topics significantly influenced the participants' intent to participation. Practitioners and researchers should be aware of a health topic's content and sensitivity when delivering the program through group-based worksite health promotion.

With the exception of the topic general health, supervisor support related to health was identified as a strong predictor positively associated with employees' interest in more sensitive health topics such as stress and anxiety, and chronic diseases. Previous findings suggested health promotion programs might lead to job discrimination or job downgrade if they screen for individual health risk factors or have the possibility to disclose personal health conditions (Allegrante & Sloan, 1986; Berkel et al., 2014; Robroek et al., 2012). Employees with chronic conditions face more emotional and physical challenges in the workplace, and may show distrust to conceal health information to their supervisors and coworkers in communications at their worksite (Berkel et al., 2014; Varekamp, de Vries, Heutink, & van Dijk Frank, 2008). Therefore, well-designed interventions targeting employees with chronic conditions are based on well-protected confidentiality, strategies to empower employees, and efforts to encourage effective communication by

methods/formats preferred by the employees. Meanwhile, ethical training for different stakeholders of workplace health promotion should be considered when utilizing conversation-based formats for delivering sensitive health topics such as chronic conditions and mental health. On the other hand, diverse delivery methods could be considered when the program addresses sensitive health topics in the workplace by converting sensitive topics in a way more welcomed and acceptable for employees. For example, stress management could also be delivered through physical activity (e.g., yoga), and meditation, and mindfulness training (Malarkey et al., 2013; Murphy, 1996; Richardson & Rothstein, 2008). Chronic disease management could also be addressed by health promotion programs targeting healthy eating and physical activity in a group session.

Perceived benefits of implementing Workplace Health Promotion (WHP) at their worksite, and perceived importance of learning health information were positively associated with interest and intent to participate in all three health topics delivered in both group discussion and individual consultation formats. Perceived benefits of implementing WHP was previous assessed for employers' intent to implement WHP at worksites (Hannon et al., 2012). In the present study, we examined this concept on employees' intent to participate in WHP programs and found a positive association. This finding reinforced previous findings of Rongen et al. (2014) employees' attitudes and beliefs toward implementing WHP in their workplace positively associated with their intent to participate in WHP. In addition, similar to previous findings, greater value on learning health information was associated with intent to participate in worksite health promotion programs (Meng, Galyardt, et al., 2017).

In this study, worse self-reported general health, lower levels of education, and higher levels of workload were identified as unique factors associated with interest in learning about chronic diseases. Self-reported general health is a strong predictor of mortality risks, disability, and morbidity, and reflects whether employees may suffer from chronic physical or mental conditions (Idler & Benyamini, 1997; Idler & Kasl, 1995; Schechter, Beatty, & Willis, 1999). In addition, individuals with lower levels of education were reported having higher rates of chronic disease and unhealthy behaviors (Oates et al., 2017). Employees with poor health and in need of chronic disease education may show higher intention to participate in worksite disease management programs. However, there is no consistent evidence to suggest health indicators or social-demographic characteristics were associated with intention to participate or actual participation in worksite health promotion programs (Robroek et al., 2009).

From results of objective 3, we found co-worker support and supervisor support were strong predictors and positively associated with intent to participate in worksite group discussions. Previous findings suggest social support was positively associated with worksite health promotion participation (Persson et al., 2013; Wyatt, Brand, Ashby-Pepper, Abraham, & Fleming, 2015). In the present study, we also detected a stronger effect of social support on workplace health promotion utilizing group formats opposed to individual formats. Our findings suggested delivery formats for worksite health promotion programs should be suitable for the targeted worksite. Before delivering a group-based worksite health promotion program, worksite social support should be assessed to ensure program efficiency and success.

The items we developed for assessing intent to participate in worksite group discussions and individual consultations have good internal consistency. Reliability test results for each of the 3-items were all over 0.8. These scales assessed preference of detailed elements of group discussions and individual consultations from different dimensions and could be used for future research measuring intent to participate in different types of worksite health promotions.

This study was not without limitations. Data were collected from 400 American Mturk users, thus our result may not be generalizable to the greater American workforce. Delivery formats of worksite health promotion are not only limited to conversation-based formats (i.e., group discussions, individual consultations). Many other formats such as presentation and online forum, were not considered in the scope of the current study. We used three items to measure intent to participate in a conversation-based format. But, in actual practice, there could be more characteristics that were not captured in only three items. In addition, previous studies noted that factors for intent to participate in workplace interventions may not be associated with actual participation (Rongen, Robroek, van Ginkel, Lindeboom, Altink, et al., 2014). Future studies are needed to better understand the link between intention and actual participation. However, the present study addressed the importance of examining effects of designing features (i.e. topics and formats) on intention of participation. The findings suggested the thorough understanding of targeted worksite and employees is a crucial foundation for worksite health promotion program development and implementation.

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Figure 4.1. Flow chart for study objectives, analyses methods and sample sizes

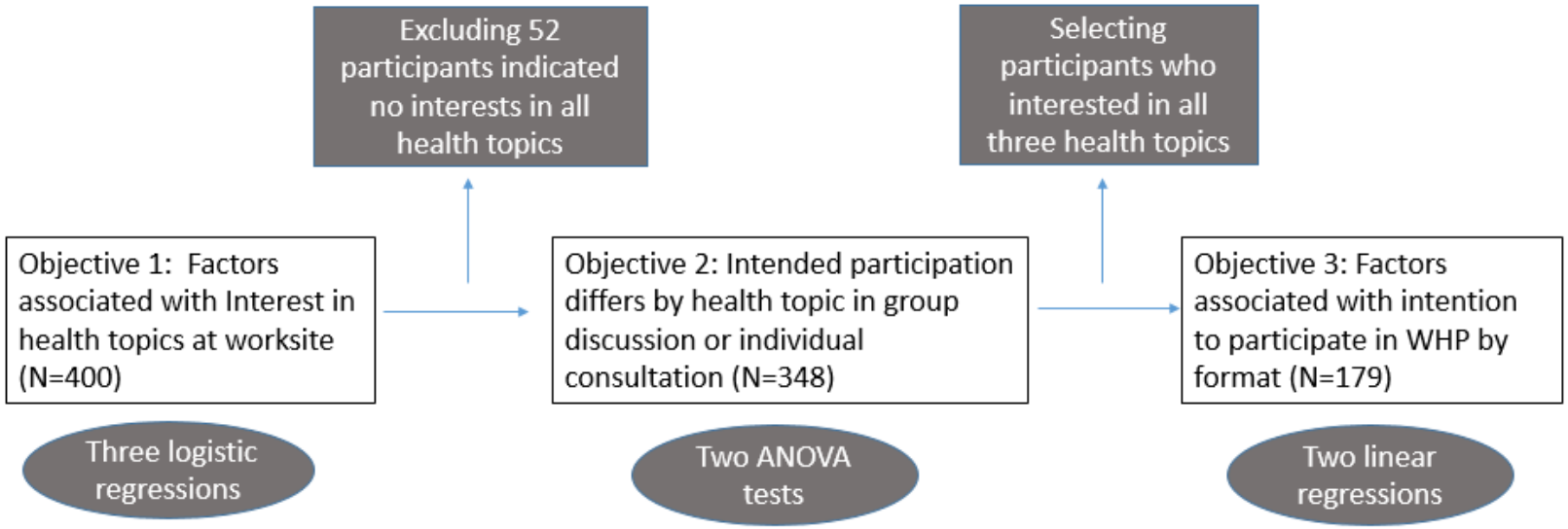

Figure 4.2. Intention to participate in different health topics delivered by group discussion and individual consultation

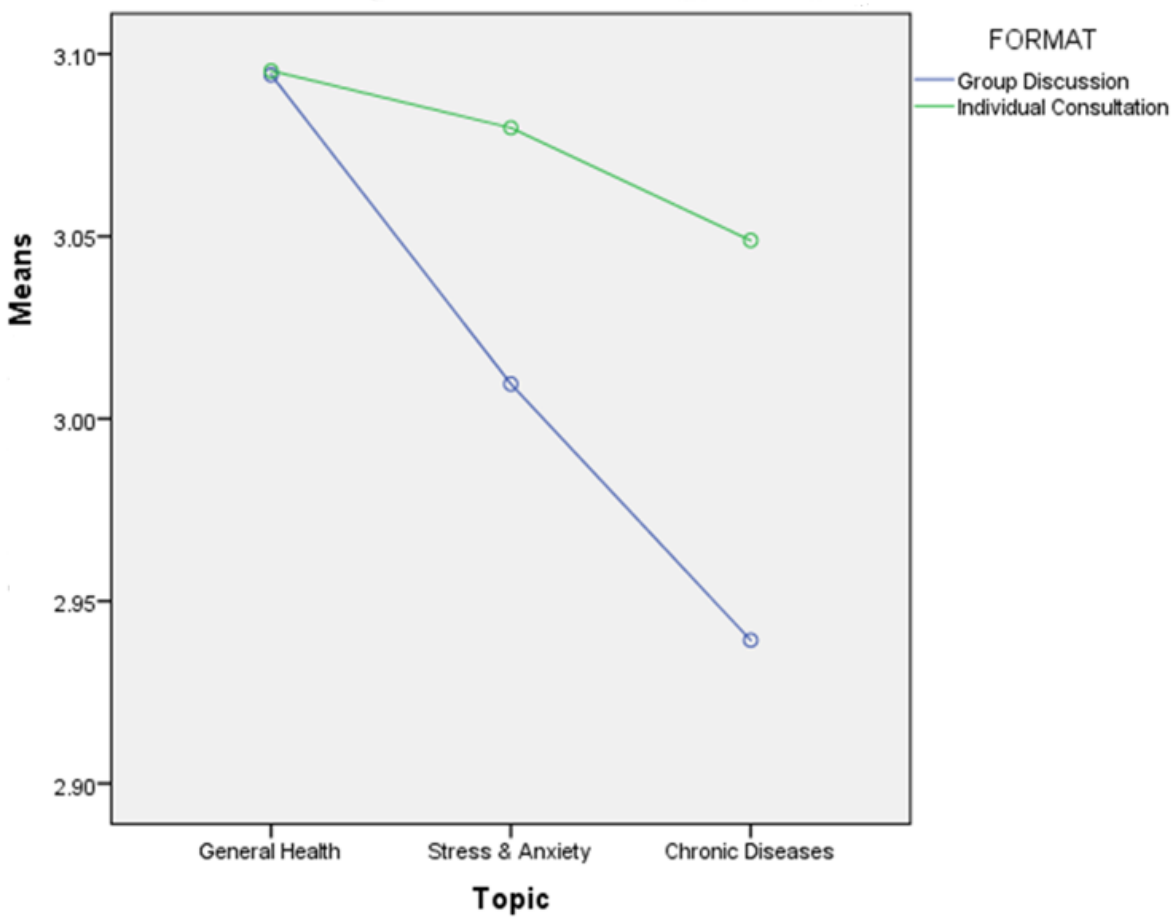

Table 4.1. Sources and descriptive information of measurements

Variables	Name of item/scales	Reference	Item number	Item example	Response and coding
Perceived Health Status	Behavioral Risk Factor Surveillance System (BRFSS)	(Ware & Sherbourne, 1992)	1	"Would you say in general your health is?"	"1=poor" to "5=excellent"
Perceived benefits of WHP Programs	Worksite health promotion program readiness scale	(Hannon et al., 2012)	3	"Health Promotion at worksites like mine would improve employee health"	"1=strongly disagree" to "5=strongly agree"
Perceived importance of making a lifestyle change	NA	(Toker et al., 2015)	1	"How important is it for you to make a lifestyle change to improve your health?"	"1=not important at all" to "4=very important"
Perceived importance of learning health information	NA	Adapted from (Toker et al., 2015)	1	"How important is it for you to learn more about health-related information to improve your health?"	"1=not important at all" to "4=very important"
Organization commitment on health	Organization commitment	(Toker et al., 2015)	1	"How committed do you think your organization is to the health of all its employees?"	"1=Not committed at all" to "4=Very committed"
Co-worker support	Co-worker support scale	(Woo, 2012)	4	"My coworkers really care about me"	"1=strongly disagree" to "5=strongly agree"

Supervisor support on health	Supervisor Health and Safety Support scale	(Butts, Hurst, & de Tormes Eby, 2013)	3	"My supervisor encourages me to take steps to prevent personal physical illness"	"1=strongly disagree" to "5=strongly agree"
Workload	Quantitative Workload Inventory (QWI)	(Spector & Jex, 1998)	5	"How often does your job require you to work very fast"	"1=Less than once per month or never" to "5=Several times per day"
Work scheduling autonomy	Global Work Autonomy Scale	(Breaugh, 1985)	3	"I have control over the scheduling of my work."	"1=strongly disagree" to "7=strongly agree"
Work related exhaustion	The quality work competence (QWC) psychosocial questionnaire	(Anderzén & Arnetz, 2005)	3	"I feel emotionally drained after work."	"1=never" to "5=daily"
Occupational stress	Adapted from The Perceived Stress Scale	(DeJoy, Wilson, Vandenberg, McGrath-Higgins, & Griffin-Blake, 2010)	6	"In the last month, how often have you upset because of something that happened unexpectedly at work?"	"1=never" to "5=very often"

Table 4.2. Result of binary correlations of worksite-level predictors

		Perceived WHP benefit	Supervisor support	Work autonomy	Cowork support	Work-related exhaustion	Work stress	Workload	Organizational commitment
Perceived WHP benefit	Pearson Correlation	1	0.18	0.08	0.33	-0.05	0.02	0.05	0.19
	p-value		<0.001	0.134	<0.001	0.324	0.697	0.374	<0.001
Supervisor support	Pearson Correlation		1	0.15	0.31	-0.19	-0.05	0.01	0.47
	p-value			0.002	<0.001	<0.001	0.331	0.807	<0.001
Work autonomy	Pearson Correlation			1	0.19	-0.26	-0.15	-0.33	0.22
	p-value				<0.001	<0.001	0.003	<0.001	<0.001
Cowork support	Pearson Correlation				1	-0.26	-0.20	0.03	0.36
	p-value					<0.001	<0.001	0.533	<0.001
Work-related exhaustion	Pearson Correlation					1	0.70	0.42	-0.27
	p-value						<0.001	<0.001	<0.001
Work stress	Pearson Correlation						1	0.45	-0.19
	p-value							<0.001	<0.001
Workload	Pearson Correlation							1	-0.04
	p-value								0.486
Organizational commitment on Health	Pearson Correlation								1
	p-value								

Table 4.3. Results of logistic regressions for factors associated with interest in different health topics at worksite

	Topic: General Health				Topic: Stress and Anxiety				Topic: Chronic Diseases			
	OR	p	95% C.I.		OR	p	95% C.I.		OR	p	95% C.I.	
Predictors			Lower	Upper			Lower	Upper			Lower	Upper
Perceived benefit of implementing WHP	3.604	<0.001	2.323	5.589	1.916	<0.001	1.335	2.75	2.09	<0.001	1.441	3.033
Supervisor support on health	1.381	0.057	0.991	1.924	1.427	0.013	1.078	1.888	1.568	0.001	1.196	2.057
Work autonomy	0.917	0.412	0.746	1.128	1.034	0.703	0.872	1.226	1.01	0.903	0.859	1.188
Co-work support	1.063	0.679	0.797	1.418	1.15	0.263	0.9	1.47	0.987	0.916	0.78	1.25
Work stress and exhaustion	0.692	0.079	0.459	1.043	1.264	0.18	0.898	1.779	0.839	0.285	0.609	1.157
Workload	1.311	0.135	0.92	1.868	1.252	0.138	0.93	1.686	1.437	0.012	1.081	1.911
General Health	1.223	0.245	0.871	1.716	0.931	0.632	0.695	1.248	0.63	0.002	0.473	0.839
Importance of make healthier life change	1.563	0.055	0.991	2.465	1.171	0.423	0.796	1.724	0.955	0.815	0.651	1.401
Importance of learning health information	1.97	0.004	1.246	3.114	1.665	0.012	1.119	2.476	2.23	<0.001	1.494	3.327
Organizational commitment to employee health	0.782	0.211	0.532	1.15	0.944	0.725	0.685	1.3	1.075	0.647	0.79	1.462
Income	1.044	0.47	0.929	1.173	0.964	0.462	0.875	1.062	1.061	0.219	0.965	1.167
Race: White	Reference				Reference				Reference			
Race: Black	0.693	0.585	0.186	2.585	0.544	0.234	0.2	1.483	0.449	0.106	0.17	1.186
Race: Other	2.388	0.179	0.671	8.495	1.251	0.625	0.51	3.072	1.649	0.232	0.726	3.747
Education: Some College and High School	Reference				Reference				Reference			
Education: College	0.827	0.575	0.426	1.606	1.007	0.98	0.57	1.779	0.916	0.755	0.529	1.586
Education: Graduate School	1.03	0.947	0.434	2.442	0.847	0.648	0.416	1.726	0.487	0.037	0.248	0.956
Gender: Female	Reference				Reference				Reference			
Gender: Male	0.593	0.089	0.325	1.082	0.607	0.055	0.364	1.011	0.751	0.25	0.462	1.223
Not married	Reference				Reference				Reference			
Married	1.055	0.867	0.565	1.97	1.115	0.687	0.657	1.891	0.872	0.596	0.525	1.448

Table 4.4 Descriptive statistics for items assessing intention to participate in different health topics delivered in group discussion and individual consultation formats

Descriptive Statistics		Item:	N	Minimum	Maximum	Mean	Std. Deviation	Cronbach's Alpha
General Health	Group Discussion (Item=3)	Share ideas about “general health” with my coworkers in a group discussion	304	1="Very unlikely"	4="Very likely"	3.04	0.75	0.843
		Listen to other coworkers’ opinions about “general health” in a group discussion				3.22	0.72	
		Ask questions about “general health” in a group discussion				3.02	0.80	
	Individual Consultation (Item=3)	Talk to a health coach/counselor individually about issues related to “general health”				3.13	0.82	0.893
		Get advice about “general health” from a health coach/counselor individually				3.15	0.84	
		Contact a health coach/counselor for questions about “general health”				3.00	0.90	
Stress and Anxiety	Group Discussion (Item=3)	Share ideas about “stress and anxiety” with my coworkers in a group discussion	280			2.95	0.87	0.860
		Listen to other coworkers’ opinions about “stress and anxiety” in a group discussion				3.18	0.81	
		Ask questions about “stress and anxiety” in a group discussion				2.90	0.91	
	Individual Consultation (Item=3)	Talk to a health coach/counselor individually about issues related to “stress and anxiety”				3.12	0.89	0.909
		Get advice about “stress and anxiety” from a health coach/counselor individually				3.13	0.89	
		Contact a health coach/counselor for questions about “stress and anxiety”				2.99	0.93	
Chronic Diseases	Group Discussion (Item=3)	Share ideas about “chronic diseases” with my coworkers in a group discussion	225			2.87	0.82	0.888
		Listen to other coworkers’ opinions about “chronic diseases” in a group discussion				3.06	0.83	
		Ask questions about “chronic diseases” in a group discussion				2.89	0.85	

	Individual Consultation (Item=3)	Talk to a health coach/counselor individually about issues related to “chronic diseases”				3.05	0.79	0.883
		Get advice about “chronic diseases” from a health coach/counselor individually.				3.09	0.79	
		Contact a health coach/counselor for questions about “chronic diseases”				3.00	0.85	

Table 4.5 Results of ANOVA analyses for investigating the effect of health topics on intention to participate in group discussion and individual consultation

		N	Mean	F	p-value
Group Discussion	General Health	304	3.0943	3.026	0.049
	Stress and Anxiety	280	3.0095		
	Chronic Diseases	225	2.9393		
Individual Consultation	General Health	304	3.0954	0.231	0.794
	Stress and Anxiety	280	3.0798		
	Chronic Diseases	225	3.0489		

Table 4.6 Final models from forward linear regression analyses for investigating factors associated with intention to participate in group discussion and individual consultation formats

	Variable	r square for the Model	Unstandardized coefficients		Standardized Coefficients	t	p-value
			B	Std. Error	Beta		
Group Discussion final regression model (method=forward)	Importance of learning health information	0.218	0.215	0.061	0.248	3.539	0.001
	Co-worker support		0.089	0.044	0.149	2.014	0.046
	Perceived WHP benefits		0.249	0.084	0.212	2.96	0.004
	Supervisor support		0.096	0.042	0.166	2.286	0.023
Individual consultation final regression model (method=forward)	Perceived WHP benefits	0.134	0.323	0.082	0.288	3.947	<0.001
	Importance of learning health information		0.135	0.061	0.162	2.222	0.028

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction Restatement

As workforce aging and chronic condition rates increase, workplace health promotion programs and interventions have gained popularity over the past decade to reduce health risk factors, decrease medical costs, and enhancing work performance. Workplace health promotion program participation is among the most important indicators for program effectiveness and success, but many health programs offered in the workplace typically have low participation rates (Glasgow et al., 1993; Robroek et al., 2009). Due to a lack of established evidence that explains factors associated with why employees favor one program over another, there is a need to explore employees' interests and preferences for WHP programs and understand how their interests or preferences relate to worksite- and individual-level factors. Designing and tailoring worksite health promotion programs based on employees' needs and intended participation, as well as worksite- and employee-level factors, could potentially increase program effectiveness and success (Glasgow et al., 1993; Robert et al., 2009).

The overall purpose of this dissertation was to gain a comprehensive understanding of employees' intent to participate in different types of worksite health promotion programs, and how their different preferences are tied with individual- and worksite-level factors.

Chapter Summaries

Summary of Chapter 2---Literature review

The purpose of the literature review chapter was to: (1) describe and list common components and characteristics of workplace health promotion programs in current studies and practices; and (2) discuss and summarize individual- and worksite-level factors associated with worksite health promotion participation and success.

Most of the current workplace health promotion practices target either primary prevention (promoting health-related behaviors) or secondary prevention (chronic diseases management) (Mattke et al., 2013). Health interventions often utilize strategies such as instructional education, physical activity, policy making, and environmental change to create a healthy environment, disseminate health information, and promote employee health (Engbers, 2008). Instructional education could be delivered through various methods, including group discussions, individual consultations, presentations, and online resources and forums. Many workplace health interventions use multiple components together to enhance the possibility of achieving maximum effectiveness (Goldgruber & Ahrens, 2010; Katz et al., 2005).

Factors associated with worksite health promotion success could be classified into three main categories: individual characteristics (i.e., social-demographic variables, health status and risks, individual health beliefs, and personal preference); worksite characteristics (i.e., organizational administration, work autonomy, worksite social support, and policy); and program characteristics (i.e., health topics, delivery formats, intensity, and size). These factors were identified and examined in previous literature closely related with worksite health promotion program implementation and

effectiveness. Designing optimal worksite health programs need to consider factors from all three aspects, and ensure program characteristics or features nicely match worksite characteristics and employees' needs.

Summary of Chapter 3—Study 1

The purpose of manuscript 1 (chapter 3) was to examine individual- and worksite-level factors associated with intent to participate in three different types of worksite physical activity programs, including worksite individual-based physical activities (e.g., physical activity breaks, onsite fitness center time), worksite group-based physical activity (e.g., onsite yoga, dancing, or aerobic exercise sessions), and team-based sports (e.g., soccer, basketball).

Individual-based worksite physical activity programs were the most welcomed among all participants. Male participants favored team-based sports while female participants favored less competitive, group-based worksite physical activities. Employees who had jobs requiring higher levels of physical effort reported more intent to participate in worksite physical activity programs in general. Co-worker support and supervisor support were positively associated with intent to participate in worksite group- or team-based physical activity programs, while work autonomy was a unique factor positively associated with intent to participate in worksite individual-based PA programs. In addition, higher perceived benefits of WHP, previous program participation, and awareness of worksite health policies increase the intent to participate in worksite PA program.

The findings provided a better understanding and comparison of factors associated with employees' intent to participate in different types of worksite PA

programs, and potentially inform employers and practitioners of future PA program designing strategies to better match employees' needs.

Summary of Chapter 4---Study 2

The purpose of manuscript 2 (chapter 4) is to investigate employees' intent to participate in conversation-based worksite health promotion programs by health topic and format, and examine individual- and worksite-level factors associated with intent to participate in different types of conversation-based programs. The study focused on three common health topics with different levels of sensitivity: general health, stress and anxiety, and chronic diseases, and two types of conversation-based programs: group discussions and individual consultations.

Findings suggest that compared to health promotion programs delivered through individual consultation, employees had significantly lower intent to participate in programs delivered through group discussion on more sensitive health topics such as mental health and chronic diseases. Worksite social support is crucial for worksite programs delivered in group discussions, and supervisor support was identified positively associated with employees' interests in WHP on sensitive health topics. Perceived benefits of implementing WHP at their worksite and perceived importance of learning health information were positively associated with intent to participate in all health topics delivered in both group discussion and individual consultation formats.

This study investigated how detailed designing features (i.e., topics and formats) of workplace health promotion programs could potentially have an impact on intention of participation, and addressed concerns of worksite health information confidentiality. The findings suggested the importance of choosing the optimal format for delivering health

topics with a certain degree of sensitivity, and a thorough examination of the targeted worksite and employees before delivering health promotion programs.

Overall Discussion and Conclusions

Discussion of Relevance to the Overall Dissertation

Worksite health promotion program features should match worksite characteristics and capacities, and employees' needs to guarantee optimal program effectiveness (Rongen, Robroek, van Ginkel, Lindeboom, Pet, et al., 2014; Wong et al., 1998). The aim of the overall dissertation was to answer the research question: how do individual- and worksite-level characteristics affect employees' interest and preference for different types of workplace health promotion programs? (Figure 5.1) First, chapter two (literature review) discussed common program features and worksite and individual-level factors identified in the previous literature that were related with program participation and success. Measures of these discussed factors were included in survey and model analyses for answering research questions in the next two chapters.

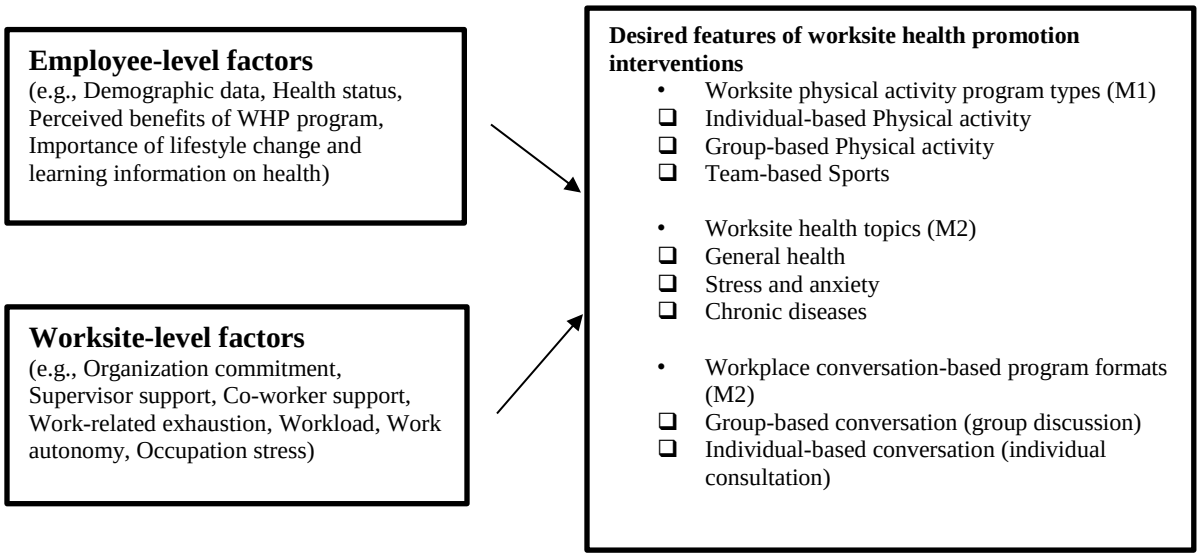

Figure 5.1 Relevance of Overall Dissertation

It is impossible to cover all types of worksite health promotion programs, thus chapter three and four (Manuscript 1&2) narrow the dissertation research down to intention to participate in two main types of worksite health promotion programs: physical activity-based program and conversation-based program. (Figure 5.1) The result of chapter three (manuscript 1) supported the idea that worksite level factors contributed to shaping different preferences for PA program features, such as group-based or individual-based PA.

The results of chapter four (Manuscript 2) addressed the impact of both worksite level factors (i.e., worksite social support) and program features (i.e., sensitivity of health topics) on the preference for two types of conversation-based worksite programs: group discussion or individual consultation.

Overall Conclusions

The findings highlighted many worksite and individual-level factors that are associated with intention to participate in different types of worksite health promotion programs. Prior to program delivery at a worksite, assessing whether the program features match the worksite's characteristics and its employees' needs is necessary for ensuring program participation and success.

Practitioners may select optimal health program elements, topics, or delivery formats to create the program for a specific worksite based on the worksite and employee-level factors. First, assessing both employees' and employers' perception of the effectiveness/benefits of implementing WHP at their worksite could potentially inform practitioners of the worksite health promotion programs' success rate (Rongen, Robroek, van Ginkel, Lindeboom, Altink, et al., 2014). Then, integrating measures of

individual and worksite level characteristics in a comprehensive needs assessment may help practitioners and employers better understand the targeted employee and worksite, in order to select appropriate program development strategies. For example, assessing worksite social support (i.e., supervisor and co-worker support) before choosing group-based formats or delivering programs about sensitive health topics. Those individual and worksite level factors include but are not limited to demographic data, health indicators, work autonomy, worksite social support, worksite gender composition, and worksite health-related policies.

On the other hand, employers may choose to engage the worksite leadership to improve main worksite or employee-level factors for facilitating program implementation and enhancing program participation. For an existing program with strict protocols, it is imperative to maintain the program's integrity for achieving original intervention effects (Smith et al., 2015). Adapting a program entirely based on the worksite and employee-level characteristics may not be realistic. Thus, when delivering existing programs, it is crucial for employers to make efforts on changing policy or providing support/resources to build a firm foundation for achieving optimal program effectiveness. For example, before delivering group-based discussion on chronic diseases at worksites during work time, effective organizational communication strategies may be needed to increase health awareness, workplace social support, and motivate willingness to participate and learn (Kent et al., 2016; Meng, et al., 2017); additional support from supervisors/employers to provide adequate time to participate in programs and policies on health information confidentiality are needed to assure for program participation and implementation.

When worksite and employee-level factors are not able to be assessed in time, it is suggested to choose program features that are most welcomed by the general working population. For example, in the present study, findings showed individual-based programs were the most welcomed among all three types of worksite physical activity programs, and intention to participate in individual-based conversation programs were higher than group-based conversation program among all three health topics. In addition, some program features should be designed to match and better serve the purpose/theme of the program (such as choosing delivery formats based on the program topic). However, even though some program features may work for the general working population, it is still necessary to match features of the upcoming program with targeted employees' needs and preferences to enhance participation (Rongen, Robroek, van Ginkel, Lindeboom, Pet, et al., 2014).

Limitations

Data Quality and Generalizability

Due to budget limits, the cross-sectional survey was distributed online using Amazon Mechanical turk, and only aimed at getting a limited sample size of 400 participants. Mturk requires users to have basic computer and internet skills to complete online tasks; more than 92% of participants in our sample reported graduating from some college or higher. Thus, Mturk users may not represent the general population in terms of education. In addition, only Mturk users with a status of "Full-time employed" were able to get access to the questionnaire, while part-time or on-call employees were not included in the present study. In sum, the 400 participants completing the survey on Mturk are not

generalizable to the greater workforce in the United States. In addition, data quality could not be fully guaranteed as the survey completion time varies from 3 minutes to 1 hour.

Survey Designing

Self-reported data were collected using online surveys, some worksite level factors might not be accurately measured using self-reported data. Participants' age was not collected in the survey, which could have been a very important covariate if included in the investigation. For assessing intention to participate in different formats of conversation-based worksite health programs, two sets of three-item scales were developed and tested for each format (group discussion/individual consultation) (Chapter 4, Table 4). Even though the developed three-item scales have very high reliability, a total of three items may not cover all characteristics of programs delivered in the format of discussion/consultation. More thorough tests of these items need to be conducted for a better measure of results for future research.

Research Scope

Various worksite health program elements could be utilized to promote employee health, including instructional education, physical activity, environmental change and policy change (Bayer, 2016; Meng, et al., 2017). The current research limited the focus down to only two main types of worksite health programs: physical activity programs (manuscript 1) and conversation-based instructional education programs (manuscript 2).

In addition, three common health topics with different degrees of sensitivity were examined in manuscript 2, including general health, stress and anxiety, and chronic diseases. The three common health topics cannot cover all health topics delivered at worksites (such as tobacco cessation, occupational safety), and there's overlap among the

three selected health topics. However, the purpose of manuscript 2 is to examine whether the selection of an optimal format for distributing health information at worksites is based on sensitivity and specificity of the health topics. And the findings successfully provided evidence supporting differences of participation intention in a group discussion based on health topics.

Recommendations and Future Study

The dissertation findings reinforced previous studies that worksite, individual and program characteristics are three important and inter-related aspects that determine workplace health promotion participation and success (Bayer, 2016). For better outcomes of workplace health promotion program planning and implementation, researchers and practitioners are recommended to take a first step to evaluate and assess worksite situations and employee compositions and characteristics, and then ensure worksite health program features are designed or tailored to fit crucial worksite- and employee-level characteristics/factors.

There is a lack of research that explores how participants self-select into different types of health programs based on different factors and explains why employees favor one program over another. The dissertation only investigated intention to participate in limited types of programs, future research is needed to investigate other elements of program features (i.e., other health topics, size, intensity) and the connection of worksite- and employee- level characteristics. Those findings could inform employers and practitioners of better WHP program development strategies to design/tailor the program to meet the needs of the participants and increase the likelihood of program success.

Previous studies have shown that factors related to intention to participate in a program may not be associated with actual participation, and that intended participation may not reflect actual participation (Biddle, 1994; Davis, Jackson, Kronenfeld, & Blair, 1984; Rongen, Robroek, van Ginkel, Lindeboom, Altink, et al., 2014). Future studies are needed to better understand the link and gap between intention, actual participation, and participant retention. Investigating the intention of participation could inform program planners about the needs of the targeted worksite and employees. However, the ultimate goal is to increase actual participation by designing new programs, or tailoring existing programs, based on intention of participation and relevant individual- and worksite- level factors. Future studies should explore whether actual participation, retention, and adherence could be improved by changing or adapting program features based on the current study.

To overcome the limitation of the present study, future studies could recruit employees from different industries or enterprises instead of collecting data only by online survey. An online survey through survey vendors (such as MTurk) could not fully guarantee data quality and whether participants represent the targeted employee population of the research. Collecting data from actual worksites enable more potential analyses/models to cluster similar job positions, or compare the results between different industries. Future studies may also further explore interactions between individual factors associated with intended participation. In addition, when assessing worksite and individual level characteristics, more objective measures (i.e., biometrics, company documentations) could be utilized in addition to self-reported data collected from surveys. Future studies could also extend the research scope to many other devise

worksite health promotion components (i.e., policy and environmental change) and health promotion topics, and explore optimal program elements to better match worksite circumstances and employees' needs and preferences.

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APPENDIX A

Questionnaire

Assessment of Interest and Intended Participation of Different Types of Worksite

Health Promotion Programs

Q1 If you were allowed to do the following things on work time, please rate how likely you would be to:

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Participate in team-based sports with my coworkers	❍	❍	❍	❍
Participate in group-based physical activity with your co-workers (aerobic exercise classes, yoga classes, etc.)	❍	❍	❍	❍
Participate in individual-based physical activity alone (individual walking/physical activity break, onsite fitness center time, etc.)	❍	❍	❍	❍

Q2 The next set of items are about learning information about general health topics (such as healthy eating and healthy habits). If you were allowed to do the following things on work time, please rate how likely you would be to:

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Share ideas about "general health" with my coworkers in a group discussion	❍	❍	❍	❍
Listen to other coworkers' opinions about "general health" in a group discussion	❍	❍	❍	❍
Ask questions about "general health" in a group discussion	❍	❍	❍	❍
Talk to a health coach/counselor individually about issues related to "general health"	❍	❍	❍	❍
Get advice about "general health" from a health coach/counselor individually	❍	❍	❍	❍
Contact a health coach/counselor for questions about "general health"	❍	❍	❍	❍

Q3 The next set of items are about learning information about stress and anxiety. If you were allowed to do the following things on work time, please rate how likely you would be to:

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Share ideas about “stress and anxiety” with my coworkers in a group discussion	❍	❍	❍	❍
Listen to other coworkers’ opinions about “stress and anxiety” in a group discussion	❍	❍	❍	❍
Ask questions about “stress and anxiety” in a group discussion	❍	❍	❍	❍
Talk to a health coach/counselor individually about issues related to “stress and anxiety”	❍	❍	❍	❍
Get advice about “stress and anxiety” from a health coach/counselor individually	❍	❍	❍	❍
Contact a health coach/counselor for questions about “stress and anxiety”	❍	❍	❍	❍

Q4 The next set of items are about learning information about common chronic diseases (such as prevention or management of heart diseases, high blood pressure, obesity, asthma, arthritis, and chronic lung diseases). If you were allowed to do the following things on work time, please rate how likely you would be to:

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Share ideas about "chronic diseases" with my coworkers in a group discussion	❍	❍	❍	❍
Listen to other coworkers' opinions about "chronic diseases" in a group discussion	❍	❍	❍	❍
Ask questions about "chronic diseases" in a group discussion	❍	❍	❍	❍
Talk to a health coach/counselor individually about issues related to "chronic diseases"	❍	❍	❍	❍
Get advice about "chronic diseases" from a health coach/counselor individually	❍	❍	❍	❍
Contact a health coach/counselor for questions about "chronic diseases"	❍	❍	❍	❍

Q5 If the following health programs were offered at your workplace, and you could participate on work time, how interested would you be?

	Not interested at all	Slightly interested	Somewhat interested	Very interested
Physical activity	❍	❍	❍	❍
General health such as healthy eating and healthy habits	❍	❍	❍	❍
Stress and Anxiety	❍	❍	❍	❍
Common chronic diseases such as obesity, diabetes, arthritis, hypertension, heart diseases, etc.	❍	❍	❍	❍

Assessment of Individual-level Factors Potentially Associated with Intended

Participation of Worksite Health Promotion Programs

Q1 Would you say in general your health is?

- ❍ Excellent
- ❍ Very good
- ❍ Good
- ❍ Fair
- ❍ Poor

Q2 Please rate your level of agreement with the following statements in terms of how it applies to your work

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Health promotion at worksites like mine would improve employee health	❍	❍	❍	❍	❍
Health promotion at worksites like mine can help to improve employee productivity	❍	❍	❍	❍	❍
Health promotion at worksites like mine can help to control health care costs	❍	❍	❍	❍	❍

Q3 How important is it for you to make a lifestyle change to improve your health?

- ❍ Not important at all
- ❍ A little important
- ❍ Somewhat important
- ❍ Very important

Q4 How important is it for you to learn more about health related information to improve your health?

- ❍ Not important at all
- ❍ A little important
- ❍ Somewhat important
- ❍ Very important

Q5 Have you ever participated in a worksite health promotion program?

- ❍ Yes
- ❍ No

Assessment of Worksite-level Factors Potentially Associated with Intended

Participation of Worksite Health Promotion Programs

Q1 How committed do you think your organization is to the health of all its employees?

- ❍ Not committed at all
- ❍ A little committed
- ❍ Somewhat committed
- ❍ Very committed

Q2 Please rate your level of agreement with the following statements in terms of how it applies to your work

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
My supervisor encourages me to take steps to prevent personal physical illnesses	❍	❍	❍	❍	❍
My supervisor and I discuss ways to improve my physical health	❍	❍	❍	❍	❍
My supervisor encourages me to take better care of myself (e.g. stop smoking, healthy diet, exercise, rest)	❍	❍	❍	❍	❍
My supervisor and I discuss my concerns about my physical health	❍	❍	❍	❍	❍

Q3 Please rate your level of agreement with the following statements in terms of how it applies to your work

	Strongly disagree	Disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Agree	Strongly agree
I have control over the scheduling of my work	❍	❍	❍	❍	❍	❍	❍
I have some control over the sequencing of my work activities (when I do what)	❍	❍	❍	❍	❍	❍	❍
My job is such that I can decide when to do particular work activities	❍	❍	❍	❍	❍	❍	❍

Q4 Please rate your level of agreement with the following statements in terms of how it applies to your work

	Strongly disagree	Disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Agree	Strongly agree
My coworkers really care about me	❍	❍	❍	❍	❍	❍	❍
I feel close to my coworkers	❍	❍	❍	❍	❍	❍	❍
My coworkers take a personal interest in me	❍	❍	❍	❍	❍	❍	❍
My coworkers are helpful in getting job done	❍	❍	❍	❍	❍	❍	❍

Q5 Please respond to each following statement in terms of how it applies to your work

	Never	A few times per year	A few times per month	A few times per week	Daily
I feel emotionally drained after work	❍	❍	❍	❍	❍
I feel worn out after work	❍	❍	❍	❍	❍
I feel tired when I think about work	❍	❍	❍	❍	❍

Q6 Please respond to each question in terms of how it applies to your work: In the last month, how often have you...

	Never	Almost never	Sometimes	Fairly often	Very often
Been upset because of something that happened unexpectedly at work?	❍	❍	❍	❍	❍
Felt that you were unable to control the important things at work?	❍	❍	❍	❍	❍
Felt nervous and stressed because of work?	❍	❍	❍	❍	❍
Found that you could not cope with all the things you had to do at work?	❍	❍	❍	❍	❍
Been angered because of things that had happened at work that were outside of your control?	❍	❍	❍	❍	❍
Felt that difficulties at work were piling up so high that you could not overcome them?	❍	❍	❍	❍	❍

Q7 Please respond to each question in terms of how it applies to your current job

	Less than once per month or never	Once or twice per month	Once or twice per week	Once or twice per day	Several times per day
How often does your job require you to work very fast?	❍	❍	❍	❍	❍
How often does your job require you to work very hard?	❍	❍	❍	❍	❍
How often does your job leave you with little time to get things done?	❍	❍	❍	❍	❍
How often is there a great deal to be done?	❍	❍	❍	❍	❍
How often do you have to do more work than you can do well?	❍	❍	❍	❍	❍

Q8 How often does your job require a lot of physical effort during your work-shift?

❍ Never
❍ Little of the time
❍ Some of the time
❍ Most of the time
❍ All the time

Q9 How often does your job require you to sit for long periods of time during your work-shift?

❍ Never
❍ Little of the time
❍ Some of the time
❍ Most of the time
❍ All the time

Q10 Are you aware of any policies implemented in your workplace to create a healthier work environment for employees?

❍ Yes
❍ No

Q11 How long have you been working for your current job?

- ❍ Less than 1 year
- ❍ 1-4 years
- ❍ 5-9 years
- ❍ 10-15 years
- ❍ 15 or more years

Demographics

Q1 What is your gender?
- ❍ Male
- ❍ Female

Q2 Please specify your race/ethnicity?
- ❍ Black or African American
- ❍ Hispanic or Latino
- ❍ Non-Hispanic White
- ❍ Asian
- ❍ Other

Q3 What is your total household income?
- ❍ Less than $10,000
- ❍ $10,000 to $19,999
- ❍ $20,000 to $29,999
- ❍ $30,000 to $39,999
- ❍ $40,000 to $49,999
- ❍ $50,000 to $59,999
- ❍ $60,000 to $69,999
- ❍ $70,000 to $79,999
- ❍ $80,000 to $89,999
- ❍ $90,000 to $99,999
- ❍ $100,000 to $149,999
- ❍ $150,000 or more

Q4 What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received.
- ❍ Some high school
- ❍ High school graduate or GED
- ❍ Some college or technical/vocational training
- ❍ Associate degree
- ❍ Bachelor degree (4 year)
- ❍ Post graduate work (working towards a Master's degree, PhD, or MD)
- ❍ Postgraduate degree (Master's degree, PhD, MD, etc)

Q5 What is your marital status?

- ❍ Married
- ❍ Widowed
- ❍ Divorced
- ❍ Separated
- ❍ Never married

APPEMDIX B

Research Timeline

Activities	**2016 Sep**	**2016 Oct**	**2016 Nov**	**2016 Dec**	**2017 Jan**	**2017 Feb**	**2017 Mar**	**2017 Apr**	**2017 May**	**2017 Jun**	**2017 Jul**	**2017 Aug**	**2017 Sep**	**2017 Oct**	**2017 Nov**
Dissertation research planning and prospectus	X	X	X	X	X	X									
Survey developing and researching	X	X	X	X	X	X									
Interviews for survey developing						X	X								
Dissertation grant application writing and submission							X	X							
IRB application preparation and submission							X	X							
IRB approval									X						
Amazon Turk setting and designing									X						

Data collection through Amazon Turk									X						
Data cleaning									X	X					
Data analyses plans										X	X				
Short reports for Manuscript 1 and Manuscript 2										X	X	X			
Manuscripts writing											X	X			
Dissertation writing	X	X	X	X	X	X					X	X	X		
Dissertation editing													X	X	
Dissertation submission															X

APPENDIX C

Consent Letter

Dear Participants:

I am a PhD candidate at the University of Georgia, Department of Health Promotion and Behavior. I invite you to participate in a research study entitled "Intention to Participate in Workplace Health Promotion Programs Delivered in Different Formats." The purpose of this study is to investigate how individual- and worksite- level characteristics affect employees' interests and preferences of workplace health promotion programs.

We require survey participants to be Amazon Mechanical Turk users aged 18 years and older who reside in the United States. Users must also be part-time or full-time employees who commute to a worksite with more than 5 co-workers.

Your participation will only involve completing a survey and should take about 15 minutes. Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled.

The results of this participation will be **confidential** and will not be released in any individual identifiable form. Your survey responses will NOT be used to inform any employers of their employees. Amazon Mechanical Turk participants' IDs will NOT be shared with anyone outside the research team, will be removed from the dataset, and/or will not be linked to survey/study responses. Additionally, all data analyses will be reported in aggregate, thus individual responses will not be identifiable.

Findings will help researchers and practitioners to design interventions and recruitment strategies to engage employees in worksite health promotion efforts. There are no known risks or discomforts associated with this research. Upon completion of the survey, you will be compensated $2 for your participation through Amazon Mechanical Turk account.

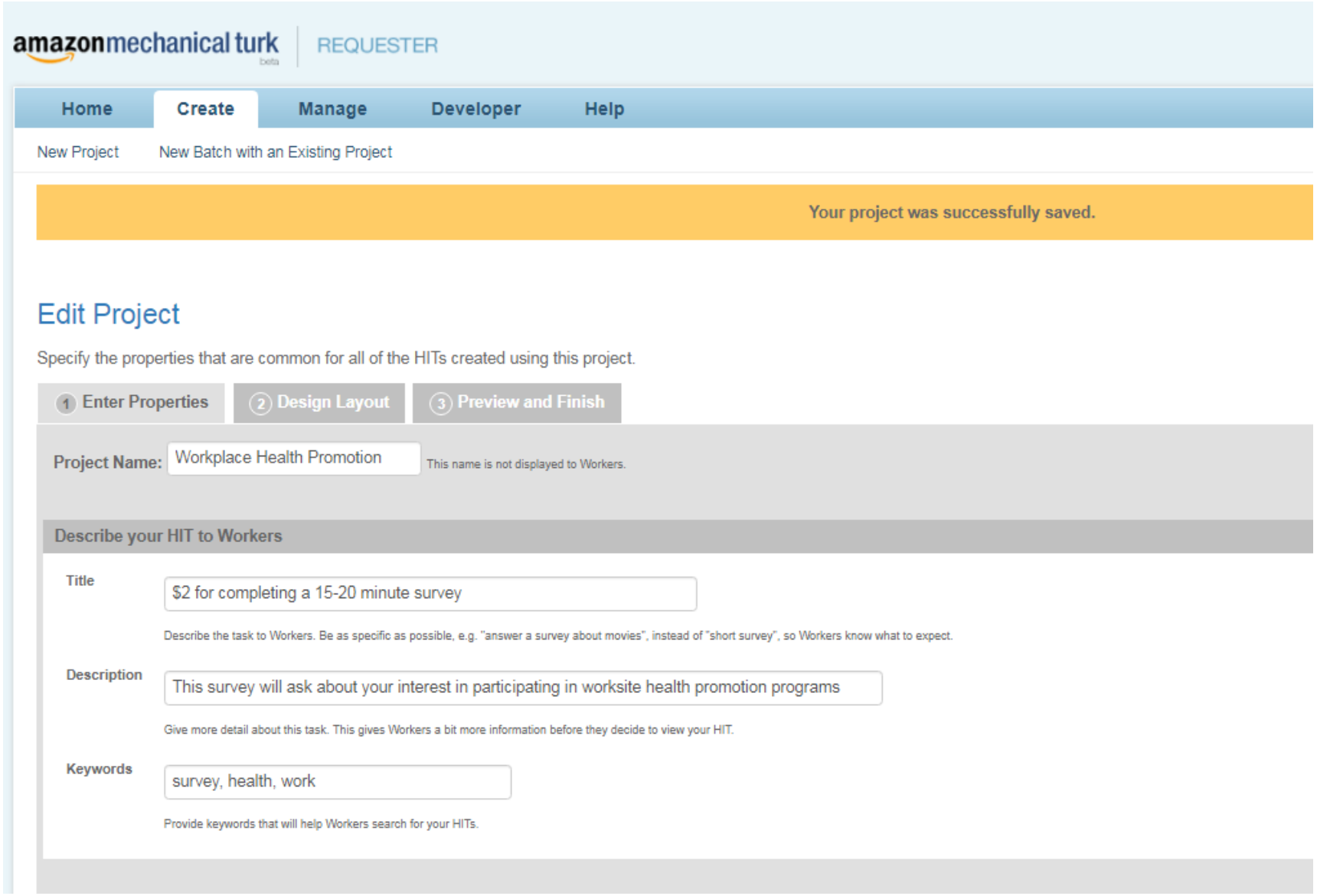
By completing this questionnaire, you are agreeing to participate in the above described research project. Please keep this letter for your records. If you have any questions about this research project, please feel free to send an e-mail to Dr. Matthew Smith (health@uga.edu). Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board; telephone (706) 542-3199; email address irb@uga.edu.

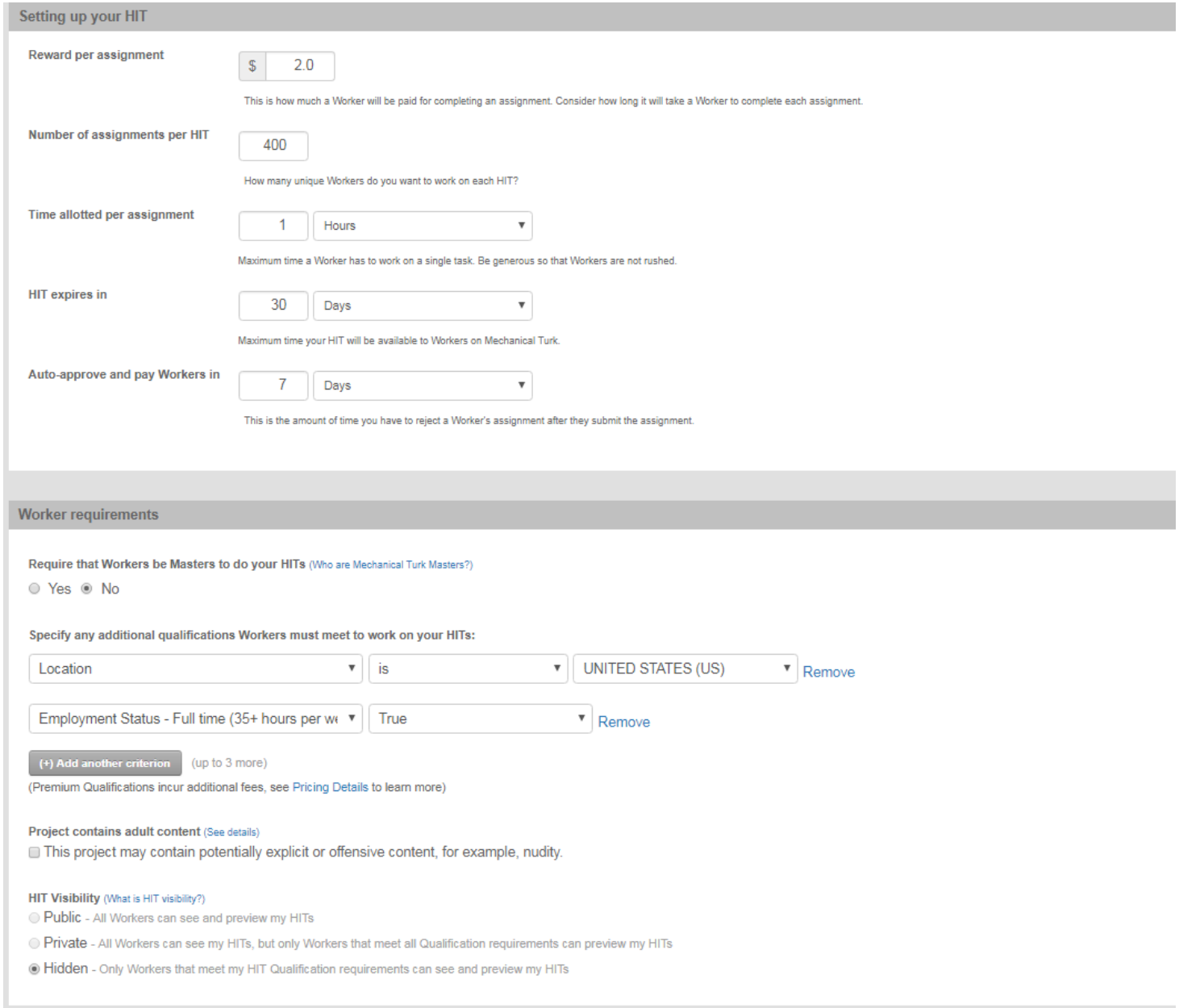
Thank you for your time and participation!

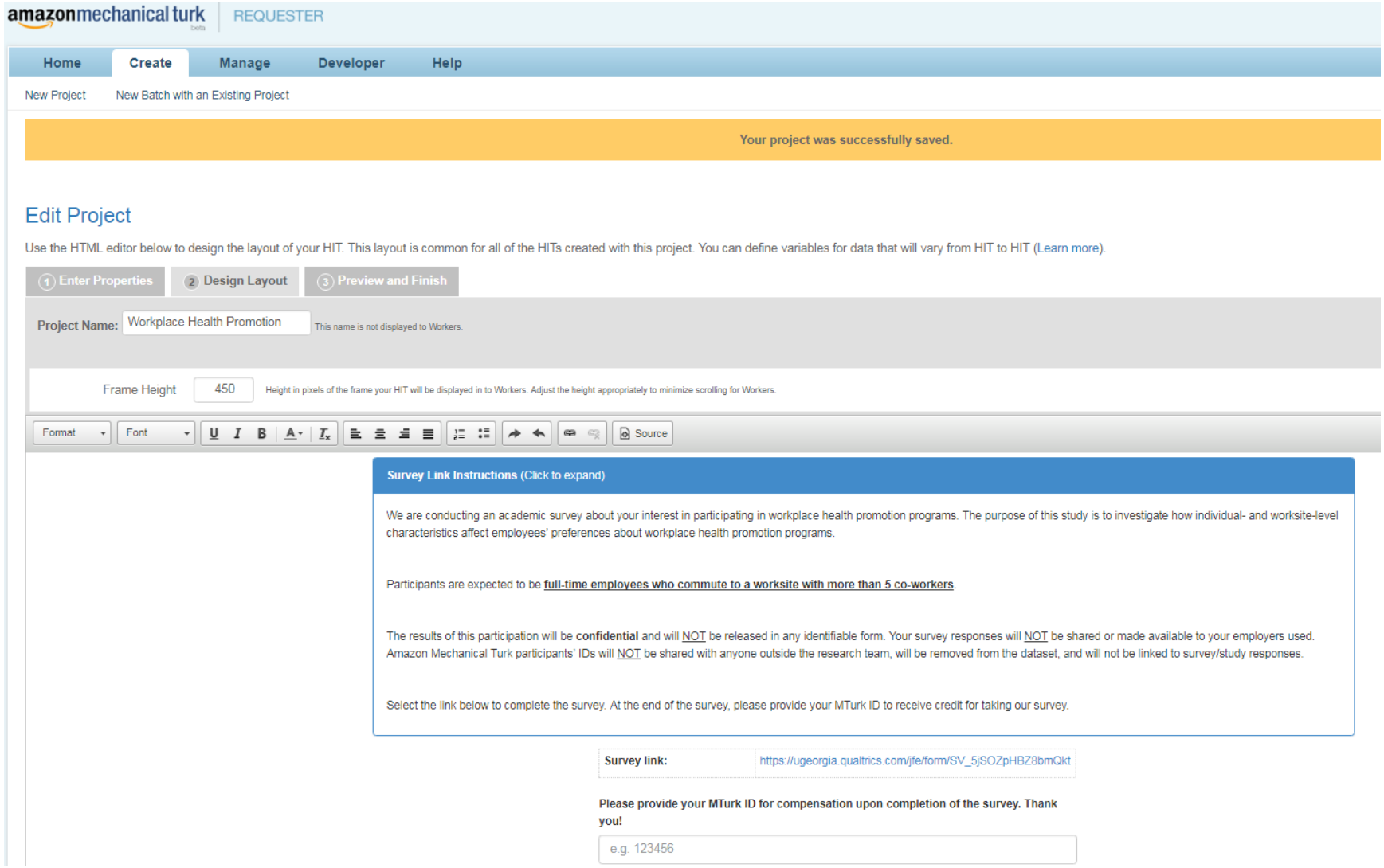
Sincerely,
Lu Meng, PhD candidate
Workplace Health Group
Department of Health Promotion and Behavior
University of Georgia

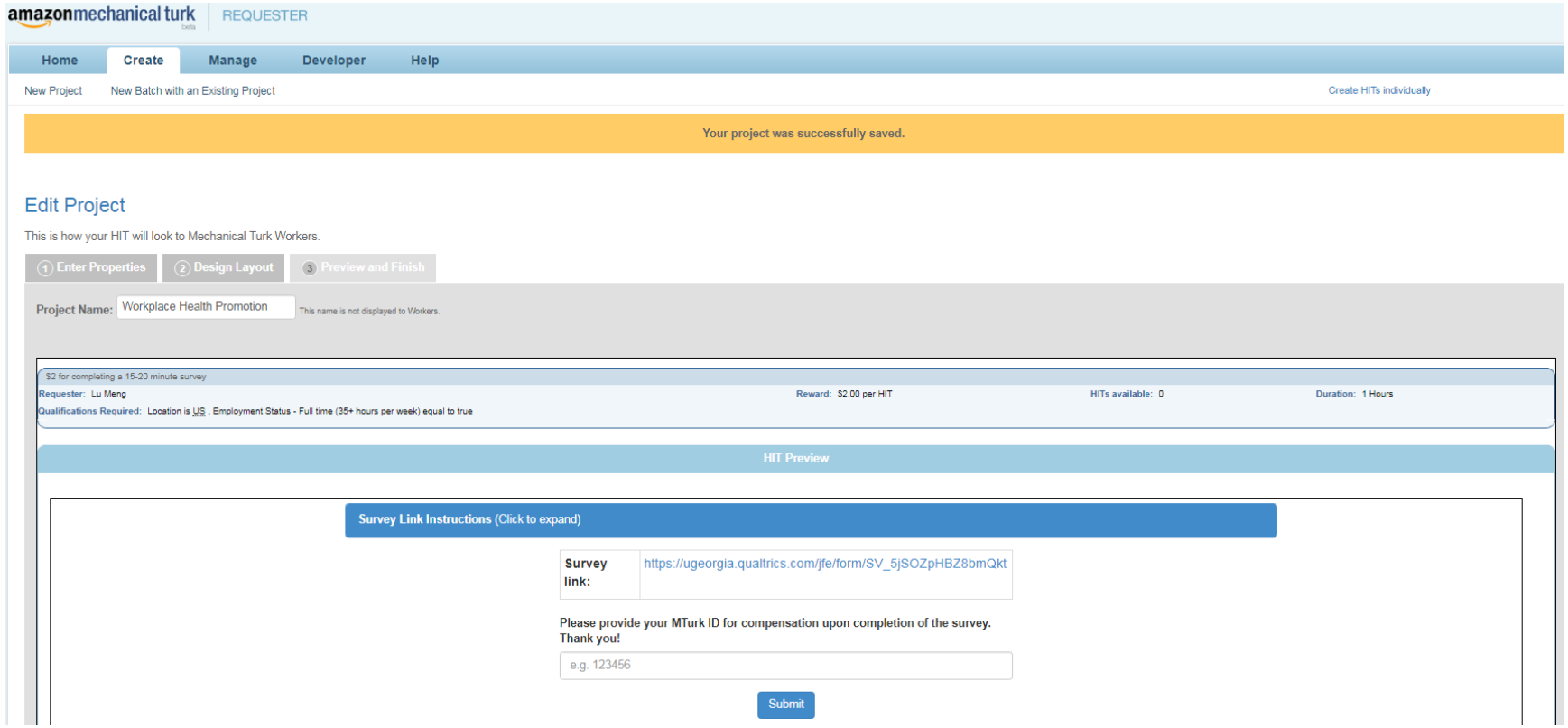
APPENDIX D

Amazon Mechanical Turk Setting and Designing


amazonmechanical turk beta
REQUESTER
Home
Create
Manage
Developer
Help
New Project
New Batch with an Existing Project
Your project was successfully saved.
Edit Project
Specify the properties that are common for all of the HITs created using this project.
1 Enter Properties
2 Design Layout
3 Preview and Finish
Project Name:
Workplace Health Promotion
This name is not displayed to Workers.
Describe your HIT to Workers
Title
$2 for completing a 15-20 minute survey
Describe the task to Workers. Be as specific as possible, e.g. "answer a survey about movies", instead of "short survey", so Workers know what to expect.
Description
This survey will ask about your interest in participating in worksite health promotion programs
Give more detail about this task. This gives Workers a bit more information before they decide to view your HIT.
Keywords
survey, health, work
Provide keywords that will help Workers search for your HITs.


Setting up your HIT
Reward per assignment
$ 2.0
This is how much a Worker will be paid for completing an assignment. Consider how long it will take a Worker to complete each assignment.
Number of assignments per HIT
400
How many unique Workers do you want to work on each HIT?
Time allotted per assignment
1 Hours
Maximum time a Worker has to work on a single task. Be generous so that Workers are not rushed.
HIT expires in
30 Days
Maximum time your HIT will be available to Workers on Mechanical Turk.
Auto-approve and pay Workers in
7 Days
This is the amount of time you have to reject a Worker's assignment after they submit the assignment.
Worker requirements
Require that Workers be Masters to do your HITs (Who are Mechanical Turk Masters?)
Yes No
Specify any additional qualifications Workers must meet to work on your HITs:
Location is UNITED STATES (US) Remove
Employment Status - Full time (35+ hours per we True Remove
(+) Add another criterion (up to 3 more)
(Premium Qualifications incur additional fees, see Pricing Details to learn more)
Project contains adult content (See details)
This project may contain potentially explicit or offensive content, for example, nudity.
HIT Visibility (What is HIT visibility?)
Public - All Workers can see and preview my HITs
Private - All Workers can see my HITs, but only Workers that meet all Qualification requirements can preview my HITs
Hidden - Only Workers that meet my HIT Qualification requirements can see and preview my HITs


amazonmechanical turk
REQUESTER
Home
Create
Manage
Developer
Help
New Project
New Batch with an Existing Project
Your project was successfully saved.
Edit Project
Use the HTML editor below to design the layout of your HIT. This layout is common for all of the HITs created with this project. You can define variables for data that will vary from HIT to HIT (Learn more).
1 Enter Properties
2 Design Layout
3 Preview and Finish
Project Name: Workplace Health Promotion
This name is not displayed to Workers.
Frame Height 450
Height in pixels of the frame your HIT will be displayed in to Workers. Adjust the height appropriately to minimize scrolling for Workers.
Format
Font
Source
Survey Link Instructions (Click to expand)
We are conducting an academic survey about your interest in participating in workplace health promotion programs. The purpose of this study is to investigate how individual- and worksite-level characteristics affect employees' preferences about workplace health promotion programs.
Participants are expected to be full-time employees who commute to a worksite with more than 5 co-workers.
The results of this participation will be confidential and will NOT be released in any identifiable form. Your survey responses will NOT be shared or made available to your employers used. Amazon Mechanical Turk participants' IDs will NOT be shared with anyone outside the research team, will be removed from the dataset, and will not be linked to survey/study responses.
Select the link below to complete the survey. At the end of the survey, please provide your MTurk ID to receive credit for taking our survey.
Survey link:
https://ugeorgia.qualtrics.com/jfe/form/SV_5jSOZpHBZ8bmQkt
Please provide your MTurk ID for compensation upon completion of the survey. Thank you!
e.g. 123456


amazonmechanical turk
REQUESTER
Home
Create
Manage
Developer
Help
New Project
New Batch with an Existing Project
Create HITs individually
Your project was successfully saved.
Edit Project
This is how your HIT will look to Mechanical Turk Workers.
1 Enter Properties
2 Design Layout
3 Preview and Finish
Project Name: Workplace Health Promotion
This name is not displayed to Workers.
$2 for completing a 15-20 minute survey
Requester: Lu Meng
Reward: $2.00 per HIT
HITs available: 0
Duration: 1 Hours
Qualifications Required: Location is US , Employment Status - Full time (35+ hours per week) equal to true
HIT Preview
Survey Link Instructions (Click to expand)
Survey link:
https://ugeorgia.qualtrics.com/jfe/form/SV_5jSOZpHBZ8bmQkt
Please provide your MTurk ID for compensation upon completion of the survey.
Thank you!
e.g. 123456
Submit

APPENDIX E

Interview Questions for Survey Development and Summary of Answers

Question 1 Charity (does the wording make sense? Would they change the wording?)

- Change "Participate into" to "Participate in"
- Change "on work time" to "during work hours"
- Change "What topic is your previous program?" to "what topic did your program cover?"
- Add a "don't know" option for the policy question: "Are you aware of any policies implemented in your workplace to create a healthier work environment for employees?"

Question 2. Complexity (was this easy to complete? Were they confused by anything?)

- Eight participants replied no confusion and easy to complete
- Two participants had confusion: first participant was confused by three boxes on different topics; second participant was confused by a box that was print on the next page.

Question 3. Completeness (does it seem like there are things that are missing? Is it too much?)

- Nine participants responded the survey is not repetitive. The items are understandable and asking from different angle/perspectives. They didn't notice major repetition when filling the survey, and they didn't report feelings of being burdened or fooled.
- One participant felt repetition in the series of questions assessing intention to participate conversation-based programs.
- Three participants felt "you are asking me the same thing in different wording" in the series of questions assessing intention to participate conversation-based programs.

Question 4 Appropriateness (is the language readable for the average working American?)

- Yes (ten participants)

Question 5 Time (monitor the time it takes for them to complete)

- Minimal 3 mins maximal 10 mins (some of them get the survey before interview and time themselves and self-reported an approximate time)

Question 6 Asking participants' perception of "Health coach" vs "health consultant"

- Seven out of ten participants understood what a "health coach" is. Most of participants like "health coach". Reasons given by participants: "I never heard

about health consultant, maybe a health counselor"; "health coach" sounds interactive and "health consultant" sounds cold; As a male, I like coach; "consultant sounds like business"

- Three participants liked "health counselor": Reasons given by participants: "Health coach is someone I think in the gym", and health counselor sounds like a health professional to talk with. "Health coach is someone timing my exercise"

APPENDIX F

IRB Approval

Phone 706-542-3199

The University of Georgia

Office of the Vice President for Research
Institutional Review Board

APPROVAL OF PROTOCOL

April 25, 2017

Dear Matthew Smith:

On 4/25/2017, the IRB reviewed the following submission:

Type of Review:	Initial Study
Review Category:	Exempt 2
Title of Study:	Intention to participate in workplace health promotion programs delivered in different format.
Investigator:	Matthew Smith
Student Co-Investigator:	Lu Meng
IRB ID:	STUDY00004731
Funding:	Name: The University of Georgia;
Documents Reviewed:	Consent Document, Survey Questionnaire

The IRB approved the protocol from 4/25/2017 to 4/24/2022.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Sincerely,

Dr. Gerald E. Crites, MD, MEd
University of Georgia
Institutional Review Board Chairperson