DISSERTATION

WORKPLACE HEALTH TRAINING:

A THEORETICAL AND EMPIRICAL MODEL

Submitted by

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ABSTRACT

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For the current study I proposed a complete, integrated model of workplace health training including its antecedents, structure, and outcomes. Additionally, I proposed the concept of 'training enrichment', where different types of training would have a multiplicative effect on relevant work outcomes. Based on this proposed model, I empirically tested the longitudinal effects of workplace health training on employee attitudes, employee performance ratings, and learning culture. I hypothesized that: 1) the structure of my empirical model would fit the data, 2) workplace health training would positively impact employee attitudes and employee performance, 3) a strong learning culture would lead to increased employee participation in workplace health training, and 4) workplace health training would interact with leadership training to positively impact employee attitudes and employee performance. Results from the structural equation model and associated statistical tests showed that while the structure of the model was appropriate, the longitudinal effects of the training were minimal. Overall, this study provides a strong foundation for structuring workplace health training, as well as some evidence of its longitudinal effectiveness.

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CHAPTER I: INTRODUCTION

With increasing healthcare costs and an aging working population, promoting healthcare has become an increasing concern for businesses in the United States and around the world. While workplace healthcare costs are growing at a slower rate than during the previous decade, costs are still at record highs as healthcare premiums continue to increase at a rate of 3-10% every year (Kanter & Kaleniecki, 2015). This increase is largely due to demographic trends and later retirement (Lerman & Schmidt, 2006), changes to daily activities due to less physically demanding lifestyles (Anspaugh, Hunter, & Mosley, 1995), and rapidly increasing obesity rates (Fryar, Carroll, & Ogden, 2014). Combined, these health-related issues present unique workplace challenges to both employers and employees. Employers desire a healthier workforce in order to reduce healthcare costs, increase employee productivity, and increase employee engagement. Employees also want to be healthier, as healthy habits lead to a wide variety of positive physical, mental, and work-related outcomes. Given the physical, mental, and financial expense of being unhealthy, it is understandable that workplace health program research has increased exponentially over the past few decades (Mattke, Schnyer, & Van Busum, 2012; Gebhardt & Crump, 1999).

In order to better understand workplace health programs, it is important to understand the history of the programs, their evolution, and the current state of practice and research. Employer concern for a healthy workforce dates back as far as the 1880s, with the National Cash Register encouraging horseback rides and daily exercise breaks for its employees. Several similar programs existed throughout early American History, but participation in these programs was often limited to executives or upper management. In the 1950s through the 1970s, employee

wellness programs started gaining popularity, and employers began to extend these benefits to workers at all organizational levels. Companies such as Texas Instruments, Rockwell, and Xerox had some form of employee fitness program in place at one point during this time period (Chenoweth, 2011). The 1960s onward was also a time when health conscious political policies were beginning to take root in the United States. During this era, the Employee Assistance Program (EAP), the Worksite Health Promotion Movement (WHP), and the Occupational Health and Safety Administration (OSHA) were established. These political policies, along with employer provided workplace fitness programs, laid the groundwork for the modern workplace health practices we see today (Chenoweth, 2011; see also: Reardon, 1998).

While early workplace health programs were often atheoretical, and rarely empirically evaluated, the idea of formally implementing workplace health programs through training and prevention gained real traction in the 1990s. There are several possible explanations for the increase in both popularity of health programs, and empirical evaluation of said programs. One explanation for this change was the increased guidance from government agencies. In 1998, OSHA published proposed rules for the design, management, and evaluation of workplace health programs. These guidelines mainly focused on workplace safety, but general well-being was also included. Notably, the program included 'identified employee training' as an essential element of workplace health and safety programs. This push to formalize the procedures and evaluation of workplace health programs was the beginning of a formal implementation of new procedures for anticipating and training employees on workplace health issues (Colligan & Cohen, 2004). More recently, the Patient Protection and Affordable Health Care act included numerous provisions designed to encourage and expand employee sponsored health promotion activities. For workplace health programs, in particular, the federal government has dedicated 200 million

dollars to wellness program start up grants for small businesses (Mattke, Schnyer, & Van Busum, 2012). While formal policy surely helped increase the popularity of workplace health programs, there are also other components that may factor into their increased popularity. For example, Greiner (1987) cites increasing health care costs, a public change in cultural attitudes towards health, and the emergence of health promotion groups as possible causes for increased interest in workplace health programs.

Historical influences and cultural health shifts have helped lay the foundation for the current prevalence and extensiveness of workplace health programs. 73% of small companies (<199 employees) and 92% of large companies (>200 employees) offer at least one wellness or health related program at work (Lerman & Schmidt, 2006). This prevalence of active workplace health programs in the modern organization provides strong incentives to further investigate the intricacies of workplace health programs.

CHAPTER II: BACKGROUND

Workplace health training is any training program that explicitly trains employees on better health practices (i.e. diet, exercise, stress management, etc.) Formalized workplace health training has received relatively little research attention compared to other aspects of workplace health programs. This is at least in part because workplace health program research often comes from a medical or business focused model. This omission creates a gap in our understanding of workplace health programs and how they relate to employee attitudes and performance. Researchers have shown repeatedly how training positively impacts attitudes and performance, and workplace health training is already a subset of some workplace health programs. By investigating workplace health training through an Industrial and Organizational Psychological lens, I will contribute to the broader workplace health program literature by explaining the function and effectiveness of training in the workplace health program model.

For the current study, I proposed a complete model of workplace health training. This model focused on individuals and how they participate in, react to, and are affected by formalized workplace health training. Specifically, the model sought to better understand how workplace health training fits into a larger training program, and how it interacts with other types of training to affect individual outcomes such as employee health attitudes, employee work attitudes, and employee performance.

I reviewed the existing research on workplace health programs before narrowing the focus to workplace health training in particular. The proposed workplace health training model was theoretically developed and empirically tested, and built upon previous research and theory from both the training literature and workplace health literature. The model includes the structure of workplace health training, the effects of health training on employee attitudes and

performance, the interaction of health training with other training programs, and an investigation into other potentially model altering variables. The most basic part of the model is composed of current empirical workplace health studies. I expanded on this model by exploring areas that do not currently have strong empirical support, adding social and industrial and organizational psychology theory, and proposing new theory to fill in previously unexplored gaps. To view the full model, please see Appendix C.

Gaps in the Literature

Despite numerous studies conducted on workplace health programs, there are still many understudied aspects. A few potential research topics include broader samples, more longitudinal data, and program impact on workplace performance and employee attitudes (Mattke et al., 2013). A few of these topics, such as effect of workplace health programs on employee performance and attitudes, need more extensive research, or have not been rigorously evaluated (Osilla et al., 2012). Consistent with a need for more research in this area, organizational data on workplace health programs is relatively sparse, or not suitable for rigorous or complex empirical analyses.

Although there has been plenty of research on general workplace health programs, there has been less research on formalized wellness training, and no research on how it fits into a broader training curriculum. None of the current literature reviews offer a concrete estimate of how often formal training is used in workplace health programs; additionally, there is ambiguity regarding whether workplace health programs use formal training at all, since many researchers describe the processes through a medical or intervention perspective, rather than an organizational perspective. Given the general effectiveness of employee training (Aguinis & Kraiger, 2009), there is reason to believe that adding a formalized training component to an

employee health program would increase its effectiveness. Formalizing some components of workplace health programs with training best practices would provide several advantages, including all employees receiving a consistent delivery of knowledge and having access to formal feedback processes. Additionally, there is preliminary evidence to suggest that creating a workplace health program as part of an overarching learning experience could increase its effectiveness. For example, Higgs and Hunt (1999) found that incorporating health education into a broad learning curriculum led to a greater retention of health knowledge. Below, I review the antecedents, interactions, and outcomes associated with workplace health training.

A Model of Workplace Health Training

The current model offers a comprehensive overview of formalized workplace health training. The model includes the antecedents/drivers, processes, properties, and outcomes associated with workplace health training. Additionally, it takes into consideration the similarities and differences between workplace health training and more traditional workplace health programs. Below is an overview of the main components of the model; subsequent sections contain an in-depth review of the theoretical and empirical support for each component.

Established Research on Workplace Health Programs

Modern workplace health programs are well-established and well-studied in organizational contexts. While programs can vary by design, implementation, and goals, there is fairly strong consensus on workplace health program best practices. Researchers have extensively studied antecedents, program structure, and health and financial outcomes, with individual outcomes having some support as well. Appendix A shows which parts of workplace health programs have empirical support; the darker the boxes, the more empirical support exists for the concepts and pieces of health programs.

Theoretical Drivers of Workplace Health Training

In addition to established empirical studies, there are several psychological theories I used to guide the formation of the Workplace Health Training Model. I drew possible theoretical drivers from the applied social psychology literature and the Industrial and Organizational Psychology training literature. The subset of training theories include testable components of the current model. Appendix B shows how several psychological theories fit into the current workplace health model.

Complete Workplace Health Training Model

Established empirical components, components needing more study, established psychological theory, and a new theory presented by me combine to form the complete Workplace Health Training Model seen in Appendix C.

Workplace Health Programs vs. Workplace Health Training

Workplace health programs are organizational initiatives which focus on increasing the overall health and productivity of employees. Workplace health programs can include many different components such as employee support groups, counseling services, medical services, employer sponsored programs and initiatives, and formal training. Workplace health training is the formal process of systematically teaching employees important health related skills (i.e. proper diet and exercise, stress management, sleep hygiene, etc.).

Companies often choose the structure of programs based on resources, processes, and desired outcomes. For example, a program focused on weight loss, exercise, and nutrition might offer weight watchers meetings, competitions for weight loss, health coaching, and educational classes. Alternatively, a program with a more narrow focus such as smoking cessation might offer counseling, nicotine replacement therapy, and smoking cessation hotlines. Programs can

differ in focus, content, and execution. Organizations use workplace health programs to provide a wide variety of interventions and resources based on the general needs of the company and its employees (Mattke et al., 2013).

Many workplace health programs do not include a formal training component. Workplace health training differs from general workplace health programs in several meaningful ways. First, formal training programs generally have a more rigid structure than workplace health programs. Training has a set time frame, a discrete set of target skills, and usually includes formal feedback mechanisms. Additionally, trainers focus on providing consistent, work-related content on a structured basis (for an overview, see: Aguinis & Kraiger, 2009), as opposed to the time-varied programs and interventions offered by workplace health programs. Finally, there is evidence that training can have longitudinal effects on workplace performance and attitudes when best practices are applied (e.g. Burke, Hutchins, & Saks, 2013). While workplace health programs could also have longitudinal effects, the evidence is limited to a small number of studies (e.g., MacKinnon et al., 2010; Naydeck, Pearson, Ozminkowski, Day, & Goetzel, 2008), with researchers often calling for more longitudinal analyses (see: Mattke et al., 2013).

While differences exist between general workplace health programs and health training, there are also several similarities. First, both workplace health programs and training programs have similar goals. Both types of programs want to improve specific employee attitudes and behaviors, whether it be health habits or work skills, in order to increase both individual and organizational outcomes. Next, motivation plays an important part in the effectiveness of both mediums. Unmotivated participants are much less likely to take place in workplace health programs (e.g. Norris-Ellis, 2012); similarly, the effectiveness of training is often related to participant motivation (Gegenfurtner, Veermans, Festner, & Gruber, 2009). Finally, researchers

have shown both types of programs to be highly effective. Training programs are effective in a variety of settings for many different outcomes (see: Aguinis & Kraiger, 2009). Similarly, workplace health programs are also overwhelmingly successful. Only a few researchers have found null results in this domain (see: Muto & Yamauchi, 2001; Sanchez Bustillos, Ortiz-Trigoso, 2013). Combined, the similarities between workplace health programs and training programs provides sufficient empirical support for studying the use of structured training as a component of (or in place of) more general workplace health programs.

Theoretical Underpinnings

It is important to understand the important role theory plays in program design, implementation, and outcomes in workplace health programs. Much of the research for these programs comes from a medical perspective, but psychological theory also plays an important role in the effectiveness of workplace health programs. While there are many psychological theories that could contribute to the workplace health program model, the most applicable theories are self-perception theory, cognitive dissonance, and social learning theory.

Cognitive dissonance is the uncomfortable feeling a person experiences when they hold two or more competing beliefs or behaviors simultaneously (Festinger, 1957). This discomfort motivates people to reduce the dissonance by changing one of the competing beliefs or behaviors. For example, if someone believed that healthy eating was important, but they always ate unhealthy food, then they would want to correct the dissonance by either changing their beliefs to match their behavior or changing their behavior to match their beliefs. Researchers have found support for cognitive dissonance theory across a variety of work situations such as employee attitudes (Abraham, 1999) and workplace learning (Dechawatanapaisal & Siengthai, 2006). Additionally, in a systematic review of the literature, Freijy and Kothe (2013) found that

health interventions applying cognitive dissonance theory can impact a wide range of non-clinical health behaviors. This combination of research results provides strong preliminary evidence that organizations could apply cognitive dissonance theory to increase the effectiveness of workplace health programs.

Self-perception theory is the idea that people develop their attitudes by monitoring their own behavior across various situations (Bem & McConnell, 1970). More simply, people's attitudes develop to match their behavior. For example, if an employee was only eating healthy food due to taking part in a nutrition program, they would develop a positive attitude towards healthy eating to match their behavior. There is evidence that this theory is applicable to a variety of organizational situations. For example, self-perception theory has some empirical support for assisting in creativity formation at work (Yan, Davidson, & Mo, 2013) and increasing the frequency of organizational citizenship behaviors (Munyon, Hochwarter, Perrewé, & Ferris, 2010). Additionally, researchers have shown self-perception theory to be an effective tool for changing health-related behaviors. Vogt, Hall, Hankins, and Marteau (2009) found that feedback given to smokers based on self-perception theory was more effective than normal feedback or no feedback at all. Gilliam (2012) found that patients coping with chronic pain coped better when they presented themselves as not being in pain. Given that workplace health programs have similar a content focus as some health studies, and given the successful use of self-perception theory in other workplace contexts, it is reasonable to hypothesize that organizations could successfully apply self-perception theory to workplace health training.

Social learning theory is the idea that learning can take place in a social context through observation of actions and consequences, in addition to direct instruction and external reinforcement (Bandura, 1962). For example, an employee who watched his or her coworkers

taking walks during lunch, and observed the positive benefits of these walks, would learn that recreational walking is socially acceptable behavior. They would be more likely to replicate this behavior and take walks themselves the more they saw the behavior and its positive outcomes demonstrated by co-workers. This theory has strong empirical support in organizational settings. Spilg, Siebert, and Graeme (2012) explored how social learning could be used to better train doctors outside of the traditional competence model. Similarly, Sulsky and Kline (2007) found that social learning theory enhances the effectiveness of frame-of-reference training. There is also strong evidence that social learning theory can influence positive health behaviors in large populations. For example, researchers used social learning theory as a theoretical basis for dispelling HIV myths in the Tanzania. The Tanzanian radio drama, "Let's Go with the Times," used relatable characters to dispel HIV myths, teach family planning, and increase condom use. Similarly, social learning theory was successfully applied by the Mexican soap opera, "Come with Me," to promote adult literacy (Smith, 2002). These real world applications, combined with a significant amount of quantitative studies, are evidence that organizations could use social learning theory to bolster the effect of workplace health programs.

A theoretical companion to social learning theory found in the training literature is the third generation learning theory (Kraiger, 2008). The third generational learning theory has roots in social constructionism, the idea that learning is an inherently social task. Kraiger, building on social constructivist theory (e.g. Bruner, 1990), posited that learning and knowledge are socially constructed, and that social interactions could supplement or even replace more formal teacher-learner interactions. In a workplace health program context, this theory would suggest that there is just as much value in informal peer-peer interactions as there is in formal learning (see also:

Moore, 1989; Garrison, 1993). Organizations could have even greater impacts on important work and health outcomes by encouraging these types of interactions.

Additionally, there are some environmental theories that could have impacts on workplace health programs. Organizations could use Thaler and Sunstein's (2008) work on behavioral nudges to improve health behaviors at work. By creating a set of choices that rewards the better (or healthier) choice, organizations can nudge employees towards making the best health decisions on the job. For example, making healthy food in the work cafeteria cheaper than unhealthy food would nudge employees towards making healthy nutritional choices. Similarly, Wansink's research (1994, 2015) on the effect of environment on eating behaviors could inform workplace health policies. For example, employees may eat more if they eat at their desk while working due to being distracted during a working lunch; organizations could encourage employees to eat as a group in order to help employees avoid environmental cues that may increase food intake.

Overall, exploring the role of theory in workplace health models is important because theory can help explain *why* people behave a certain way. Employers can craft more effective workplace health programs by better understanding the underlying motivations of health behaviors.

This theoretical review leads to the first two broad propositions of the workplace health training model (see Appendix C).

Proposition 1: Organizations can apply social psychology theories to increase the impact of workplace health programs. ***Support: Moderate[1].***

[1] See Appendix E for an explanation of support levels.

Antecedents

In order to achieve desired results, practitioners should employ best practices when initially planning a workplace health program. Goetzel and Ozminkowski (2008) found that approximately 7% of workplace health programs use *all* of the components they identified as required for a successful intervention. There are generally five factors that promote wellness program success: effective communication strategies, opportunities for employees to engage, engaged leadership at all levels, appropriate use of existing resources and relationships, and continuous program evaluation (Mattke et al., 2013). Organizations can create a successful workplace health program by accounting for these crucial antecedents.

There is extensive research on which specific antecedents lead to more successful workplace health programs. First, workplace health programs need appropriate resource allocation and leadership support to have the greatest chance of a successful launch (McLellan et al., 2015). A program should have adequate funding based on its structure, anticipated number of participants, and goals. Second, employees must be aware that the program exists. Having strong communication in the early stages is vital to a successful program (Johnson, 2014). Next, the workplace health program must be convenient to encourage maximum employee participation, and the program must include health services that employees care about. If employees are not motivated, or if the program does not fit into their existing work schedule, then they are much less likely to participate (Harbin, 2014). Finally, incentives can help increase employee participation (e.g. Haijing et al., 2016). Incentives can greatly increase participation rates in comprehensive programs; however, incentives are less useful when dealing with one-off intervention programs that do not encourage continued positive health behaviors. Strong

communication, leadership support, and incentives all provide the foundation for a successful workplace health program.

It is also important to note that there are some uncontrollable factors that can affect participation levels. Health attitudes, exercise habits, employee level, and demographics can all change participation rates in workplace health programs (see: Norris-Ellis, 2012; Williams et al., 2007). This line of research is promising, but it is only just emerging. It is too early to make definitive statements about the impact of individual differences on workplace health program participation.

Proposition 2: Organizations antecedents such as communication, availability, incentives, and leadership support can increase participation in workplace health programs. ***Support: Strong.***

Proposition 3: Individual motivation can affect participation in workplace health programs. ***Support: Moderate.***

Proposition 4: Individual differences, such as health attitudes and satisfaction, can also affect participation in workplace health programs. ***Support: Limited.***

Structure

Choosing the correct structure for an employee workplace health program is vital to program success. Programs are not "one size fits all", and employers can structure health programs in a variety of ways. Most modern programs use a combination of screenings and interventions. Organizations use screenings to identify which health issues are most important to employees. They can include annual surveys, focus groups, and health questionnaires. Organizations use interventions to try to directly change a single behavior or small set of behaviors. Types of interventions include lifestyle management programs (e.g. smoking,

nutrition/weight, fitness, stress management, health education, etc.), employer health services (e.g. on site vaccinations, fitness facilities, nurse lines, healthy food choices, etc.), environmental workplace changes (e.g. healthier vending machines, increased workout space, etc.), and occasionally disease management programs (e.g. diabetes, asthma, depression, pain management, etc.) (Mattke et al., 2013; French et al., 2010; Leeks et al., 2010). Employers structure workplace health programs to be compatible with the needs, availability, and goals of the employees and organization.

The most successful programs include a comprehensive mix of different types of services and training. These programs often include at least two, and often three, different components. The first component of a comprehensive program typically offered is a healthcare screening. This often consists of a short survey to better understand the lifestyle habits of employees. Employees who complete a screening can opt-in to receive more information about the types of programs and services offered by the employer. The second component of a comprehensive program is a health intervention. Interventions typically include training and support for gaining the necessary knowledge to make positive lifestyle changes. The final component offered in many employee health programs is a lifestyle management program. Lifestyle management programs are most commonly associated with employee health programs, and include fitness opportunities, smoking cessation tips, nutritional information, etc. Programs are most successful when they combine all three of these components (see: Mattke et al., 2013).

Proposition 5: The structure of workplace health programs and services can influence program effectiveness. ***Support: Strong.***

Outcomes

Workplace health program outcomes can be broken into roughly four categories: health outcomes, financial outcomes, attitude outcomes, and performance outcomes. I will provide a brief summary of the literature for each type of outcome, as well as a review of the amount of empirical support for each type of outcome.

Health Outcomes

Workplace health programs positively impact a wide-variety of health-related outcomes. Health programs have been demonstrated to be effective at promoting cardiovascular health (Eng, Moy, & Bulgiba, 2016), improving eating and exercise habits (Foley, 2013), promoting mental health (Harding, Freak-Poli, Backholer, & Peeters, 2013), reducing absenteeism (Baicker, Cutler, & Zuriu, 2010), increasing presenteeism (Cancelliere, Cassidy, Ammendolia, & Côté, 2011), improving employee work attitudes (Kumar, McCalla, & Lybeck, 2009), and reducing healthcare costs (Baxter et al., 2014). There is a strong consensus in the literature that workplace health programs are positively related to many different health outcomes.

> *Proposition 6: Workplace health program participation is correlated with a variety of health outcomes including cardiovascular health, improved diet, improved exercise, improved health attitudes, and improved health knowledge.* ***Support: Strong.***
>
> *Proposition 7: Workplace health program participation is correlated with other health outcomes such as mental well-being.* ***Support: Limited.***

Financial Outcomes

Researchers have extensively documented the positive financial effects of workplace health programs (e.g. Dement, Epling, Joyner, & Cavanaugh, 2015); there is even evidence to suggest that the financial effects of many programs could be even greater. For example, Bolnick,

Millard, and Dugas (2013) found that the potential health cost savings to employers could be as high as 18.4%. Baicker, Cutler, and Zirui (2010) found that workplace wellness programs return about $3 in healthcare costs or absenteeism savings for every dollar spent. Finally, Aldana et al. (2005) found that savings on employee absenteeism could be as high as $15 for every dollar spent. Many different researchers have provided strong evidence that workplace health programs provide financial benefits to organizations across a wide-variety of areas including decreased plan usage, decreased costs, and decreased absenteeism.

Proposition 89: Workplace health program participation is correlated with financial outcomes such as lower health plan utilization, lower health care costs, lower absenteeism; additionally, they provide a strong return on investment. ***Support: Strong.***

Attitude Outcomes

One research area that has received relatively little attention is the effect of workplace health programs on employee attitudes. While some researchers have called for more work in this domain, the current evidence is limited to a few studies. One example of this effect comes from Kumar, McCalla, and Lybeck (2009) investigating the effectiveness of workplace health programs on increasing employee engagement, productivity, and healthy behaviors. Results showed that employees who had better eating and exercise habits were more productive and more engaged at work. However, workers who did not already have some of these habits were skeptical of the workplace health program and far less likely to participate. These findings suggest that workplace health programs could improve employee engagement as long as there is enough employee buy-in to the program, but more there needs to be additional research to confirm these findings.

Anderzén and Arnetz (2005) studied the effects of workplace health program participation on a wide variety of work related outcomes. Besides health outcomes, the authors found that participation in a workplace health programs was positively correlated with performance feedback. Similarly, Goetzel and Ozminkowski (2008) found that participation in workplace health programs can have a positive effect on employee attitudes if employers follow best practices. Cancelliere et al. (2011) found that participation in workplace health programs led to an increase in presenteeism, or being present at work. Finally, Merrill, Aldana, Garrett, and Ross (2011), using a large diverse sample, found that participation in workplace health programs is related to positive changes in employee attitudes such as happiness, feelings of calm, and the ability to cope with stress. Researchers are clearly interested in these effects, but there has not been a strong cluster of studies in any one area of employee attitudes. Although limited, this line of research provides reasonable justification for further exploring the effects of workplace health programs on employee attitudes.

Proposition 9: Workplace health program participation is correlated with employee work attitudes. ***Support: Limited/Moderate.***

Performance Outcomes

The effect of workplace health programs on employee performance is another work outcome that has minimal quantitative research. However, there is some evidence that suggests that employees who participate in health programs have higher ratings in a variety of performance metrics. Merill et al. (2013) found that employees who were physically healthy and practiced good health behaviors had better performance ratings than their peers. Additionally, researchers have found that participation in workplace health programs is related to general productivity (Goetzel & Ozminkowski, 2008; Kumar, McCalla, & Lybeck, 2009), efficiency and

participatory management (Anderzén & Arnetz, 2005), and a variety of attitudes that directly affect employee performance (Mattke et al., 2013). Similar to the research on employee attitudes, there is minimal research in this domain.

While direct research in this area is limited, it is also possible that participation in workplace health programs could affect performance through a variety of mediators. For example, healthier workers have lower rates of absenteeism (e.g. Daley & Parfitt, 1996), and employees who are at work regularly are more likely to be high performers. Also, healthier employees have higher levels of engagement (Kumar, McCalla, & Lybeck, 2009), which is a moderate predictor of performance.

Proposition 10: Workplace health program participation is correlated with employee performance. ***Support: Limited/Moderate.***

Training Enrichment

Integrating workplace health training into a broader training curriculum could increase the effectiveness of all types of training. I refer to this idea of increased effectiveness from training interaction as 'training enrichment.' While there is not any research looking at this exact phenomenon, this idea is a clear extension of previous theories and work. While prior research has shown the impact of individual training programs (for a review, see: Aguinis & Kraiger, 2009), there is reason to believe this effect can be extended to include a synergistic relationship of multiple training programs. This synergistic effect is likely because of the interrelatedness of training outcomes.

It is important to explain how training outcomes are interrelated. Learning is multifaceted and complex. Kraiger, Ford, and Salas (1993) explained that learning outcomes are interrelated: cognitive, skill-based, and affective outcomes are all part of the same nomological net. Changes

to one of these outcomes could have impacts on changes to another outcome. Alliger, Tannenbaum, Bennett, Traver, and Shotland (1997) expanded on this idea in a meta-analysis to examining trainee reactions, different levels of learning, and training transfer. The researchers found that different types of learning were related (immediate and retention). Combined, these studies and theoretical papers show that learning processes and outcomes are related within a training program.

In order to better understand how these learning processes all interact, it is important to have clear working definitions of learning attitudes and learning culture. Learning attitudes are a measurable interest in learning new skills and abilities. An example of a learning attitude would be an interest in learning a new skill at work. These attitudes were captured directly using a three item scale.

Learning culture is a complex construct that can be influence by organizational structure, HR practices and resources, organizational strategy, employee attitudes, and employee characteristics (see: Rebelo & Gomes, 2011). For the purpose of this study, I conceptualized learning culture as a combination of employee learning attitudes, organizational resources and support, and cultural learning norms within an organization. Organizational resources include the number of training courses offered or the post-training learning resources available to employees. Cultural norms within the organization include formal and informal organizational policies which directly affect how employees feel about learning. Organizations that encourage employees to take non-mandatory developmental training for professional development would have cultural norms that encourage a strong learning culture. Positive learning attitudes, ample organizational resources, and strong cultural norms can combine to create a cultural of learning.

Learning culture is an important part of any organization that wants to maximize the effectiveness of its training programs. There have been several studies that underline the importance of a strong learning culture: Yap (2014) found that continuous training and a positive view of learning were both important parts of creating a strong learning culture; Burke, Chan-Serafin, Salvador, Smith, and Sarpy (2008) found that having a climate conducive to learned content could lead to greater training transfer; finally, Mathewson (2014) found that training alone is often not enough to create behavioral change, and a culture that encourages continual learning and application creates a better environment for training transfer. In addition to these studies, there are several researchers who discuss how a strong learning culture affects training effectiveness and specific outcomes. Song and Kolb (2013) found that a positive learning culture mediates the effect of learning on knowledge creation and knowledge retention. Similarly, Salas and Von Glinow (2008) found that a strong learning culture could help organizations create a knowledge-based competitive advantage with their training. Having multiple training courses, having the opportunity for continuous learning, and creating a positive learning culture all may contribute to more effective training across a wide variety of outcomes. These combined concepts provide preliminary support for the idea of training enrichment through a strong learning culture.

Organizations that have consistent learning opportunities promote a culture of learning (Rebelo & Gomes, 2011). Including more types of training in the workplace, such as workplace health training, should enhance learning culture, thereby enhancing the effectiveness of all training courses. Workplaces that offer multi-faceted training curriculums, including workplace health training, are fostering a culture of learning by going above and beyond basic skills training. This commitment to learning is what we hypothesize will help explain any additional

outcome variance found due to the interaction between workplace health training and other optional training courses.

While researchers have never studied combining training programs for greater effectiveness directly, but there is evidence in the strategic human resource management literature that bundling HR practices can lead to more positive outcomes. Researchers have discussed the bundling of HR practices intermittently for the last several decades (e.g., Becker, Huselid, Pickus, & Spratt, 1997). However, it is only more recently that researchers have begun to empirically test the effects of strategically bundling specific HR practices. For example, Kim and Ployhart (2014) found that staffing and training practices interactively affect firm profit growth through productivity increases. Thus, there is at least some support in related literature suggesting that distinct yet related HR initiatives can interact to positively affect workplace outcomes.

I thus propose that consistent learning processes across different training courses, assisted by a strong learning culture, can influence cross-course outcomes. A strong learning culture could tie distinct but interrelated training processes and outcomes together. This process will create the training enrichment effect. Exploring the effects of a robust learning culture on training programs could provide some insight into how different types of training content could complement one another and lead to training enrichment.

Proposition 11: Workplace health training and other training programs will enrich each other when they are part of a strong learning culture. ***Support: Limited.***

Feedback Loops

Finally, to understand the longitudinal impact of workplace health programs, it is important to consider the possibility of feedback loops. More specifically, do the outcomes of workplace health programs:

- Increase motivation to continue participation?
- Increase participation in the same or similar health programs?
- Help build a culture of learning?

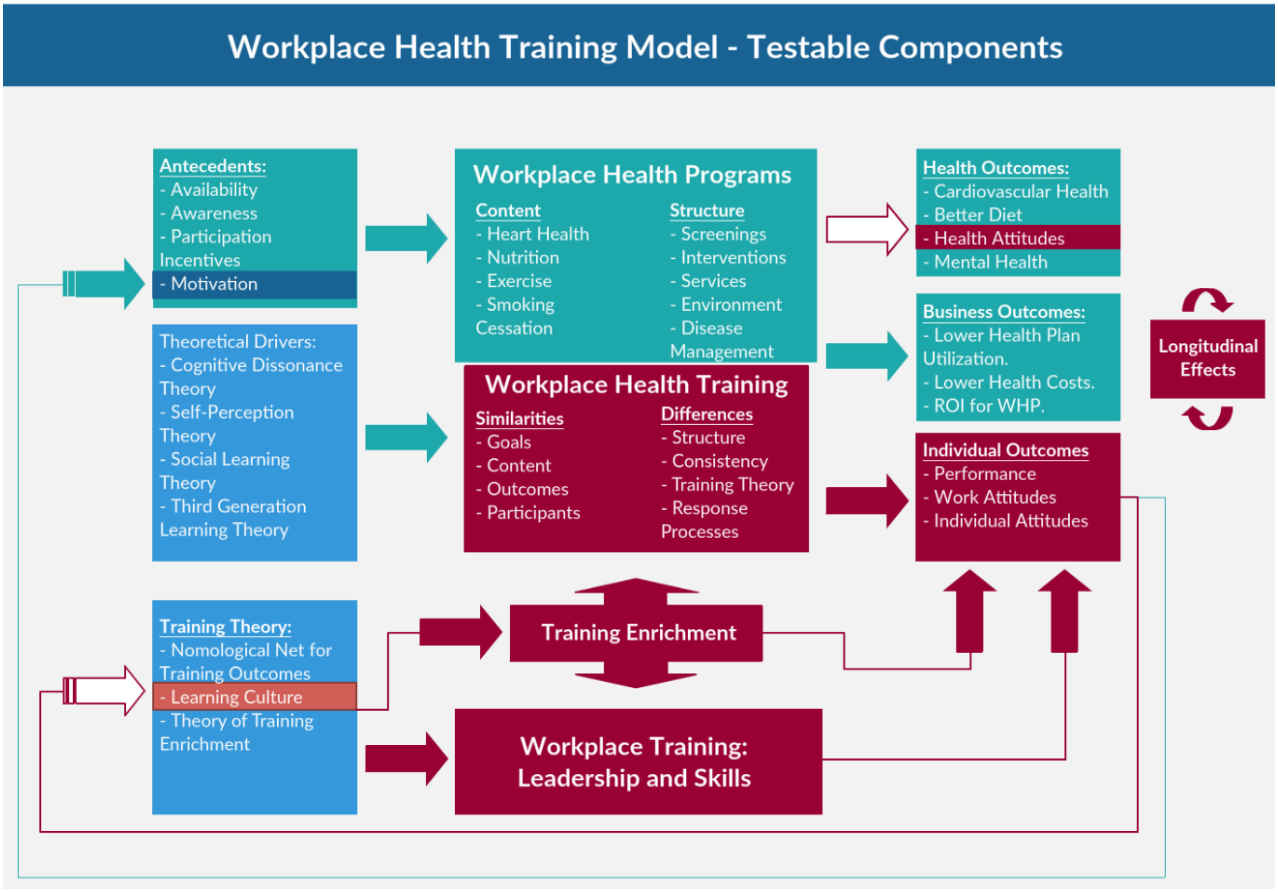
While workplace health researchers have never explicitly studied this training participation feedback loops, there are some indications that healthier behaviors create a feedback loop. First, self-perception theory would predict that people who consistently engage in a behavior will change their attitudes to match that behavior (Bem & McConnell, 1970). For example, a person who exercises in a workplace health program may begin to see exercise as a positive activity. This could increase their motivation, which in turn could lead them to enrolling in more workplace health initiatives because of their new-found attitude. There is also some evidence that a more engaged workforce could influence healthy behaviors as much or more than health promotion alone (Torp, Grimsmo, Hagen, Duran, & Gudbergsson, 2013). For example, an engaged employee may be more likely to participate in optional health training programs than an unengaged employee. Overall, there is sufficient reason to believe that the outcomes from teaching employees healthy behaviors could create a positive feedback loop.

Proposition 12: Workplace health program participation will lead to improved employee attitudes, which will increase motivation and participation in future training programs.

Support: Limited.

CHAPTER III: THE CURRENT STUDY

The current theoretical model includes the longitudinal effects of workplace health training, workplace leadership training, and the interaction between the two types of training (training enrichment). Only part of the model was able to be empirically given the available data. The red boxes in the following illustration are the parts that could be empirically tested using the available data set:



A larger version of this model is available in Appendix D.

My hypotheses for this study fall into four distinct categories. The first set of hypotheses test the effect of workplace health training on employee attitudes and performance. These hypotheses include a mixture of well-established outcomes as well as emerging trends in workplace health research.

Hypothesis 1

The health training program will have a positive effect on employee health attitudes.

Hypothesis 2

The health training program will have a positive effect on employee satisfaction with the company.

Hypothesis 3

The health training program will have a positive effect on employee performance.

The second category of hypotheses test the effect of leadership development training. Specifically, they deal with relevant leadership courses within the organization and their effect on employee attitudes and performance.

Hypothesis 4

The leadership training program will have a positive effect on employee performance.

Hypothesis 5

The leadership training program will have a positive effect on employee engagement.

Hypothesis 6

The leadership training program will have a positive effect on employee satisfaction with the company.

For the third set of hypotheses are focused on the newly proposed training enrichment theory. I proposed that the combination of employee health training and leadership training courses creates an interaction effect above and beyond the main effects of the individual training programs. I hypothesized that this interaction would have an effect on the same attitude and performance measures as the individual training.

Hypothesis 7

Health Training and Leadership Training combined will interact, such that the effectiveness of each training will be enhanced when employees participate in both.

Hypothesis 8

Health Training and Leadership Training combined will have a positive effect on employee satisfaction with the company beyond the separate, individual training effects.

Hypothesis 9

Health Training and Leadership Training combined will have a positive effect on employee performance that is stronger than the separate training effects.

The final set of hypotheses tested a possible feedback loop associated with positive outcomes from workplace health training. I predicted that health training, leadership training, and the combination of the two would all have an effect on employee learning attitudes and culture within the company. Additionally, I made several hypotheses about how participation in workplace training would affect future participation in workplace training.

Hypothesis 10

The leadership training program will have a positive effect on employee learning attitudes

Hypothesis 11

The health training program will have a positive effect on employee learning attitudes.

Hypothesis 12

Health Training and Leadership Training combined will have a positive effect on learning attitudes beyond the separate, individual training effects.

Hypothesis 13a

Employees with high learning attitudes will be more likely to participate in all types of training.

Hypothesis 13b

Employees who enroll health training will be more likely to participate in leadership training in future years.

Hypothesis 13c

Employees who enroll leadership training will be more likely to participate in health training in future years.

Hypothesis 13d

Employees who enroll in training will be less likely to participate in the same type of training the following year.

CHAPTER IV: METHODS

Participants

A large, international company provided archival data for this study. The dataset includes employees across a wide variety of different countries, departments, and job levels. The data come from three separate sources: survey data collected annually, employee performance data collected annually, and training completion data collected throughout the year. Only employees who completed the relevant training courses and have data for at least one outcome will be included in the final analysis.

Measures

The first data source for this research is three consecutive years of organizational training data (about 8000 employees per year). The data came from the organization's leadership training program which had dozens of courses available to participants. For the purpose of this study, I only examined the employee health training course, as well as courses specific to leadership development. I selected leadership courses because the population that enrolls in the health training course overlaps heavily with the population that enrolls in leadership development courses. I excluded courses outside of these content areas (e.g. Microsoft Outlook Course), since many of those courses were compulsory. Examples of leadership development courses that were included in the data set are "Crucial Conversations" (a communications course) and "Leadership Skills". The specific data point used from the training data was course participation. While it would have made sense to include evaluation of the courses in the model as well, a previous exploration of the current data set for this organization had indicated that employees view the

training courses as overwhelmingly positive (even though the feedback is confidential); thus, there was almost no variance in training evaluation reactions.

The courses had a high level of consistency for both content and trainers. Course content is solidified before a course is deployed, and the same content and materials are used across time. Trainers are internal employees who receive consistent training and retraining to maintain course standards. Combined, this internal consistency means that the training process doesn't add any unnecessary error to the model.

The employee health training course was a two-day course that emphasizes all aspects of being healthy. Content delivered on the first day included healthy eating knowledge, information on the benefits of regular exercise, motivation tips, and specific strategies to practice healthy habits at work. Two experienced instructors who had specialized training in health course content delivered the course. The instructors delivered content through lecture, group activities, and interactive question and answer sessions. For the second day of the course, participants went to the company gym. While there, the gym employees led participants through a 30-minute exercise routine. There was then a 30-minute period for participants to exercise freely. Finally, gym employees gave exercise advice, handed out materials about gym workout programs, and answered exercise related or general health questions.

For both types of training courses, I coded the variables as either a 1 or a 0 (participated in the training or did not participate in the training). Normally this type of scoring would be problematic since people taking a training course could all have very different experiences. Often, motivation, effort, or evaluation of the training is used as a variable for these types of studies. However, the sample that took part in this training was not typical. First, all of the courses in this data set had voluntary participation. Despite the voluntary nature of the course,

participation for the selected courses was moderately high within the sample. Each course was a well-regarded leadership development course that most company leadership had elected to take at some point in their career. Thus, employees held these courses in higher regard than some of the other available courses. These course characteristics suggested that employees were more motivated towards training than the average employee.

Additionally, the average (confidential) training reaction score for each training was above 4 (out of a possible 5). This is slightly high, and it speaks to the perceived value of these courses. Finally, participant feedback showed that there was a strong desire to use the trained skills on the job. Thus, participants were motivated, satisfied with the training, and had a desire to apply the training; this combination of sample traits makes exposure to the training a good proxy for any variable that would normally be used for analysis.

The annual company survey was the second source of data for this project (about 100,000 employees per year). I have four years of data from this data source. This survey had a high completion rate, and had dozens of subscales to measure various individual level and organizational-level attitudes. Each subscale was three to seven items long. I cannot share specific items from the subscales since they are proprietary. I examined the following subscales from the annual employee survey for the current study:

Satisfaction with company. This was a 3-item subscale that asked employees about their overall satisfaction with the company. An example of a type of item included in this subscale would be, "I am performing my best for the company."

Health Attitudes. The personal well-being subscale was a 3-item scale that measured employee attitudes towards their own well-being. Items focused on employee attitudes towards general health and fitness as well. An example of a type of item included in this subscale would be, "I try to be active and healthy".

Learning attitudes. This subscale was a 3-item measure of learning atttitudes. An example of a type of item included in this subscale would be, “I have many opportunities to develop my skills at work”.

The final source of data available for this study was employee performance ratings at the company (about 100,000 employees per year). I had three years of data from this source. Managers assigned employees a score based on their performance over the course of the year. Performance ratings were based on employee achievements, and performance reviews included concrete explanations for ratings. The employee ratings were all forced distribution, with values of 1 through 5 being possible. Forced distribution means that there are strict upper-bounds on the number of employees who score either a 1 or a 5.

CHAPTER V: STATISTICAL ANALYSIS

I conducted statistical analyses in several separate steps to better understand the strengths and limitations of the data. First, I examined descriptive statistics for each variable (i.e. means, standard deviations, correlations, and reliabilities). This analysis included checking assumptions for my chosen methods and models (i.e. outliers, multicollinearity, normality, and missing data). Next, I analyzed the structural equation model in two separate parts. First, I used confirmatory factor analysis (CFA) to examine the structure of the latent variables. Next, I used a cross-lagged structural equation modeling to test the hypotheses. Before explaining my models and results, I will provide a brief overview of cross-lagged structural equation modeling.

Cross-Lagged Structural Equation Modeling

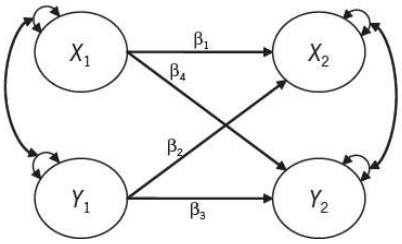
The statistical technique that is best suited for this data structure is structural equation modeling (SEM). SEM is used to analyze the structure of latent variables, as well as the relationship those latent variables have with other variables. It is a combination of confirmatory factor analysis and regression. The first step in analysis is analyzing the structure of latent variables in order to make sure they are being properly represented by the survey questions (CFA). The second step of structural equation modeling involves analyzing regression paths to better understand between variable relationships. For both parts of the analysis, it is important to examine model fit to ensure that the proposed explanation of the data is reasonable (Selig & Little, 2012; Brown, 2006; Newsom, 2015).

Since the data I am analyzing is longitudinal, I will need to use a specific type of SEM. One special subset of SEM is the auto-regressive model. Auto-regressive models measure the stable statistical components of a variable over time by looking at the influence of a previous time point plus error (Kline, 2015). When an auto-regressive model has two or more variables

that are hypothesized affect each other over time, it is referred to as a cross-lagged model. This type of model can measure the effect of X on Y over time, and it can also measure the effect of Y on X over time. It is used to show changes in variables over multiple points in time. For example, with my data I can use the model to show the effect of training completion on employee learning attitudes year over year. Similarly, the model can show the effect of employee learning attitudes on training completion year over year. This is an example of a cross-lagged effects. One advantage of using a cross-lagged model is that prior levels of each outcome construct can be controlled for at each specific time point. Thus, I can control for any existing relationship the variables have before measuring their relationship over time (Selig & Little, 2012). Given that my data for this analysis has variables affecting each other in multiple waves over multiple years, a cross-lagged structural equation model is the most appropriate type of analysis for this data (see: Kline, 2015; MacKinnon, 2008). An example of this type of model is illustrated by the figure and equations below:

Illustration 1

Two wave, two variable, panel model.



Adopted from Selig and Little (2012).

$X2 = \beta 1 X1 + \beta 2 Y1 + \varepsilon x$

$Y2 = \beta 3 Y1 + \beta 4 X1 + \varepsilon y$

Brief Overview of Assumption Checking

Before assessing any model it is important to check general assumptions about the data as well as assumptions specific to that model. While structural equation models are usually robust against assumption violations, all general linear models (GLM) share a set of assumptions about the data. Severe violations of assumptions can change the outcome of the analyses and the interpretation of the results. Below are the basic GLM assumptions I checked:

1. *Normality* – I assessed the normality of all variables using a combination of statistics and charts. I looked at the Kolmogorov-Smirnov and Shapiro-Wilk statistics as well as QQ plots and histograms. As expected based on the frequency tables, there is a slight deviation from a normal distribution for the employee attitude variables. This type of distribution is common for survey data, and it did not present any problems for analysis since the skewness and kurtosis were not extreme (West, Finch, & Curran, 1995).
2. *Linearity* – There were no linearity issues with the data.
3. *Missing Data* – There is missing data, but it is not a problem for the chosen model since the missing data was known to be missing at random from previous analyses (Allison, 2002).
4. *Outliers* – There were no outliers in the data due to most data being on a Likert scale. Although number of training courses completed could technically produce an outlier (>5 courses completed each year would be highly unusual), there were no outliers in the data set for this variable.
5. *Unidimensionality of Constructs* – There were some problems here, which were addressed as part of the measurement portion of the model.

Finally, I also assessed the potential for multicollinearity in the data, as it can be a threat to interpretability. As the highest correlations I observed were about .60 (>.70 would be problematic), it seemed unlikely that multicollinearity would pose a serious concern in this data (Allison, 2012). It is important to note that all of these assumptions are about properties of the data. There are further model specific assumptions that I examined in depth as part of building the SEM model. Overall, these results indicate that no major violations have occurred, and that it is reasonable to move forward with analysis.

CHAPTER VI: RESULTS

Descriptive Statistics and Distributions

Prior to running analyses, I examined the means, standard deviations, and correlations of all variables. I first examined course participation rates for each available leadership development course (see Table 1). Participation across years was stable for most courses, with participation in the final year (2015) being low because there was not a full year of data collection. There were two instances of courses that had unexpected participation changes for one year. First, the 'Health Training' course had a significant drop in participation from 2012-2013, because the course was offered less frequently that year. Second, four separate courses had one year attendance spikes which almost doubled attendance. These courses were, 'Effective Leadership', 'Leadership and Trust, 'Situational Leadership', and 'Leadership Culture'[2]. The increase in attendance for these four courses came from a promotion by leadership to push particular leadership development courses based on company goals and values for each given year. These differences did not affect the analyses since overall participation is the variable of interest, and the increased participation was spread out fairly evenly across the various years.

Overall, participants had high scores for employee learning attitudes, satisfaction, and employee health attitudes (see Table 2). Means ranged from 3.82 to 4.31, offering evidence of slight range restriction. In order to better understand the distribution of scores I examined the frequencies of responses for each scale. The variables had a mostly normal distribution, although very few respondents answered with a '1' or a '2' on a five point scale. The only attitude

[2] *Note.* I created course names for this study to give an approximate indication of course content. Actual course names are not included for confidentiality reasons.

measure that was truly non-normal was satisfaction, with about one fourth of respondents answering '5' on a five point scale. West, Finch, and Curran (1995) recommend concern if skewness > 2 and kurtosis > 7, and no variable approached either of these thresholds, so lack of normality is not a problem. Additionally, this model is robust to slightly non-normal distributions (Bollen, 1989).

Finally, employee performance ratings for the different years had stable means and standard deviations across all years due to the company using a forced distribution employee performance rating system (see Table 3). The distribution for performance ratings are shown in Table 4.

Correlations

In addition to examining the means, standard deviations, and distributions of the variables, I examined correlations to get a general understanding of the relationships between the dependent variables (see Table 5). Correlations for work attitudes within variable and between years ranged from approximately .40 to .56 across all variables. This is consistent with expectations about stability of these constructs over time (e.g. Staw & Ross, 1985). Correlations for work attitudes between variables within years ranged from .19 to .61. These are considered weak to moderate correlations, indicating that the constructs are related but distinct (Bollen, 1989).

Employee performance ratings were correlated across years between .29 and .53 (see Table 5). Given that performance ratings are dynamic over time (largely due to rater bias) this falls within the expected range (see: Spence & Keeping, 2011). Performance ratings had little correlation to any of the workplace attitude measures (between 0 and 0.10).

Measurement Model

I used a CFA to determine the fit of a predefined model to the observed data sets (Rosseel, 2012)[3]. The goal of confirmatory factor analysis is to confirm that the items in each scale correctly map onto higher order constructs. For example, all satisfaction items from the employee survey should map onto the construct of satisfaction, and not onto other constructs such as health attitudes. I examined the structure and fit of all four latent variables by year: learning attitudes, satisfaction, health attitudes, and engagement.

There are several statistical indicators of how well the model fits the data. The most common method of evaluating model appropriateness is looking at model fit. Model fit is a measure of whether or not a chosen explanation of the data is reasonable. If model fit is low, then an alternative explanation of data structure is needed (Selig & Little, 2012). Each measure of fit provides different information about the model. χ^2 is a good general measure of fit for a limited range of sample sizes. A significant χ^2 indicates poor fit; however, very large sample sizes will always show poor fit. Thus, the χ^2 test of significance is not very useful for my data, but the χ^2 value still provides a useful look at fit across years (although the numbers cannot be compared directly if the models are not nested). The Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) are both measures of absolute fit. This means they represent how much variance in the covariance matrix has been accounted for in the model. The fit of the model is then compared to the null model and given a score of 0 to 1. Fit values of .90 are usually considered adequate, with .95 being considered good (Hu & Bentler, 1999). The Root Mean Square Error of Approximation (RMSEA) is a residual based index. It is calculated based on the discrepancies

[3] *All measurement and structural analysis was completed using lavaan, a package for r.*

between observed and predicted covariances. Often 0.01, 0.05, and 0.08 to indicate excellent, good, and mediocre fit, respectively (Kline, 2015; MacCallum, Browne & Sugawara, 1996). It is important to note that no fit index on its own is enough to indicate whether a model is appropriate. Most researchers recommend using a variety of pre-defined and different types of fit indices in order to not bias interpretation of fit (Kline, 2005; Hu & Bentler, 1999).

The original model had fit values below expectations. Additionally, the correlation between satisfaction and engagement in the initial model resulted in an improper solution. Satisfaction and engagement items had correlations between 0.29 and 0.67. Based on the initial measurement model fit and correlations (RMSEA = .081[4], CFI = .92, TLI = .89), I made the decision to collapse two of the dependent variables into a single measure. In this particular case, the constructs of 'satisfaction' and 'engagement' had less than ideal content related validity; this led to greater than expected multicollinearity between the constructs. Collapsing these items into one construct of satisfaction not only increased fit for all models, it also provided additional content and construct validity for the final measurement model. There was minimal theoretical loss as the constructs were originally only loosely connected to academic definitions of these constructs. Dropping poorly performing items or constructs is fairly common in survey research (e.g. Mardsen & Wright, 2010). Unfortunately, this means I have less variables to test for the current study.

After combining the constructs, I ran a new CFA. The model had improved overall fit compared to the original model. Fit for each latent variable varied slightly by year (2012 attitudes: RMSEA = .070,CFI = .96, TLI = .94; 2013 attitudes: RMSEA = .081,CFI = .95, TLI =

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[4] *RMSEA is commonly reported at 3 decimal places, while other fit indices are commonly reported at 2 decimal places.*

.93; 2014 attitudes: RMSEA = .084,CFI = .95, TLI = .92), but the overall fit for the longitudinal model was acceptable to good, and adequate for use in the full model (RMSEA = .056,CFI = .91, TLI = .89) (see Table 6). Based on previously referenced research, I would describe the overall fit of the longitudinal measurement model as 'good' based on the combination of previously published guidelines and recommendations.

Finally, it is important to analyze factor loadings to make sure items are correctly assigned to latent variables. Factor loadings (e.g., a standardized mathematical score of 0-1) determine how well each scale item fits a given latent variable; they represent how correlated an item is with the common factor underlying the items for a given scale (Brown, 2006). Generally, higher factor loadings are better as they are an indicator of items being related. Overall, factor loadings were reasonable with a general range of .50-.85. While not all loadings were as high as desired, no single item fell below the acceptable threshold of 0.30 (McDonald, 1999). For a sample this large, most researchers would agree that a factor loading of .30-.40 is acceptable, and anything above .40 is good to excellent (Stevens, 1992; Comrey & Lee, 1992; MacCallum, 2001). Thus, I still would consider even the smallest loadings as 'good'. A full list of factor loadings can be found in Tables 7, 8, and 9.

Measurement Invariance

One common issue with scales used on multiple samples, across groups or time, is the possibility for a lack of measurement invariance. One of the model specific assumptions of cross-lagged SEM is that scales given to participants over time will have equivalent constructs, items, and errors over time (Kline, 2015). When this assumption is not met, the problem is referred to as a lack of invariance (Vandenberg & Lance, 2000). I used multiple group CFA to test measurement invariance for the model (Rosseel, 2012).

Measurement invariance is tested by constraining different parts of the CFA model overtime in order to understand what parts of the model vary over time. Generally, there are four different models tested and compared: configural invariance, metric invariance, scalar invariance, and strict invariance. Configural invariance is the base model with no constraints. Metric invariance constrains factor loadings to be equal for each year. This model is used to test if latent constructs have the same meaning across time. Scalar invariance constrains factor loadings and item intercepts to be equal for each year. This model is used to test if items have the same mean across time. Finally, strict invariance constrains factor loadings, item intercepts, and item residual variances across time. This model is used to test if items have the same amount of error across time (Vanderberg & Lance, 2000). Table 10 shows a summary of the four models used to test measurement invariance.

Each model is compared to the previous model using ANOVA to see if there are significant differences (Rosseel, 2012). Significant differences indicate lack of measurement invariance for the newly imposed constraint of the model. Change in CFI is used to evaluate if there are significant differences. More specifically, a change in CFI of >.01 is considered a significant change (Cheung & Rensvold, 2009). The final measurement invariance table showed only lack of scalar invariance for the current CFA model (see Table 11). Scalar invariance is a test of intercepts across groups. A lack of scalar invariance suggests that respondents' answers to individual questions changed meaningfully over time. Given that measurements were taken only once per year, the lack of invariance displayed is acceptable and expected. Employees should have changing attitudes over time, especially since the items relate to the relevant training I am using for my independent variable. The metric invariance and strict invariance models indicate

that construct conceptualization and item error was consistent over time. (Cheung & Rensvold, 2009; Vanderberg & Lance, 2000).

One of the final steps before running a structural equation model is deciding whether or not to allow correlations among residual variances. Based on best practices and the properties of my data, I decided two sets of residuals needed to be correlated for this model. First, I correlated item level residuals within constructs and across years for employee attitudes. This is standard for longitudinal modeling, as it is an assumption of longitudinal sem (Selig & Little, 2012; Cole, Ciesla, & Steigler, 2007). By correlating residuals at the item-level, I am accounting for shared outside factors that could affect item responses across years. This makes sense for my model in particular since I do not have many common organizational covariates to include in the model; given that there are many outside factors that affect employee attitudes, it makes theoretical sense to include these correlated residuals in the model. Second, I decided to correlate construct level residuals within years. Brown (2015) suggests only correlating these types of residuals if there are strong methodological and theoretical reasons. Methodologically, it would make sense that these constructs would share some error because they came from the same survey (Doty & Glick, 1998). Theoretically, it would make sense that there is some shared construct level error because workplace attitudes are highly related (Judge & Kammeyer-Mueller, 2012). Combined, there is ample justification for this second set of correlated residuals.

Fit for the overall, revised measurement model was excellent ($\chi^2 = 6701$, RMSEA = .036, CFI = .97, TLI = .95). These fit statistics indicate that there are no fit problems and that this explanation of the data is an appropriate one. The structure of the measurement model can be seen in Figure 1.

Results of Longitudinal Cross-Lagged Model

I used a cross-lagged structural equation model as the main tool to understand how variables affected each other over time. One of the main assumptions of this type of model is that each variable is, at least in part, a function of its own score at the previous time point plus random error (Schlueter, Davidov, & Schmidt, 2007). Thus, the initial model I tested simply examines how well each variable predicts itself in the future after accounting for error. For example, employee performance ratings at time one and time two were used to predict performance ratings at time three. I repeated this process for each variable. The initial structural model can be seen in Figure 2. When compared to the measurement model, the fit of the initial model (see Table 12) had plenty of room for improvement (χ^2 = 16367, RMSEA = .037,CFI = .92, TLI = .91, AIC = 951288). This is expected, as I had hypothesized that there were cross-lagged effects for most variables.

The second model tested was the hypothesized model. This model included cross-lagged paths for each variable when appropriate. For example, leadership training participation at time one was used to predict employee learning attitudes at time two. Conversely, learning attitudes at time one were used to predict leadership training participation at time two. I included these cross-lagged paths for each hypothesized relationship between variables. This second model showed an improvement of fit over the initial model, but still showed some room for improvement compared to the measurement model (χ^2 = 12534, RMSEA = .032,CFI = .94, TLI = .93, AIC = 947528). While these fit statistics were good, there was still some room for improvement.

Before running the third model I reviewed the paths I had not predicted a priori. I wanted to better understand if there were any possible simple and theoretically sound additions to the

model that could improve model fit. I decided to add these exploratory paths in small increments to test both statistical and practical significance; adding post-hoc paths to a structural equation model should be done carefully to make sure any additions are truly theoretically meaningful and not just capitalizing on chance (Selig & Little, 2012).

The exploratory model I used involved adding paths between employee attitudes between years (see Figure 4). For example, learning attitudes for 2012 would be used to predict health attitudes and satisfaction attitudes for 2013, and so on for all attitude variables. There are two main reasons that these additions make sense. First, from a statistical standpoint I know that these variables are highly related. They are moderately to highly correlated both within and between years. Second, researchers have repeatedly shown that employee attitudes are highly related to each other (see: Judge & Kammeyer-Mueller, 2012). It would thus make sense that employee attitudes in 2012 would affect employee attitudes in 2013, and so on.

This model included all paths from the hypothesized model plus additional paths for employee attitudes between years. The fit for this model was a statistically significant improvement in fit over the third model (χ^2 = 11971, RMSEA = .032, CFI = .95, TLI = .93, AIC = 947000). However, adding a moderate number of paths (delta df = 18) makes the model both less parsimonious and more difficult to interpret. Given the fit improvement is small, I will be using the hypothesized model for hypothesis testing as the paths included are more parsimonious and more directly related to the relevant questions I seek to answer with this research.

Hypothesis Testing

Before reporting the results, it is important that I explicitly lay out my criteria for practical significance. Unlike statistical significance, practical significance is not easily interpretable by a single number. I define practical significance as how large of an impact one

variable has on another variable, while taking into account expected results, type of data and analysis, and units of measurement. For this data set in particular, a practically significant path would be large enough to have a meaningful impact on results and decision making within the organization. Given these factors, I would define a practically significant path as accounting for at least 2-3% of the variance for the outcome variable for this data. For the current model, that translates to a standardized path coefficient of about 0.10.

Health Training Hypotheses

Hypothesis 1

Hypothesis 1 addressed the effect of health training program participation on employee health attitudes. The regression paths showed that employee health training participation did not have a practically significant effect on employee health attitudes the following year (2014 health attitudes: B = -.04 (.01), 2013 health attitudes: B = .01 (.01)). Overall, the model did not show support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 2

Similar to hypothesis 1, hypothesis 2 addressed the effect of health training program participation on employee satisfaction. The regression paths showed that employee health training participation did not have a practically significant effect on employee satisfaction the following year (2014 satisfaction: B = -.05 (.02), 2013 satisfaction: B = .04 (.01)). Additionally, direction of the effect was inconsistent across years. Overall, the model did not show support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 3

Hypothesis 3 addressed the effect of health training program participation on employee performance ratings. The regression path showed that employee health training participation did

not have a statistically significant or practically significant effect on employee performance ratings the following year (2013 employee rating: B = -.04 (.02)). I would like to note that there was only one year tested for the training to performance link because of the way the data collection was staggered. Overall, the model did not show support for this hypothesis, but it is hard to draw any definitive conclusions over just a single year. Table 17 shows the full results for this outcome. Overall, there is not much support for the idea that employee health training courses affect employee attitudes and performance longitudinally. The data show there may be some small effects, but I would need to run a more controlled study to tease those effects out.

Leadership Training Hypotheses

Hypothesis 4

Hypothesis 4 addressed the effect of leadership training program participation on employee health attitudes. The regression paths showed that employee leadership training participation did not have a practically significant effect on employee health attitudes the following year (2014 health attitudes: B = .01 (.01), 2013 health attitudes: B = .03 (.01)). While there was a statistically significant effect for one year, the effect has limited practical significance because of the small size of the path. Overall, the model showed limited support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 5

Similar to hypothesis 4, hypothesis 5 addressed the effect of leadership training program participation on employee satisfaction. The regression paths showed that employee leadership training participation did not have a statistically significant or practically significant effect on employee satisfaction the following year (2014 satisfaction: B = -.01 (.01), 2013 health attitudes:

B = -.03 (.01)). Overall, the model did not show support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 6

Hypothesis 6 addressed the effect of leadership training program participation on employee performance ratings. The regression path showed that employee leadership training participation did not have a statistically significant or practically significant effect on employee performance ratings the following year (2013 employee rating: B = .00 (.02)). Again, only one year was tested for the training to performance link because of the way the data collection was staggered. Overall, the model did not show support for this hypothesis, but it is hard to draw any definitive conclusions over just a single year. Table 17 shows the full results for this outcome. Overall, there is limited support for the idea that employee leadership training courses affect employee attitudes and performance longitudinally.

Training Enrichment Hypotheses

Hypothesis 7

Hypothesis 7 addressed the effect of the interaction between leadership training and health training participation on employee health attitudes. The regression paths showed that this combined training participation did not have a statistically significant or practically significant effect on employee health attitudes the following year (2014 health attitudes: B = -.02 (.04), 2013 health attitudes: B = -.04 (.03)). Overall, the model did not show support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 8

Similar to hypothesis 7, hypothesis 8 addressed the effect of the interaction between leadership training and health training participation on employee satisfaction. The regression paths showed

that this combined training participation did not have a statistically significant or practically significant effect on employee satisfaction the following year (2014 health attitudes: B = -.05 (.04), 2013 health attitudes: B = .02 (.04)). Additionally, direction of the effect was inconsistent across years. Overall, the model did not show support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 9

Hypothesis 9 addressed the effect of the interaction between leadership training and health training participation on employee performance. The regression paths showed that this combined training participation did not have a statistically significant or practically significant effect on employee performance the following year (2013 employee rating: B = .03 (.05)). Overall, the model did not show support for this hypothesis. Table 17 shows the full results for this outcome. Overall, there is limited support for the idea that employee leadership training and health training courses combine to affect employee attitudes and performance longitudinally. It should be noted however that the data for this hypothesis suffered from power problems. Only around 300 people per year (out of 19,000) participated in both types of training each year. This lack of power would make any effect hard to detect. I explain this further in the discussion section.

Learning Attitudes Hypotheses

Hypothesis 10

Hypothesis 10 addressed the effect of employee leadership training participation on employee learning attitudes. The regression paths showed that leadership training participation did not have a statistically significant or practically significant effect on employee learning attitudes the following year (2014 learning attitudes: B = -.02 (.01), 2013 learning attitudes: B = -.03 (.01)).

Overall, the model did not show support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 11

Hypothesis 10 addressed the effect of employee health training participation on employee learning attitudes. The regression paths showed that health training participation did not have a practically significant effect on employee learning attitudes the following year (2014 learning attitudes: B = -.07 (.01), 2013 learning attitudes: B = -.02 (.01)). The model did show a statistically significant negative relationship, but it was not practically significant. Overall, the model did not show support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 12

Hypothesis 12 addressed the effect of the interaction between leadership training and health training participation on employee learning attitudes. The regression paths showed that this combined training participation did not have a practically significant effect on employee learning attitudes the following year (2014 learning attitudes: B = -.02 (.04), 2013 learning attitudes: B = .04 (.03)). Additionally, the direction of the effect was inconsistent across years. Overall, the model did not show support for this hypothesis. Tables 13 and 14 show the full results for this outcome.

Hypothesis 13a

Hypothesis 13a addressed the effects of employee learning attitudes on employee participation in leadership and health training courses. The regression paths showed that higher learning attitudes generally lead to higher leadership training participation (2014 leadership training participation: B = .05 (.00), 2014 health training participation: B = .00 (.00), 2013 leadership training

participation: B = .04 (.00), 2013 health training participation: B = .01 (.00)). The results were statistically significant but did not have substantial practical significance. Overall, the model showed limited support for this hypothesis. Tables 15 and 16 show the full results for this outcome.

Hypothesis 13b

Hypothesis 13b addressed the effects of employee participation in health training on employee participation in leadership training. The regression paths showed that participation in health training courses led to lower participation in future leadership training courses (2014 leadership training participation: B = -.28 (.01), 2013 leadership training participation: B = -.15 (.01)). The results were both statistically significant and practically significant. However, the results were in the opposite direction of the hypothesis. This is likely due to the training participation structure at the company, which I explain in detail in the discussion section. Tables 15 and 16 show the full results for this outcome.

Hypothesis 13c

Hypothesis 13c addressed the effects of employee participation in leadership training on employee participation in health training. The regression paths showed that participation in leadership training courses led to lower participation in future health training courses (2014 health training participation: B = -.17 (.01), 2013 health training participation: B = -.08 (.00)). The results were both statistically significant and practically significant. However, the results were in the opposite direction of the hypothesis. This is likely due to training participation structure at the company which I explain in detail in the discussion section. Tables 15 and 16 show the full results for this outcome.

Hypothesis 13d

Hypothesis 13d addressed the effects of employee participation in either type of training would lead to lower participation of that same type of training in the following year. The regression paths showed participation was lower year to year based on previous years training (2014 health training participation: B = -.24 (.00), 2013 health training participation: B = -.15 (.01), 2014 leadership training participation: B = -.26 (.01), 2013 leadership training participation: B = -.14 (.01). The results were both statistically significant and practically significant. Overall, the model showed full support for this hypothesis. Tables 15 and 16 show the full results for this outcome.

CHAPTER VII: DISCUSSION

I had two main objectives with the current study: first, to build and confirm the structure of a complete model of workplace health training (see Appendix D), and second, to investigate the longitudinal relationships among workplace health training, leadership training, employee attitudes, and employee performance. In the introduction, I discussed the extent to which empirical support currently exists for various parts of the model. There were parts of the model that already had wide ranging support such as the effect of motivation on training participation (Harbin, 2014), and there were other parts of the model which had very limited support to date, such as the effect of employee attitudes on training participation (Norris-Ellis, 2012). The current study attempted to add to this model by proposing new theoretical connections within the model, such as the compounding effect of voluntary training participation, as well as proposing entirely new ideas to the training paradigm, such as the idea of training enrichment. With this study, I sought to combine this wide ranging combination of ideas about the antecedents and effects of workplace health training into one complete longitudinal model.

Although many of the specific hypotheses I proposed were not supported by the data, this study nevertheless makes a meaningful contribution to the training literature, because it is the first study to integrate employee health training into a greater training framework. Additionally, it is the first study to empirically test these longitudinal relationships using field data. As I will explain below, the use of organizational data is both a limitation and a strength of the current study. Issues of data quality and sensitivity may explain some of the null results, but these findings have meaningful theoretical and practical implications even after the limitations of the data are considered.

Overall Model

My first goal for this research was to introduce a general model explaining the role of workplace health training in large organizations. There are two main parts of creating such a model: 1) building the model using existing and new theories, and 2) testing as many parts of the model as possible with real world data. While the entire theoretical model is unlikely to be testable with a single data set, it creates a strong blueprint for future research on this topic. More importantly, confirming the structure of parts of this model can give insight into future directions and changes. The overall fit of the final proposed model for the current data was strong (χ^2 = 12534, RMSEA = .032, CFI = .94, TLI = .93). In addition to testing the model structure, I also looked at modification indices after I had completed my analyses. Modification indices indicate what changes could be made to the model to produce large, positive changes in model fit. While it is inappropriate to use this information to make structural changes to the model without theoretical justification, it is useful for understanding other possible regression paths that could be used for future competing models (Bentler, 2007; Hooper, Coughlan, & Mullen, 2008). There were a few important implications to model fit when I looked at the modification indices. First, flipping the order of data for certain years did not improve the model (2012->2013->2014 produced better fit than other possible sequences, such as 2013->2012->2014). Second, there were no significant paths left out of the model that would drastically change the interpretation. For example, adding employee performance as a predictor of employee satisfaction for any available year would not improve the ability of the model to explain the data. This lack of possible structural additions to the model is an indication that although some specific paths were weak or in the opposite of the expected direction, they were all temporally in the correct order,

and they went between the correct variables. Thus, while the proposed model is not the only possible reasonable interpretation of the data, it is a strong interpretation of the data.

These findings confirm the general structure of the model in several ways. First, they are consistent with several different ideas currently expressed in the literature such as the consistency of employee attitudes over time, the relationship of employee health attitudes with other employee attitudes, and the importance of temporal placement of training and its effect on employee attitudes (training preceding attitude changes). Second, they show that this interpretation of the data is reasonable, even if some relationships are not as strong as hypothesized. These findings suggest that the hypothesized effects could exist, but the current data set is not sensitive enough to detect them. Combined, these structural outcomes provide a solid base for expanding on this research in the future.

Health Training

There was a lack of empirical support for my hypotheses about the effects of health training on employee outcomes. Although some of the effects were statistically significant, they were not practically significant. The regression paths showed that participation in employee health training had small positive and negative effects on employee health attitudes. These results are unexpected, given the direct content relationship between the employee health training course and the employee health attitudes scale. There is no theoretical reason that employee health training courses should not directly affect employee health attitudes; indeed, there is a fair amount of evidence to suggest that they should (Norris-Ellis, 2012; Williams et al., 2007). This initial lack of results points to issues with either the data or methodology given the clear expected relationship of these two variables. Staggered overall data collection, long average

times between data collection, and low variance and sample size for some variables could all be contributing to the lack of meaningful paths between these variables.

The lack of relationship between employee health training and employee satisfaction (and similarly employee performance ratings) is harder to explain. The lack of relationship for these variables could also share some of the data issues mentioned above, but it is also possible that these relationships do not exist as hypothesized. Overall, given the theoretical support for these hypotheses, I do not think there are any meaningful generalizations we can draw from these specific results.

Leadership Training

Similar to the results from the health training set of hypotheses, there was not much support for the idea that participation in leadership training affected employee attitudes or employee performance ratings. The regression paths showed that while there is statistically significant support showing leadership training participation affecting employee attitudes, the results are not practically meaningful. Additionally, the small effect shown on satisfaction was negative. There is some theoretical support showing the effect of leadership training on employee attitudes, learning outcomes, and performance (i.e. Hasson, von Thiele Schwarz, Holmstrom, Karanika-Murray, & Tafvelin, 2016), but it is not as clear cut as the link between health training and health attitudes. Therefore, it is again possible that the lack of support for these hypotheses is due to either a lack of a real effect or a problem with data quality. Overall, support for leadership training longitudinally impacting employee attitudes and performance is very limited and should not be generalized.

Training Enrichment

Similar to both the leadership training and health training hypotheses, there was not much support for the theory of training enrichment. The regression paths for this variable did not show any statistically significant effects. Additionally, there was a high standard error for all paths involving training enrichment. This is likely due to sample size issues for this variable, in addition to some other sampling problems with the data. Since this was a mostly new concept, there was not any direct theoretical support for an effect. However, given the data issues as well as support for the concept of HR bundling in parallel research streams (Becker, Huselid, Pickus, & Spratt, 1997; Kim & Ployhart, 2014), this effect is worth exploring further.

Learning Attitudes

My hypotheses regarding learning attitudes can be broken down into three distinct categories: 1) the effects of training participation on employee learning attitudes, 2) the effect of employee learning attitudes on future training participation, and 3) the effect of training participation on future training participation. For the first set of hypotheses, I examined regression paths to determine whether or not employee health training, employee leadership training, or a combination of the two had a positive effect on employee learning attitudes. While there were some statistically significant relationships, none of the relationships were practically significant. This coincides with previous hypotheses in which there were only small or no results of training predicting employee attitudes. However, unlike some previous hypotheses there is reasonable theoretical evidence that learning attitudes should be positively related to training (see: Noe & Schmitt, 1986; Velada & Caetano, 2007). Thus, it is likely that the muted or non-existent effects are at least partially due to data issues or variable issues.

My second set of hypotheses involving learning attitudes predicted that positive employee learning attitudes would lead to increased participation in future training courses. I found mixed results for these hypotheses. There were some paths that were statistically significant, but like many of the paths in the analysis they had low practical significance. However, given that all results were in the expected direction, and the relatively low standard errors for each path, it is reasonable to conclude that learning attitudes are related to employee training for this sample. To generalize this to a wider population, I would want to take an additional sample to confirm the results.

Finally, my last set of hypotheses about learning attitudes were about the effect of training participation on future training participation. Results showed that participation in any training course led to a slightly lower chance of participation in training for the following year. I hypothesized this to be true for the paths between similar types of training. For example, participation in health training in 2013 would make it less likely for participation the following year. This should be true because it is unlikely an employee would want to (or be able to) take the same training course two years in a row due to managers acting as gatekeepers and only approving training intermittently to meet budgetary goals. Given the limited number of leadership training courses, I would expect a similar but weaker pattern for concurrent leadership training course participation. The data confirmed both of these expectations.

However, I did not hypothesize that participation in one of the two types of courses to lower participation in the other type for the following year. For example, an employee who participated in health training in 2013 would be less likely to participate in leadership training in 2014. This discrepancy is likely an artifact of the data. For the company in question, there are about 30 possible training courses within the leadership training regimen. However, for this

study only a subset of those courses were included for theoretical reasons. Courses that did not explicitly deal with health training or leadership were not included in the sample. Thus, it is reasonable that a person who participated in health or explicit leadership training (7 courses out of 30) would be more likely to participate in one of the other courses offered than they would be to participate in one of the remaining courses from this specific sample. These results make practical sense given the structure of the data, despite not meeting theoretical expectations about training participation overall.

Additionally, this study contributes to a better overall understanding of learning culture in the workplace. While there are many different components that can contribute to a successful learning culture (i.e. organizational support) (Rebelo & Gomes, 2011), these components may be necessary but not sufficient to produce changes in learning attitudes. Similarly, while the idea of training enrichment has a strong theoretical basis, just encouraging professional development might not be sufficient for observing its effects. It is possible that there are variables that are necessary for affecting learning culture and enabling training enrichment that were not present in the current environment. Possible examples include direct manager support, opportunity to practice behaviors, and a workforce with a high desire to learn.

Overall, the hypotheses about employee learning attitudes and course participation had mixed support. While some of the links between learning attitudes and course participation were weaker than expected, course participation overall followed predictable practical patterns. I would expect that this section of the employee training model would replicate well if tested on other samples. There are several reasons these effects should be generalizable. First, the company training program followed many best practices. First, all trainers received the same training on both content and teaching capabilities. Next, all courses included standardized

materials and delivery to ensure consistent training across courses. Finally, course content included standard material for leadership training, with some courses being popular 'off the shelf' courses sold by vendors. Thus, some other companies already use this exact training.

The diversity of the sample for these training courses should also help with generalizability. The trainees for this study were diverse in the areas of age, tenure, experience, role level, gender, ethnicity, skillset, and education. This sample included a cross-section of employees that was diverse enough to represent many different occupational groups and populations. While the training program analyzed in this study has some unique properties, the core ideas tested should generalize well to other industries and organizations that use similar best practices with training. Additionally, it should generalize well to many different populations.

Limitations

There were several different data related limitations with this research. These include data collection times, staggered data sets, sample problems, and some problems with limited variance.

Collection Times. One of the biggest limitations with the data was that the training participation data were only reported by year. When I proposed the study, I expected that I would be able to obtain a more accurate version of the data that included training participation by month or day. This change was problematic for several reasons. First, all training participation data had to be treated equally in the model. For example, a person who participated in a training program in January 2012 and a person who participated in a training program in November 2012 had the same value for training participation in 2012. This diluted the power of the sample, and made it so I was not able to test for temporal effects of training. Ideally, I would have an exact date for each participants training participation so I could use continuous time modeling and

account for the role of participation dates in the model. This limitation greatly reduced power for the analyses.

The second reason this is a problem is the fleeting effect of training. Training effects on various outcomes are often greatest within the first few months and then deteriorate quickly (Alliger, Tannenbaum, Bennett, Traver, & Shotland, 1997; Burke, Hutchins, & Saks, 2013). While training transfer can be extended beyond this time period, it takes a concerted effort by the organization to make that happen. I know from previous research that training transfer was not a specific focus within the organization, so any positive effects beyond the first few months are unlikely. Unfortunately, since training courses are offered year round within the company, the average time between training participation and the outcomes studied is always going to be 6 months. This means that any effects measured will be muted by the temporal difference between data collected for the independent and dependent variable. Additionally, the different types of data were collected at slightly different times. *Training participation* occurred continuously throughout the year. However, the data set only shows the year each training course was completed. Given that training effects fade over time, this interval adds additional error into the model. Employees who took courses closer to the outcome variables should show a greater training effect. *Employee attitudes* were measured almost yearly (11-13 months apart). While the intervals were almost yearly, there is some possible additional error added by the intervals being slightly different. Finally, *employee performance* was measured every year at a consistent time. These temporal differences can be problematic for longitudinal structural equation models, as the distance between measurements for all variables can greatly affect the overall model (Collins, 2006).

Ideally, I would solve these temporal issues in one of three ways for future studies: 1) get specific time data for each data point 2) only use data collected 3 months before the outcome data (or sooner), or 3) collect additional data in a more controlled environment to study specific effects separate from the larger model.

Staggered Data. Another potential limitation of the data is the staggering of how it was collected (see Table 18). The employee performance rating data available was collected before much of the training participation data. This made it so I only had one year of performance data as an outcome variable in the model. Given the type of longitudinal model used, it is difficult to draw definitive conclusions from a single time point. This limitation could only be overcome with additional data.

Sample Size Problems. It may seem a bit out of place to discuss sample size problems when the dataset had almost 20,000 participants, but there were problems with one specific variable: training enrichment. There were only two possible health training courses for participants, and only five possible leadership development courses in the program (out of about 30 total courses). Thus, it was not likely that participants would take a leadership course and a health training course in the same year. Out of almost 20,000 data points, participation in *both* courses for either year was only 300-500 (see Table 19). This limitation, combined with the training course data collection time limitation, made it difficult to draw any meaningful conclusions about training enrichment. This limitation could only be overcome with additional data.

Content Related Validity. It is also possible that content related validity problems added additional error to the model. While earlier analyses within the organization indicated that the items had initial evidence of construct validity (i.e. CFA, convergent validity, discriminant

validity), their content related validity could be cause for some concern. The items for the outcome scales were written to meet organizational goals and needs, not necessarily to meet high standards of content related validity. For example, the job satisfaction and employee engagement constructs overlapped significantly. The reason there was overlap is because some survey items are written and used by different areas of the business. Different areas of the business have different interests when it comes to items and outcomes. For example, one department may be interested in employee engagement in the strict sense (employees being physically, cognitively, and emotionally engaged at work), while another department may be interested in engagement in a more loosely defined sense (does the employee work hard at their job). Other constructs may have had similar problems where the items were proxies but not exact matches for the content labels. These types of differences could create items with low content related validity, which could have added a moderate amount of error to the model.

Lack of Behavioral Data. While it is important to assess employee attitudes about training and its effects, it may be even more important to assess employee behavior. Changing attitudes is a necessary but not sufficient step to changing behavior. Ideally, I would have liked to measure specific employee related behaviors (i.e. health habits, learning habits). Attitudes are a proxy for behaviors, but they are different enough that the more specific criterion would have been more appropriate.

It is also important to note that the health training courses in particular have previously shown positive effects on behavior, so I know that the training is not completely ineffective. Previous internal analyses have shown that participation in the health training course has led to greater participation in a variety of workplace health offerings (i.e. health center utilization).

Thus, I can conclude that the training has been effective at changing some behaviors, but not the behaviors of interest for this study.

Variance Problems. There were also some variance problems with the training participation variable. While the range of courses taken was 0-5, the vast majority of participants took 0-2 leadership training courses. This lack of variance in the independent variable likely suppressed any statistically significant effects in the analysis. This limitation on its own is probably not enough to affect the overall model, but combined with the previously mentioned limitations it likely suppressed the strength of studied effects.

Forced Distribution Employee Performance Ratings. Performance ratings for the company were on a forced distribution. While there was plenty of variance within years for performance, variance between years was low. However, given that performance ratings could only be used as an outcome for a single year, this was a minor problem. Additionally, even if a training course impacted absolute performance, it may not show up in a measure of relative performance. There could very well be significant within-person improvements that are not visible since the employee performance ratings measure between-person improvements.

Overall, there were several limitations of the data set that made it difficult to accurately test individual paths within the model. While I was able to create a cohesive model explaining the structure of the data as a whole, individual relationships most likely had muted effects due to structural problems with the data. Additionally, it is also possible that some of the hypothesized effects would not exist even with better data. Many of the hypotheses, especially those dealing specifically with health training and training enrichment, had limited theoretical support a priori. I would want to collect more data before drawing final conclusions on many of the hypotheses.

Going into this study, I was aware that the type of data I had available to me would prove somewhat challenging for analysis. Real world data is messy, distorted, and often suffers from errors and inaccuracies. However, there were many reasons I believed this data would still be appropriate for answering my research questions. First, I grounded all of my hypotheses in solid theory, and they were supported by hard empirical evidence whenever possible. Second, this data may be as good as it gets for this type of analyses. There will always be problems with real world, multi-source, longitudinal data. This data did *not* have many of the common problems of similar data sets such as excessive missing data, obvious measurement error, or lack of theoretical grounding. Indeed, this and similar data are used within the organization for high stakes decision making. Finally, I would not have been able to test such an ambitious model without using this type of data set. Overall, while the results for the analyses were mixed, I think that for this analysis the risks of using less than ideal data were outweighed by the rewards of using real world 'big data' to test previously untested longitudinal hypotheses.

Conclusions and Practical Implications

While I was not able to confirm every hypothesis with the analyses, the results still provide valuable insight about the structure and effects of longitudinal training programs. There are several key outcomes from this research such as the theoretical model, the structural model, and a better understanding of the size and scope of training effects on distal outcomes.

Theoretical model of workplace health training. Workplace health training is a key component of workplace health programs, but it is a component that is rarely studied as a unique predictor. Separating this from other pieces of a workplace health program provides a basis for better understanding the theoretical interaction between training and health. Further, there is no existing research that thoroughly examines the theoretical and practical significance of

workplace health training among broader work constructs. By combining and synthesizing research in the areas of workplace health programs, workplace health training, leadership training programs, and employee attitudes, I have created a strong blueprint for any researchers who wish to examine this issue in more depth going forward.

Additionally, this model furthers the idea that workplace health researchers should be examining reciprocal effects and feedback loops. While the antecedents and outcomes of workplace health programs are often studied individually, they are rarely examined simultaneously. Including a cross-lagged component to the model provides an opportunity for a more detailed understanding of how these complex organizational pieces interact over time. This synthesis of research can be used as a starting point to explore many of the other gaps in the research in the area of workplace health training, and it acts as a nice complement to other workplace health program models (e.g. Mattke et al., 2013). It also provides a springboard for researchers who hope to further study the cumulative and interactive effects of various HR systems.

Finally, the model proposed and tested in this study helps complement some of the previous theoretical work around training. For example, the type of training used in this study is an example of social learning theory (Bandura, 1962) being intertwined with workplace health training. Since the second day of training involves an actual physical workout, as well as the opportunity to sign up for physical fitness classes, participants may be more likely to use these resources when they observe their coworkers participating. These types of interactions could also create a foundation for applying third generation learning theory (Kraiger, 2008) to more types of workplace health trainings. Creating the opportunity for informal interactions and learning to take place after the training could be used to improve training transfer.

Initial confirmation of workplace health training model structure. In addition to building a theoretical model of workplace health training, I tested part of that model using empirical data. While many predictors in my model did not perform as expected, the general structure of the model was confirmed by the analyses. The large sample size, the lack of measurement problems, and the most appropriate model were still not enough to detect large effects of training programs over long time periods (see: Gegenfurtner, Veermans, Festner, & Gruber, 2009; Aguinis & Kraiger, 2009). This result provides a strong example of needing to measure the effects of training quickly in order to see its effects, and it provides further incentive for companies to focus on training transfer in order to enjoy the long term positive effects of training programs. Overall, this model is useful going forward as a basic starting point for future research involving longitudinal research in this area. It builds upon previous models (i.e. MacKinnon et al., 2010) of longitudinal workplace health programs.

Proposal and initial testing of training enrichment. While the data was not well suited to studying training interaction, the proposal of training enrichment is a useful tool going forward for anyone studying specific training courses nested within larger training programs. Researchers have explored the additive properties of HR systems in the past (e.g. Kim & Ployhart, 2014), but this idea has not been thoroughly explored in the training literature. This research can act as a theoretical starting point for anyone investigating the interaction of various types of training in the future.

The effect of learning culture on training participation. There is not much research on the effects of learning culture on participation in voluntary leadership training. The initial findings from the current model are encouraging, with some support for the idea that a strong learning culture can lead to greater participation in employee workplace training. The concept of creating

a strong learning environment to encourage voluntary leadership development has real value. However, the idea of using continuous training as part of that learning culture has more limited support (see: Yap, 2014). This study provides another example of how continuous training opportunities can create positive learning attitudes among employees.

Practical applications. There are several high-level take-away messages for executives who may be interested in starting, keeping, or expanding workplace health programs. First, workplace health training should be viewed through the broader HR lens. Like all HR programs, workplace health training interacts with other training and HR policies on many different levels. Integrating a workplace health training program into a broader curriculum of training or even other HR programs will likely have net benefits beyond the variables included in this study. There is value in breaking down silos and creating synergy between HR programs that exist in different areas of the business. Second, workplace health training has real value. While I did not confirm every finding in this study, workplace health programs offer a wide-range of well-supported benefits to the broader workforce (i.e. higher health outcomes, better mental health outcomes, lower premiums, etc.). Finally, this study serves as an example of the importance of promoting transfer of training within an organization. While the workplace health training program offered in this study was well-received and well-regarded, lasting attitude changes that lead to behavioral change may not emerge without promoting transfer of training. While having a strong training curriculum is important, continually encouraging employees to apply what they learned over time will lead to better measureable outcomes.

Future research. Since this is one of the first studies to thoroughly examine workplace health training and its place within health and training programs, there is plenty of space to research this topic further. Future studies should look to examine other antecedents and outcomes

of both training and workplace health programs to find the best mix of how to create a successful health training program. Additionally, there is much more work to be done in the area of the additive nature of HR practices. In addition to trying to better understand how different types of training programs interact, future research should aim to better understand how training programs of all types interact with other HR practices from a practical, empirical, and strategic perspective.

Overall, health training is a valuable addition to the workplace health program model. While the topic is not often studied independently, there are many opportunities to better understand how workplace health programs can leverage the strengths of formal training programs to have greater impact over time. These results can be used to better understand the theoretical models around workplace health training, as well as provide practical guidance for incorporating a workplace health training program into a broader training program within a company.

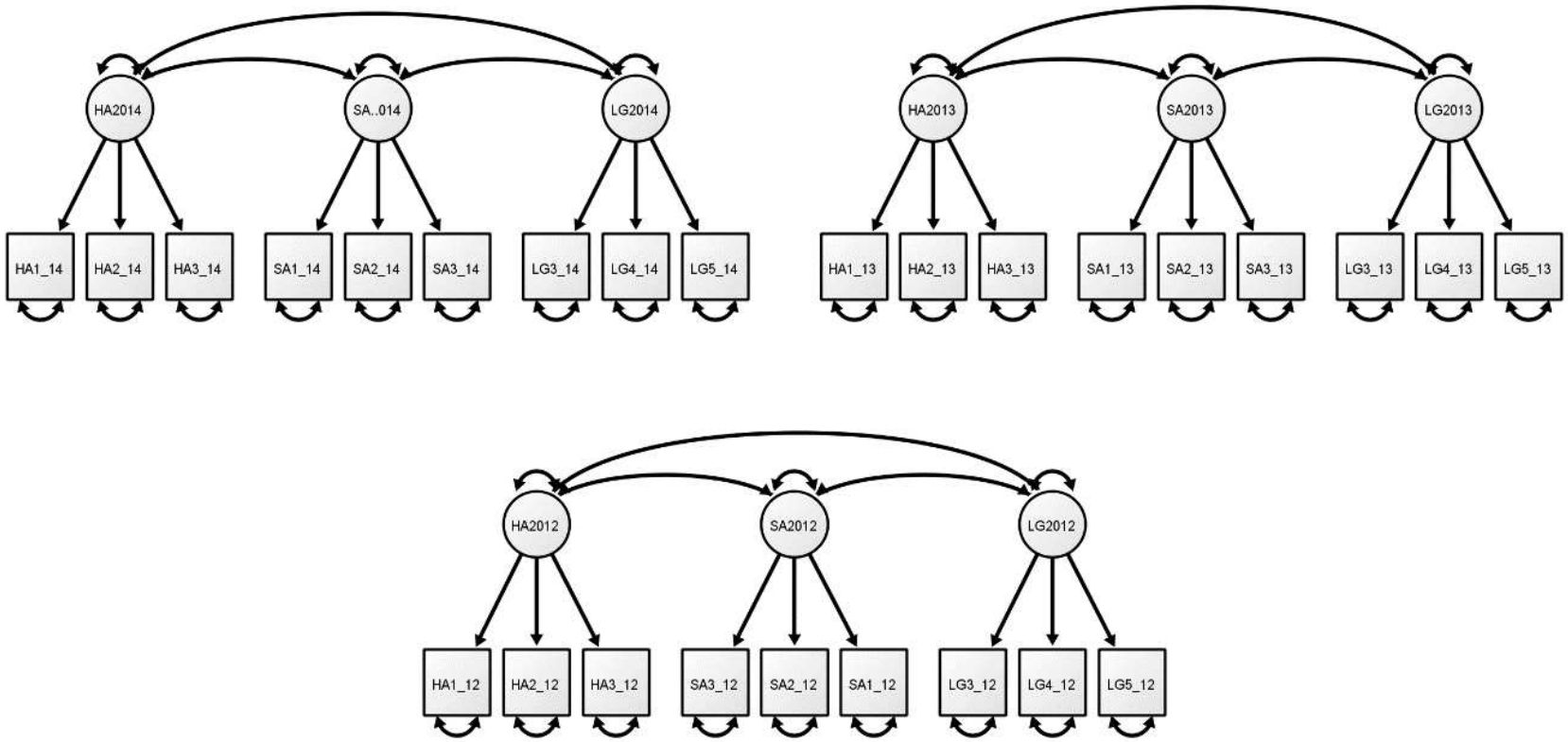

Figure 1. Measurement model for employee attitudes

Note. Correlated residuals not included in the model visualization due to space constraints.

Note. HA=Health Attitudes, SA=Satisfaction Attitudes, LG=Learning Attitudes, numbers=year.

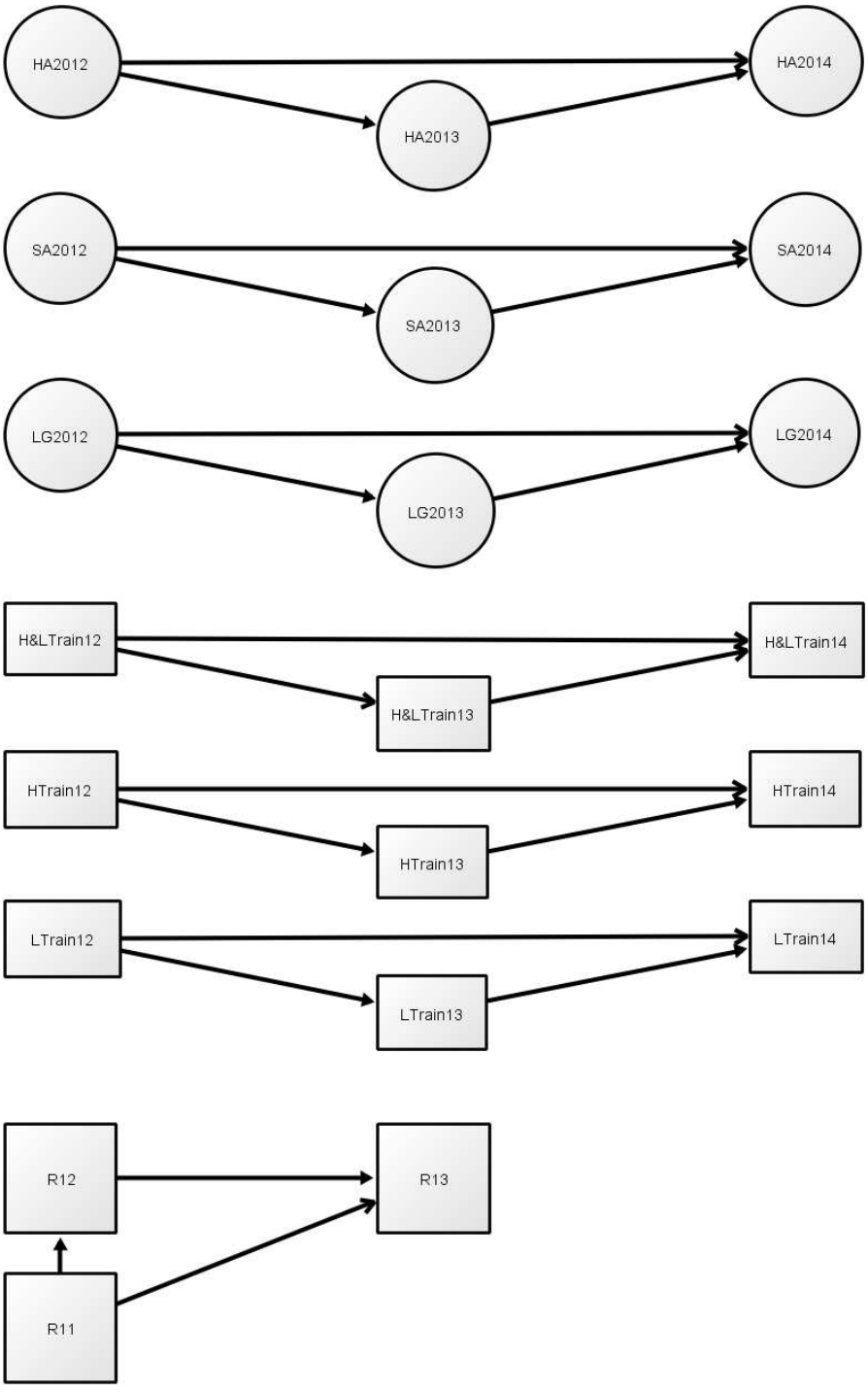

Figure 2. Baseline structural model

Note. Correlated residuals not included in the model visualization due to space constraints.

Note. HA=Health Attitudes, SA=Satisfaction Attitudes, LG=Learning Attitudes, H=Health, L=Leadership, Train=Training, R=Turnover, numbers=y

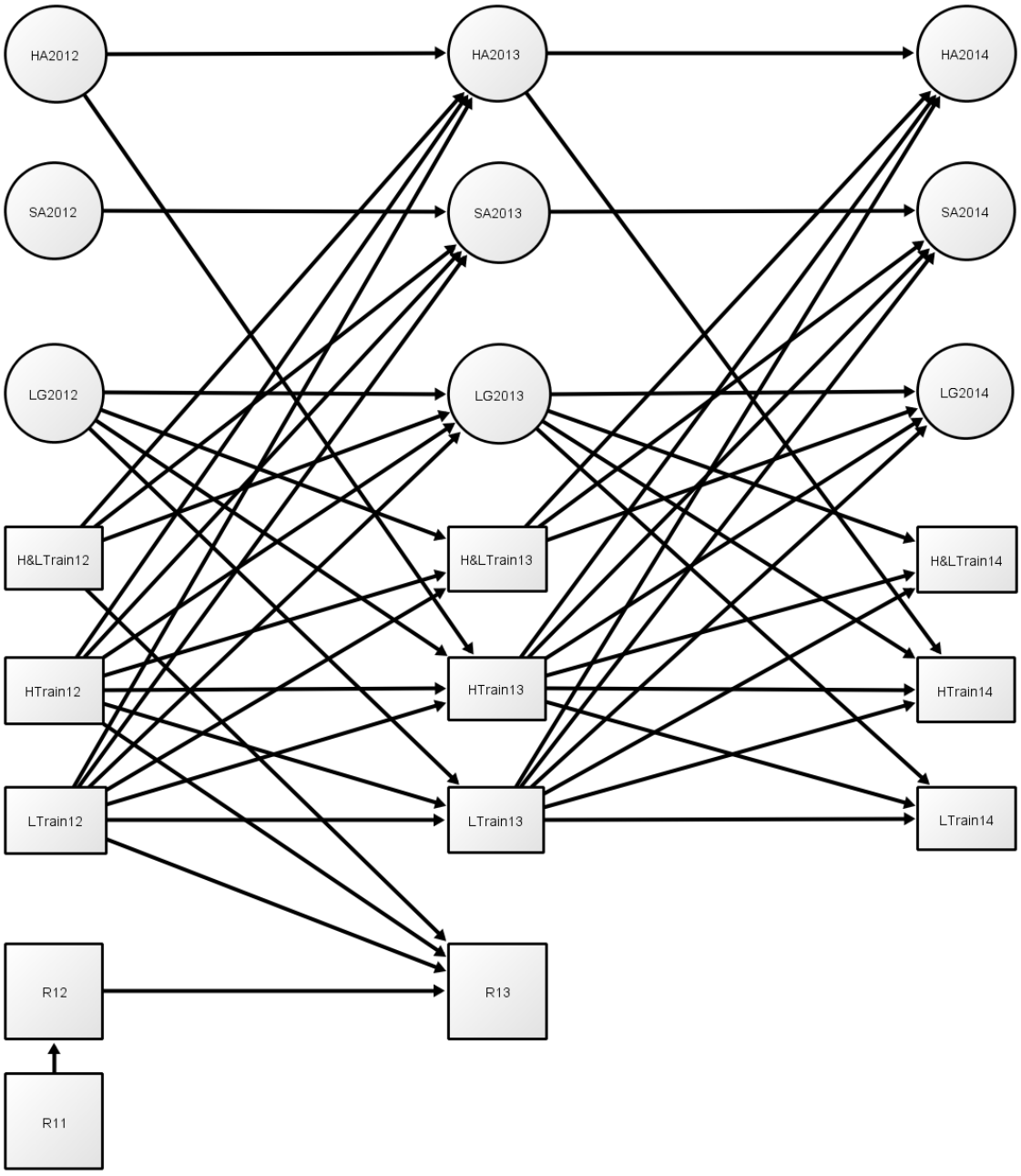

Figure 3. Final structural model used for hypothesis testing

Note. Correlated residuals not included in the model visualization due to space constraints. Most paths not directly related to hypotheses removed due to space constraints.

Note. HA=Health Attitudes, SA=Satisfaction Attitudes, LG=Learning Attitudes, H=Health, L=Leadership, Train=Training, R=Turnover, numbers=year

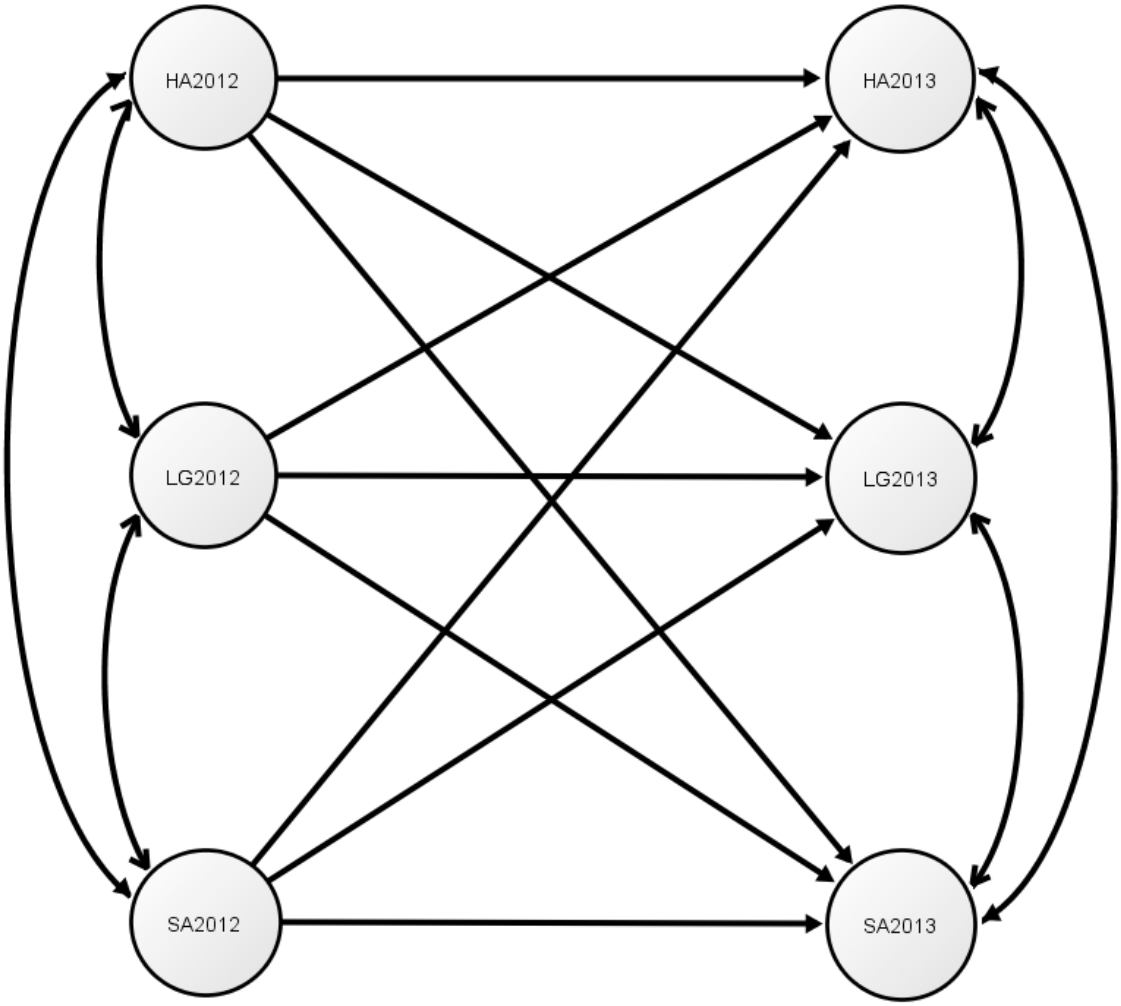

Figure 4. Example of paths added to exploratory model

Note. This is an example of the additional employee attitude paths added. The full final model added these paths between employee attitudes each year.

Note. HA=Health Attitudes, SA=Satisfaction Attitudes, LG=Learning Attitudes.

Table 1 - Number of Participants in Training Courses by Year

Course	2012	2013	2014	2015
Health Training – 1 Day	1616	1392	1861	340
Health Training – 2 Day	1575	894	1037	352
Effective Leadership	877	977	1781	436
Leadership and Trust	424	848	373	89
New Leader	1205	1174	1075	113
Situational Leadership	407	400	956	446
Leadership Culture	643	558	1034	76

Table 2 - Descriptive Statistics for Employee Attitudes

	2012		2013		2014	
Attitude	Mean	SD	Mean	SD	Mean	SD
Learning Attitudes	4.05	0.69	4.05	0.70	4.01	0.71
Health Attitudes	3.83	0.77	3.82	0.79	3.85	0.80
Satisfaction	4.18	0.68	4.31	0.67	4.27	0.70

Note. All ratings on a 1-5 Likert scale (1=strongly disagree, 5=strongly agree).

Table 3 - Descriptive Statistics for Employee Ratings

	Mean	SD	Skewness
2011 Ratings	3.57	0.92	0.58
2012 Ratings	3.57	0.91	0.58
2013 Ratings	3.60	0.92	0.45

Note. All ratings on a 1-5 forced distribution scale.

Table 4 - Frequency of Employee Ratings

Employee Rating	2011	2012	2013
1	69	73	105
2	66	73	87
3	4742	4818	5487
4	602	702	987
5	1928	1899	2361

Table 5 - Correlation Matrix for Dependent Variables

		1	2	3	4	5	6	7	8	9	10	11	12
1.	Satisfaction 2012	1											
2.	Satisfaction 2013	.562*	1										
3.	Satisfaction 2014	.464*	.600*	1									
4.	Learning 2012	.453*	.342*	.275*	1								
5.	Learning 2013	.361*	.556*	.365*	.495*	1							
6.	Learning 2014	.297*	.380*	.546*	.395*	.535*	1						
7.	Health Att. 2012	.307*	.262*	.226*	.378*	.296*	.239*	1					
8.	Health Att. 2013	.204*	.339*	.254*	.265*	.371*	.281*	.590*	1				
9.	Health Att. 2014	.186*	.244*	.348*	.236*	.270*	.377*	.515*	.613*	1			
10.	Rating 2011	.032	.046*	.045*	.074*	.090*	.081*	.014	-.001	.009	1		
11.	Rating 2012	.022	.054*	.040*	.074*	.089*	.082*	.015	.005	.013	.461*	1	
12.	Rating 2013	.009	.055*	.046*	.045*	.105*	.098*	.000	.017	.026*	.288*	.529*	1

Note. * $p < .01$

Table 6 - Confirmatory Factor Analysis for Employee Attitude Measures: 2012 to 2014 and Final Model

	Model χ^2 (*df*)	RMSEA	CFI	TLI
2012 Attitudes	1690.14* (24)	0.070	0.96	0.94
2013 Attitudes	2374.39* (24)	0.081	0.95	0.93
2014 Attitudes	2754.52* (24)	0.084	0.95	0.92
Final Measurement Model	6701.12* (261)	0.036	0.97	0.95

Note. * $p < .01$

Table 7 - Factor Loadings for Final Measurement Model: Learning Attitudes

Parameter Estimate	Unstandardized	Standardized
Learning Attitudes 2012		
Item 1	1.00	0.68
Item 2	1.48	0.76
Item 3	1.47	0.68
Learning Attitudes 2013		
Item 1	1.00	0.66
Item 2	1.59	0.76
Item 3	1.30	0.70
Learning Attitudes 2014		
Item 1	1.00	0.65
Item 2	1.57	0.75
Item 3	1.36	0.70

Table 8 - Factor Loadings for Final Measurement Model: Satisfaction

Parameter Estimate	Unstandardized	Standardized
Satisfaction 2012		
Item 1	1.00	0.84
Item 2	0.84	0.78
Item 3	0.72	0.44
Satisfaction 2013		
Item 1	1.00	0.86
Item 2	0.79	0.77
Item 3	0.81	0.68
Satisfaction 2014		
Item 1	1.00	0.86
Item 2	0.83	0.79
Item 3	0.84	0.68

Table 9 - Factor Loadings for Final Measurement Model: Health Attitudes

Parameter Estimate	Unstandardized	Standardized
Health Attitudes 2012		
Item 1	1.00	0.73
Item 2	1.13	0.67
Item 3	1.14	0.75
Health Attitudes 2013		
Item 1	1.00	0.73
Item 2	1.20	0.67
Item 3	1.22	0.79
Health Attitudes 2014		
Item 1	1.00	0.72
Item 2	1.21	0.69
Item 3	1.23	0.79

Table 10 - Measurement Invariance Model Constraints

Model	Constrained Parameters	Comparison Model
Configural	Mean	
Metric	Fl+Mean	Configural
Scalar	Fl+Int	Loading
Strict	Fl+Int+Res	Scalar

Note. Fl = factor loading, Int = item intercepts, Res = item residual variances, Mean = mean of latent variable. Adapted from Xu (2017).

Table 11 - Measurement Invariance Model Fit

Models	CFI	RMSEA	CFI Change	RMSEA Change
Configural	0.95	0.08		
Metric	0.95	0.08	0.002	0.005
Scalar	0.94	0.08	0.014*	0.004
Strict	0.94	0.08	0.000	0.002

Note. *delta cfi > .01 is significant.

Table 12 - Fit Indices for Cross-Lagged Models

	Measurement Model	Model 1 – Baseline	Model 2 – Hypothesized	Model 3 – Exploratory
Fit Indices				
χ^2 (df)	6701 (261)	16367 (571)	12534 (597)	11971 (579)
RMSEA	0.036	0.037	0.032	0.032
CFI	0.97	0.92	0.94	0.95
TLI	0.95	0.91	0.93	0.93
AIC	NA	951288	947528	947000
Delta χ^2	NA	NA		

Note. * indicates $p < .01$

Table 13 - Parameter Estimates for Final Cross-Lagged Model – 2014 Attitudes

Parameter Estimate	Corresponding Hypothesis	Unstandardized (std error)	Standardized	p
Learning Attitudes 2014 ~				
Learning Attitudes 2013		.50 (.01)	.49	.00
Learning Attitudes 2012		.16 (.01)	.17	.00
Employee Rating 2013		.03 (.01)	.05	.00
Health Training Participation 2013	H11	-.07 (.01)	-.15	.00
Leadership Training Participation 2013	H10	-.02 (.01)	-.02	.05
Health and Leadership Training 2013	H12	-.02 (.04)	-.07	.50
Satisfaction 2014 ~				
Satisfaction 2013		.56 (.01)	.54	.00
Satisfaction 2012		.19 (.01)	.18	.00
Employee Rating 2013		.02 (.01)	.02	.04
Health Training Participation 2013	H2	-.05 (.02)	-.07	.00
Leadership Training Participation 2013	H5	-.01 (.01)	-.02	.36
Health and Leadership Training 2013	H8	-.05 (.02)	-.07	.27
Health Attitudes 2014 ~				
Health Attitudes 2013		.23 (.01)	.23	.00
Health Attitudes 2012		.52 (.01)	.52	.00
Employee Rating 2013		.01 (.01)	.02	.00
Health Training Participation 2013	H1	-.04 (.01)	-.07	.00
Leadership Training Participation 2013	H4	.01 (.01)	.01	.62
Health and Leadership Training 2013	H7	-.02 (.04)	-.04	.57

Table 14 - Parameter Estimates for Final Cross-Lagged Model – 2013 Attitudes

Parameter Estimate	Corresponding Hypothesis	Unstandardized (std error)	Standardized	p
Learning Attitudes 2013 ~				
Learning Attitudes 2012		.56 (.01)	.59	.00
Employee Rating 2012		.04 (.01)	.07	.00
Health Training Participation 2012	H11	-.02 (.01)	-.05	.02
Leadership Training Participation 2012	H10	-.03 (.01)	-.06	.01
Health and Leadership Training 2012	H12	.04 (.03)	.01	.12
Satisfaction 2013 ~				
Satisfaction 2012		.69 (.01)	.66	.00
Employee Rating 2012		.03 (.01)	.05	.00
Health Training Participation 2012	H2	.04 (.01)	.05	.01
Leadership Training Participation 2012	H5	-.03 (.01)	-.04	.04
Health and Leadership Training 2012	H8	.02 (.04)	.03	.64
Health Attitudes 2013 ~				
Health Attitudes 2012		.64 (.01)	.65	.00
Employee Rating 2012		.02 (.01)	.03	.00
Health Training Participation 2012	H1	.01 (.01)	.02	.27
Leadership Training Participation 2012	H4	.03 (.01)	.05	.01
Health and Leadership Training 2012	H7	-.04 (.03)	-.07	.24

Table 15 - Parameter Estimates for Final Cross-Lagged Model – 2014 Training

Parameter Estimate	Corresponding Hypothesis	Unstandardized (std error)	Standardized	p
Health Training 2014 ~				
Learning Attitudes 2013	H13a	.00 (.01)	.01	.54
Health Attitudes 2013		-.02 (.01)	-.03	.00
Health Training Participation 2013	H13d	-.25 (.01)	-.23	.00
Health Training Participation 2012	H13d	-.23 (.01)	-.24	.00
Leadership Training Participation 2013	H13c	-.17 (.01)	-.20	.00
Leadership Training Participation 2012	H13c	-.16 (.01)	-.18	.00
Leadership Training 2014 ~				
Learning Attitudes 2013	H13a	.05 (.01)	.05	.00
Health Training Participation 2013	H13b	-.28 (.01)	-.19	.00
Health Training Participation 2012	H13b	-.27 (.01)	-.21	.00
Leadership Training Participation 2013	H13d	-.26 (.01)	-.23	.00
Leadership Training Participation 2012	H13d	-.25 (.01)	-.22	.00
Health and Leadership Training 2014 ~				
Learning Attitudes 2013	H13a	.01 (.00)	.03	.00
Health Training Participation 2013		-.03 (.00)	-.05	.00
Leadership Training Participation 2013		-.02 (.00)	-.05	.00

Table 16 - Parameter Estimates for Final Cross-Lagged Model – 2013 Training

Parameter Estimate	Corresponding Hypothesis	Unstandardized (std error)	Standardized	p
Health Training 2013 ~				
Learning Attitudes 2012	H13a	.01 (.01)	.02	.57
Health Attitudes 2012		-.00 (.01)	-.01	.60
Health Training Participation t 2012	H13d	-.15 (.01)	-.15	.00
Leadership Training Participation 2012	H13c	-.08 (.01)	-.11	.00
Leadership Training 2013 ~				
Learning Attitudes 2012	H13a	.04 (.01)	.05	.00
Health Training Participation 2012	H13b	-.15 (.01)	-.15	.00
Leadership Training Participation 2012	H13d	-.14 (.01)	-.14	.00
Health and Leadership Training 2013 ~				
Learning Attitudes 2012	H13a	.01 (.00)	.04	.00
Health Training Participation 2012		-.02 (.00)	-.05	.00
Leadership Training Participation 2012		-.01 (.00)	-.04	.00

Table 17 - Parameter Estimates for Final Cross-Lagged Model – 2013 Employee Ratings

Parameter Estimate	Corresponding Hypothesis	Unstandardized (std error)	Standardized	p
Structural Model Estimates				
Employee Rating 2013 ~				
Health Training Participation 2012	H3	-.04 (.02)	-.04	.09
Leadership Training Participation 2012	H6	.00 (.02)	.00	.97
Health and Leadership Training Participation 2012	H9	.03 (.05)	.03	.61
Employee Rating 2012		.51 (.01)	.51	.00
Employee Rating 2011		.07 (.01)	.07	.00

Table 18 - Data Collection by Year

	2011	2012	2013	2014	2015
Type of Data					
Training Participation			X	X	X*
Employee Attitudes		X	X	X	
Employee Performance	X	X	X		

Note. *Data collection for this year was only for two months, and the sample size was not large enough for inclusion in the model.

Table 19 - Number of Training Courses Taken Each Year

	2012	2013	2014
Type of Participation			
Health OR Leadership Training	3335	3779	4873
Health AND Leadership Training	302	235	369

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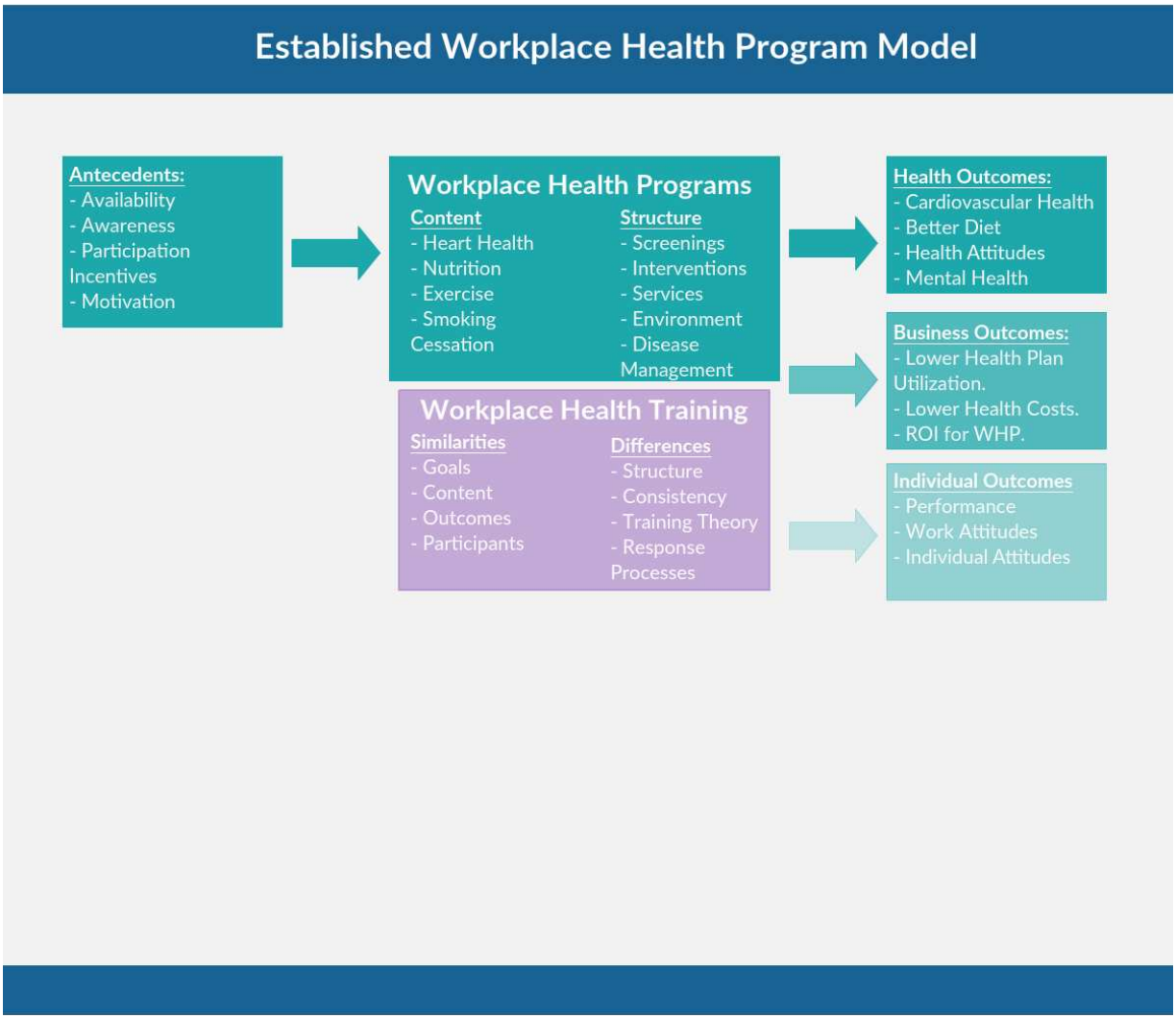
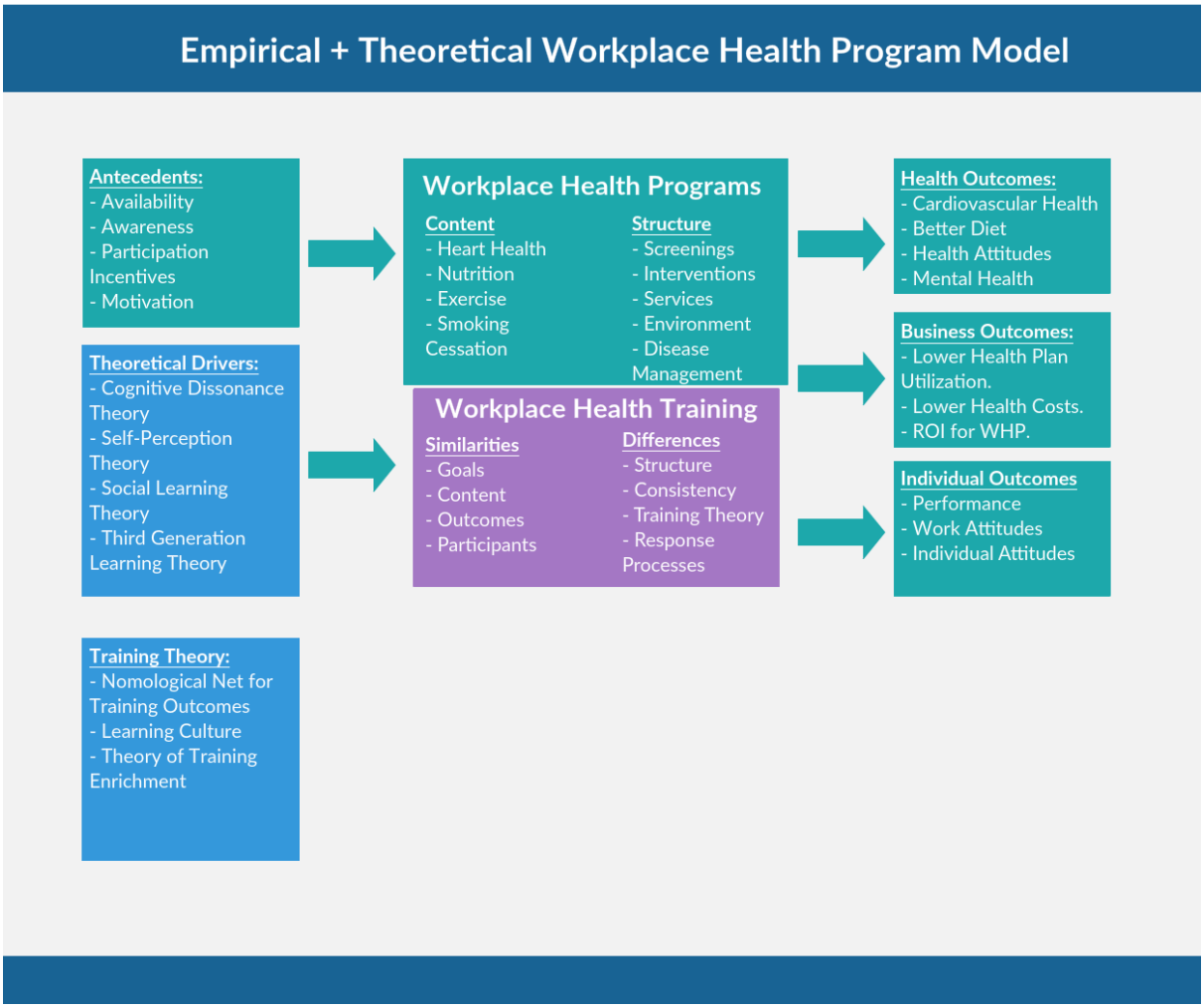
APPENDICES

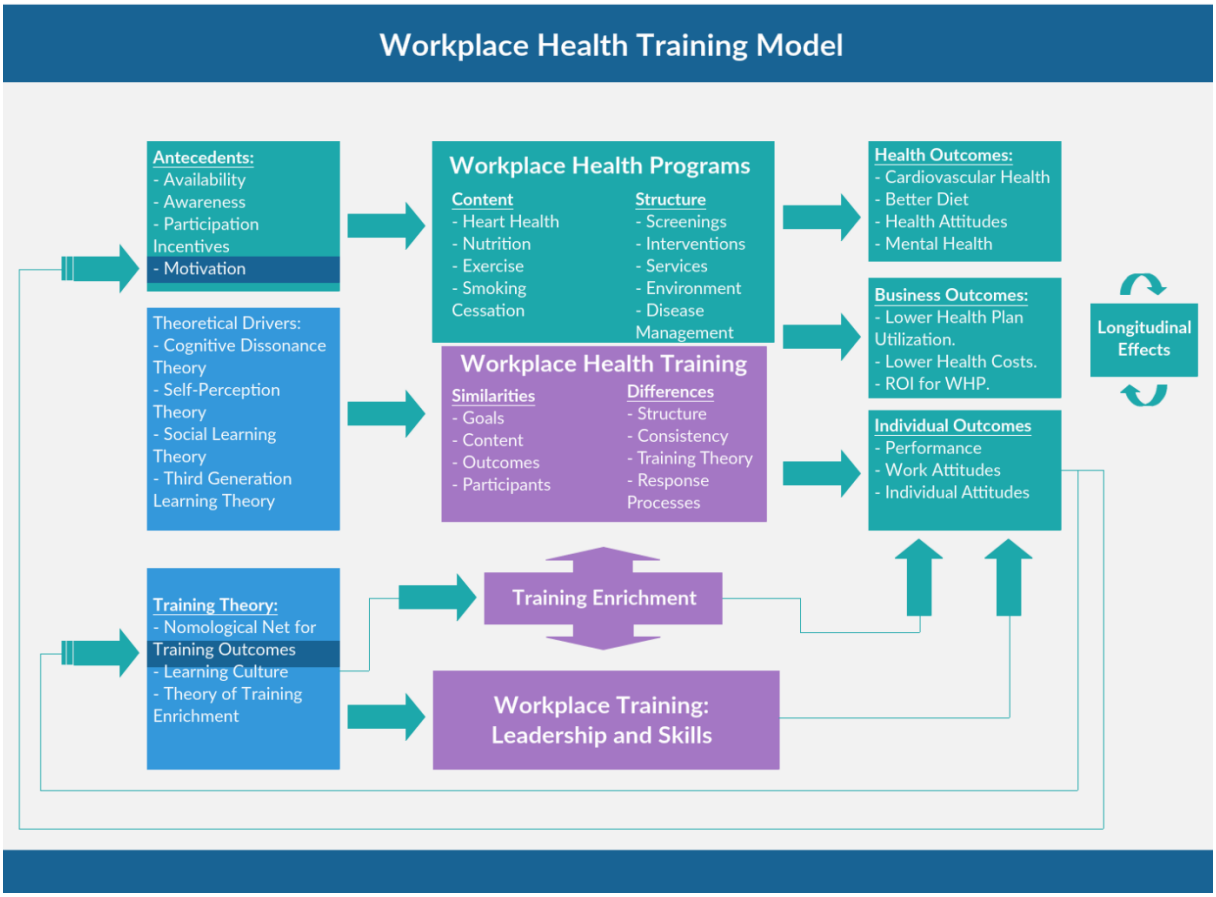
Appendix A: Established Workplace Health Program Model



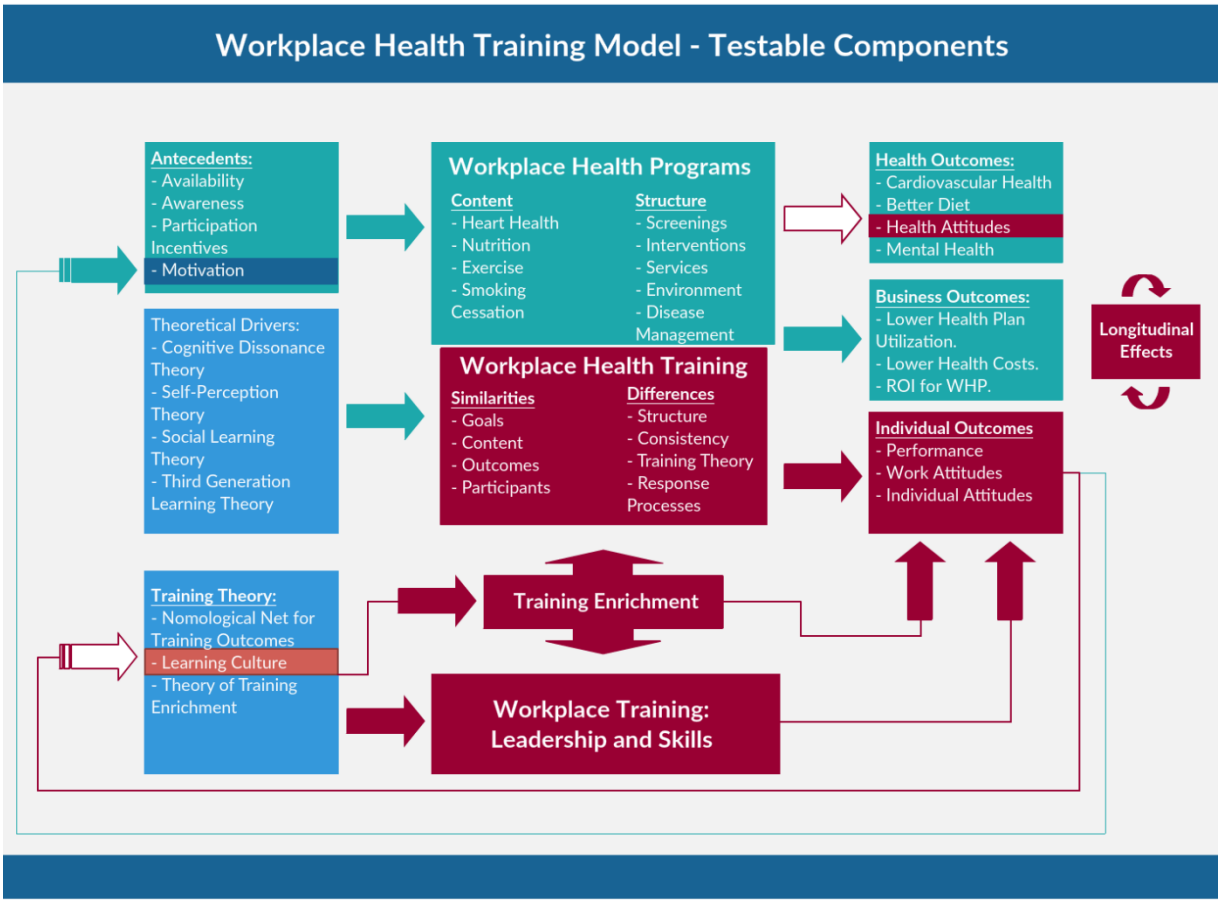
Appendix B: Empirical and Theoretical Workplace Health Program Model



Appendix C: Workplace Health Training Model



Appendix D: Workplace Health Training Model: Testable Components



Appendix E: Proposition Support Table

Support Label	Explanation
Strong	Strong support means there are multiple, high quality studies that support the proposition. These studies can be well executed empirical studies, meta-analyses, or consensus through review articles.
Moderate	Moderate support means there are empirical studies supporting the proposition, but researchers have not reached a consensus. More empirical research is needed to fill in gaps or expand on current lines of research.
Limited	Limited support means that there are few empirical studies supporting the proposition. Additionally, there may not be enough high quality data available for the empirical studies that do exist.
None	No support means there are almost no empirical studies related to the proposition.