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A Holistic Approach to Employee Functioning: Assessing the Impact of a Virtual-Reality Mindfulness Intervention at Work

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A HOLISTIC APPROACH TO EMPLOYEE FUNCTIONING: ASSESSING THE IMPACT OF A VIRTUAL-REALITY MINDFULNESS INTERVENTION AT WORK

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To: Dean Michael Heithaus
College of Arts, Sciences and Education

This dissertation, written by Arieana Thompson, and entitled A Holistic Approach to Employee Functioning: Assessing the Impact of a Virtual-Reality Mindfulness Intervention at Work, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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DEDICATION

I dedicate this dissertation to the future of global society.

May we create a world of happier employees who flourish in health, achieve with passion, and connect through shared values, compassion, and truth.

May we sustain life and beauty through environmentally-friendly, innovative, and joyful organizations.

May we co-create new ways of life through awareness, appreciation, acceptance, and honoring our unique, inherent, and diverse human strengths.

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ABSTRACT OF THE DISSERTATION

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Professor Valentina Bruk-Lee, Major Professor

The purpose of the collected papers was to advance the field of Industrial/ Organizational Psychology by examining the impact of a workplace virtual reality (VR) mindfulness intervention on holistic employee functioning. The workplace VR mindfulness intervention conducted in this dissertation integrated the components of: a.) being attractive to employees, b.) short in duration, and c.) likely to effectively improve all three dimensions of holistic employee functioning (employee wellbeing, employee performance, and employee attitudes). Thus, this collection of papers aimed to shed light on how employee functioning may be effectively improved through mindfulness VR.

The three collected papers detail the results of three organizations that implemented a VR mindfulness program in their respective workplaces for the purpose of employee stress reduction. Manuscript 1 provides data to suggest that VR mindfulness at work is significantly related to decreased employee stress. Manuscript 2 failed to detect significant relationships between VR mindfulness and employee performance and attitudes. Lastly, Manuscript 3 is a Practitioners Report. This paper examines the barriers

to stress management in an organizational setting and provides recommendations for overcoming these obstacles.

Together, this collection of papers contributes to occupational health psychology literature and depicts how employee functioning may be effectively improved through modern stress management strategies (i.e., VR mindfulness), which are short and attractive to employees. Unfortunately, the objective of increasing all three dimensions of holistic employee functioning, through an innovative stress management program, was only partially successful. This indicates that, although short and attractive stress management interventions increase employee wellbeing, there is room to examine past stress management program implementation strategies. Practitioners are provided with methods of overcoming organizational barriers to enhance job performance outcomes and job attitudes and to reduce program attrition.

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I. COLLECTED PAPERS INTRODUCTION

The collected papers dissertation presented here investigates the impact of a virtual reality mindfulness intervention on outcomes of particular interest to the workplace. The background to the problem, the problem statement, prior empirical research related to the overarching themes, and the purpose of the collected papers are presented first. Next, each proposed collected paper is described. Chapter 1 ends with a brief overview of potential implications for the entire collection.

Background to the Problem

In the broader societal context, there are mounting global concerns regarding the mental wellbeing and holistic health of modern-day people. Key mental health indicators from the World Health Organization (WHO), the National Institute of Mental Health (NIMH), and other reliable sources demonstrate that rates of suicide, depression, anxiety, loneliness, and alcohol/drug-use are at all-time highs (NIMH, 2019; Ritchie & Roser, 2018). Correspondingly, collective rates of happiness and optimism about the future are on the decline (NORC, 2020). In the United States, for the first time in 50 years, the percentage of people reporting that they not very happy (23%) is greater than the number of people reporting to be very happy (14%; NORC, 2020). Due to these perturbing wellbeing indicators, equipping people and organizations with the skills and resources necessary to alleviate stress and increase their own mental wellbeing may be said to be a public health imperative. Although many societal domains that would benefit from increased mental health support and resources, one area of critical investigation and importance is the present-day workplace.

Numerous aspects of the rapidly changing modern work environment are negatively impacting employee wellbeing and productivity (Ernst Kossek, Kalliath, & Kalliath, 2012). Researchers indicate that current employees face unprecedented levels of job insecurity, nonstandard work schedules, economic pressure caused by globalization, underemployment, skill obsolescence, and cultures of overwork (especially in relation to understaffing; Ernst Kossek et al., 2012). While occupational health researchers have been examining methods to reduce employee stress for decades (Ganster & Rosen, 2013), recently, there has been a shift towards linking employee wellbeing to organizational outcomes of interest, such as productivity or turnover (Baptiste, 2008). In other words, there is both a need and a desire to merge the two disciplines of occupational health and job performance research to holistically examine employee functioning. *Holistic employee functioning* will be operationalized here as encompassing the three dimensions of employee wellbeing, employee performance, and employee attitudes.

There is some evidence to suggest that the shift to a holistic approach has already begun. For instance, the Job Demands-Resource (JD-R) model provides a foundational theoretical framework for modeling the expected levels of employee stress that will result under varying workplace conditions (Ganster & Rosen, 2013). Nonetheless, the authors' most recent publication on the JD-R model extended the theoretic framework to include employee job performance as a new, fundamental feature of this employee stress model. Explicitly, employee attitudes and employee performance outcomes are said to diminish when employees face prolonged exposure to workplace demands, with insufficient job resources, and experience chronic work-related stress (Bakker & Demerouti, 2017).

Further, a number of recent studies have begun to investigate the interrelatedness of employee wellbeing and productivity (Ganster & Rosen, 2013; Halkos & Bousinakis, 2010; Naqvi, Khan, Kant, & Khan, 2013). Bakker (2017) states that "organizations that want to stay competitive" must harness employee wellbeing through both a top-down and a bottom-up approach. Altogether, this evidence suggests that employee wellbeing, employee performance, and employee attitudes go hand-in-hand and taking a holistic approach to employee functioning may be vital for organizations wishing to maintain their competitive advantage.

Few researchers employ a holistic perspective when examining employee functioning, especially as academic journals are frequently fragmented and publications often fall into either the "employee wellbeing" camp or the "job performance" camp. Nevertheless, in practice, organizations are slowly recognizing the value of employee wellbeing in achieving organizational objectives. In fact, according to the Society of Industrial and Organizational Psychology, "Workforce health and well-being" is ranked as one of the top ten workplace trends for the year 2020 (SIOP, 2020). The trend of workplace wellbeing and perspective shift is mirrored by popular press outlets (i.e., Forbes) and stock market analysis reports alike ("Corporate Wellness Market Trends" 2018; Kohll, 2018). Consequently, there is a need for increased effective workplace interventions that approach employee functioning holistically. Specifically, there is a need for workplace interventions that seek to increase all three dimension of employee functioning: employee wellbeing, employee performance, and employee attitudes.

The Problem Statement

While it is true that organizations are beginning to identify employee wellbeing as a critical component of employee functioning, and thus a critical factor in employee job performance outcomes, organizations are often hesitant to expend additional resources in the area of employee wellbeing (Grawitch, Gottschalk, & Munz, 2006). Resource expenditure considerations include the amount of time employees will spend away from the floor (Parry, 1996) and skepticism over whether or not the employees will voluntarily participate in the wellbeing interventions in the first place (Brown & McCracken, 2009). Therefore, while there is evidence that wellness programs do generate a significant return-on-investment (Baicker, Cutler, & Song, 2010), organizations will likely only endorse easy-to-implement strategies of improving holistic employee functioning. Said differently, organizations will likely desire easy to implement wellbeing programs, which are brief and attractive to employees. One way to implement a short, attractive wellbeing intervention may be through the use of virtual reality technologies.

Consequently, there is a gap in the literature in regard to workplace interventions that meet all of the following criteria: a.) are attractive to employees, b.) can be completed in a short period of time, and c.) can effectively improve all three dimensions of holistic employee functioning (employee wellbeing, employee performance, and employee attitudes). Nevertheless, utilizing the advanced, technological platform of virtual reality may be the key to addressing this significant, scientist-practitioner gap in the field of Industrial/Organizational Psychology. Thus, the current collection of papers dissertation seeks to address this gap by integrating and extending research from the two domains of mindfulness and virtual reality. Explicitly, the collection of papers seeks to

investigate the impact of a workplace virtual reality mindfulness intervention on holistic employee functioning.

Empirical Research on Wellbeing and Mindfulness at Work

As briefly alluded to, organizations are slowly beginning to recognize the benefits of wellbeing (or stress management) interventions (Quick, Wright, Adkins, Nelson, & Quick, 2013). According to the Center for Disease Control and Prevention (CDC), nearly one-half of large companies in the United States provide some type of stress management intervention for their workforce (Sauter et al., 1999). Wellbeing/stress management interventions emphasize individual employees. Specifically, these interventions provide learning opportunities that aim to provide employees with the necessary tools and techniques to improve their own levels of wellbeing (Ganster & Rosen, 2013).

Wellbeing and stress management interventions have demonstrated effectiveness in helping to alleviate employee strain in relation to high job demands, and to increase their access to resources (Jenny et al., 2015). In a recent meta-analysis, stress management interventions were shown to significantly decrease employees' overall strain levels (Jesus, Miguel-Tobal, Rus, Viseu, & Gamboa, 2014). Additionally, wellbeing and stress management interventions are effective for a range of populations. A stress management intervention for working nurses demonstrated significantly decreased work-related stress levels (Sailaxmi & Lalitha, 2015), and similar results were found for elementary school teachers (Tsang et al., 2015). Thus, this research suggests that wellbeing/stress management interventions can be an effective tool in reducing strain in

the workplace, and these conclusions will likely generalize to diverse fields and occupations (Jesus et al., 2014).

When designing wellbeing/stress management interventions, it is beneficial to understand the three levels of employee strain prevention (primary, secondary, and tertiary prevention). Primary prevention occurs when efforts are made to prevent negative strain outcomes from ever occurring, and involves addressing the stressors in the work environment that cause chronic strain (Nelson & Quick, 2012). There are many methods that can be used to reduce the effects of environmental stressors, including more clearly defining the job role, increasing autonomy (Van Yperen & Hagedoorn, 2003), improving organizational communication (Rhezaii, Hosseini, & Fallahi, 2006), increasing employee levels of positivity (Zheng, Molineux, Mirshekary, & Scarparo, 2015), and creating policies for work-life balance (Nezlek, Holas, Rusanowska, & Krejtz, 2016).

Primary prevention is often the most strongly favored method of reducing strain, since it attempts to prevent strain from occurring (Nelson & Quick, 2012). However, a primary prevention strategy is not always feasible, as a result of organizational constraints, and thus secondary prevention methods must be employed (Quick et al., 2013). Secondary prevention aims to address a problem in its early stages. Specifically, secondary prevention in stress management is utilized when there is already evidence of negative strain outcomes on the employee (Michie, 2002). In demanding work situations, the individual's response to the stressor must be adapted. Forms of secondary prevention include the use of a variety of coping skills to alleviate the effect of the stressor on the

individual. Secondary prevention tends to be the most common form of prevention in the area of stress management (Richardson & Rothstein, 2008).

Lastly, tertiary prevention occurs when severe negative outcomes have already occurred and the consequences of enduring strain must be addressed. Tertiary prevention in stress management is necessary when critical distress and strains are present and must be treated (Nelson & Quick, 2012). Tertiary prevention often takes place in the workplace when an employee is experiencing serious mental health problems and is treated in the form of counseling, medical follow-ups, and Return-To-Work programs (Michie, 2002).

Wellbeing/Stress Management Intervention Evaluation

As mentioned above, wellbeing/ stress management interventions typically operate at the secondary level of prevention (Richardson & Rothstein, 2008). Thus, the wellbeing/stress management interventions will emphasize techniques that employees can engage in to reduce current mild to moderate strain levels. Measuring the level of strain that employees are experiencing before and after the intervention is vital to evaluating whether the intervention has been successful in improving wellbeing and mental health outcomes in the workplace. Intervention evaluation may be one of the most important, and yet one of the most overlooked, aspects of wellbeing/ stress management interventions. Intervention evaluations are essential to ensure that learning has occurred, the intervention tenets were actually implemented, and that the intervention had a measurable impact on long-term outcomes of interest (Cascio & Aguinis, 2014).

There are several methods in which to collect information regarding the scope and sources of employee strain. These may include survey data, panel discussions, interviews, or objective data (such as absenteeism, sick days, and turnover). However, in most cases, current employees will be surveyed via questionnaires (Richardson & Rothstein, 2008). Employee strain can be appraised through a global measure of job strain or through the use of more specific strain measurements. For example, an intervention's pretest-posttest questionnaire might measure employees' "Stress in General" (SIG) or other particular strain outcomes, such as poor sleep, exhaustion, burnout, disengagement, job dissatisfaction, life dissatisfaction, poor work-life balance, or depressive symptoms (Bakker & Demerouti, 2017).

Levels of Intervention Evaluation

Kirkpatrick's Model of Training Evaluation is a frequently used method for intervention evaluation. The Kirkpatrick model is used to assess interventions on the basis of: participant reactions, learning of intervention materials, transfer of intervention content to on-the-job behaviors, and bottom-line results/outcomes (Kirkpatrick, 1975). The first level of the model addresses participant reactions. Participant reactions are typically assessed through the use of self-report measures which represent trainees' affective and attitudinal responses to the intervention. The second level assesses participant learning. Learning criteria measure the knowledge acquisition outcomes of interventions; these are not measures of job performance. Learning measures are typically administered by using paper-and-pencil and performance tests. The first two levels are considered training-level criteria (Kirkpatrick, 1975).

The last two levels are considered performance-level criteria, addressing behavior and results (Kirkpatrick, 1975). The third level in Kirkpatrick's model is behavior, sometimes also referred to as transfer of knowledge. Behavioral criteria measure on-the-job performance and can be used to identify the effects of the intervention on actual work activity (Kirkpatrick, 1975). Behavior criteria are evaluated through the use of supervisor ratings or objective indicators of performance. The final level is results or bottom-line outcomes. The success of the intervention can be determined through utility analysis estimates (Kirkpatrick, 1975). Utility analyses provide a formula with which to assess the dollar amount gained when making personnel decisions, including interventions (Cascio & Aguinis, 2014).

The Kirkpatrick model can be used to consider the effectiveness of wellbeing/ stress management interventions. Though researchers may choose to evaluate the intervention by any one of the four levels of intervention evaluation, assessment at multiple levels will provide the most information in relation to the intervention's success (Arthur, Bennett, Edens, & Bell, 2003). Particularly in stress management interventions, reactions to the intervention session and material are critical. As mentioned above, employees have a range of perceptions when it comes to the importance of wellbeing/stress management interventions and the face validity of wellbeing/stress management techniques (i.e., mindful deep-breathing). Therefore, reactions to the intervention will provide significant insight into the motivation employees will have to implement learning on the job. If employees perceived the intervention to be interesting, engaging, and informative, it is more likely that they will engage in wellbeing/ stress management practices (Cascio & Aguinis, 2014).

Similarly, learning is often an important evaluative criterion in interventions (Kirkpatrick, 1975). Though it is likely that, in comparison to other interventions, high levels of learning in wellbeing/stress management interventions are less important than whether or not as important as whether the techniques are being practiced. However, if the wellbeing/stress management intervention is highly focused on technical details (such as the neural-cognition processes of strain), learning may be less likely to occur and therefore should be accurately measured and analyzed. Therefore, behavioral criteria are possibly the primary concern. The behavioral criterion refers to the actual implementation of stress management strategies. If transfer-of-training is not occurring, it is important to identify why. For instance, employees may not be engaging in stress management because of a lack of learning, motivation, or organizational support.

Lastly, evaluating results is often the real point of interest for organizations. Organizations want to understand how employee wellness is impacting the bottom-line outcomes of interest. To evaluate the intervention results, researchers might use objective data to compare yearly or quarterly data on performance, turnover, etc. Nevertheless, researchers often do not have access to this information and may use self-reported turnover intentions, performance, or other subjective measures as a proxy for evaluating the impact of the intervention on organizational outcomes (Richardson & Rothstein, 2008).

Intervention Design

Once the criterion levels of intervention evaluation are established, the wellbeing/ stress management intervention research design may be selected. Traditional

organizational intervention designs fall into one of three categories: a.) preexperimental designs, b.) experimental designs, or c.) quasi-experimental designs (Cook & Campbell, 1979; Tannenbaum & Woods, 1992). Preexperimental designs utilize a pretest and posttest survey but do not employ a control group (Tannenbaum & Woods, 1992). The method effectively assesses whether there are significant changes in relevant organizational outcomes before and after the intervention (Cascio & Aguinis, 2014), and is commonly utilized in the wellbeing/ stress management literature (Tannenbaum & Woods, 1992; Van der Hek & Plomp, 1997). Nevertheless, preexperimental designs are subject to many threats to internal validity, such as instrumentation, maturation, or history effects (Cascio & Aguinis, 2014).

Experimental designs utilize a control group and random assignment; these additions allow greater causal inferences to be made in relation to the intervention's implementation and outcomes (Tannenbaum & Woods, 1992). The traditional experimental design randomly assigns participants to one of two groups (the intervention group or the control group), to isolate whether improvements occur solely in the intervention group (Cascio & Aguinis, 2014). A more advanced experimental design is the Solomon Four-Group Design, which assesses intervention effects by randomly assigning participants to one of four conditions: 1.) pre-test, treatment, post-test, 2.) pre-test, no treatment, post-test, 3.) treatment, post-test, and 4.) no treatment, post-test. When this design is employed, researchers have the ability to examine intervention main effects and interaction effects (Solomon, 1949). However, the Solomon Four-Group design assumes that intervention impacts posttest scores independently and requires large sample sizes to attain sufficient statistical power (Cascio & Aguinis, 2014).

Thirdly, intervention designs can be quasi-experimental (Cook & Campbell, 1979; Tannenbaum & Woods, 1992). Quasi-experimental designs mirror experimental designs, except participants are no longer randomly assigned to the intervention or control group. The lack of random assignment often results from real organizational constraints, such as deploying the intervention in one area or department and not another (i.e., during a geographical or functional roll-out), if there are intervention capacity limitations (i.e., some employees must be waitlisted). While quasi-experimental designs often benefit from higher external validity (as they frequently utilize employee samples, rather than controlled lab samples), in comparison to experimental designs quasi-experimental designs face more threats to internal validity (e.g., differential selection; Cascio & Aguinis, 2014).

Accordingly, wellbeing/stress management interventions can be evaluated through preexperimental, experimental, or quasi-experimental research designs (Cook & Campbell, 1979; Lamontagne, Keegel, Louie, Ostry, & Landsbergis, 2007; Tannenbaum & Woods, 1992). In a 25 year review of wellbeing/stress management intervention impact and design, Lamontagne et al., (2007) found that all three types of research designs were utilized equally in the literature. Additionally, outcomes and data patterns did not significantly differ depending on the type of research design employed (Lamontagne et al., 2007).

Wellbeing/Stress Management Intervention Content

According to meta-analytic evidence, there is a sizeable amount of variation in how wellbeing/stress management interventions are constructed (Richardson &

Rothstein, 2008). Despite the fact that there are many methods of formatting stress management interventions, traditional wellbeing/stress management interventions often explain the harmful effects of chronic stress, suggest ways to engage in secondary prevention of stress, make stress reduction goals, and practice stress reducing exercises (Van der Hek & Plomp, 1997). Wellbeing/stress management intervention sessions can be conducted with in-person instructors individually or in small groups, or participants may be taught via computers, books, or recordings. Further, interventions may occur online, off-site, or at the workplace, and can take between 15 minutes, all-day, or weeks to complete (Richardson & Rothstein, 2008).

Not only is there a great deal of variability in the time, delivery, and location of wellbeing/ stress management interventions, there are also many different types of wellbeing/stress management tools that can be provided to employees currently experiencing mild to moderate strain levels (employees at the secondary level of prevention). These include training employees to improve and practice cognitive-behavioral skills, exercising, journaling, time management, goal setting, relaxation, deep breathing, and mindfulness (Richardson & Rothstein, 2008). The present collected papers dissertation will focus on mindfulness as a wellbeing/stress management tool.

Explicitly, there has been a growing movement towards the use of mindfulness practices for increasing personal and professional wellbeing and effectiveness (Garland, Hanley, Farb, & Froeliger, 2015). Mindfulness practices frequently include numerous forms of meditation (e.g., guided meditation or walking meditation), but may also include some forms of exercise, such as yoga or stretching (Grossman, Niemann, Schmidt, &

Walach, 2010). Mindfulness practices endeavor to draw individuals' attention back to the present moment and ensure that participants check in with their body and mind and begin to cultivate self-acceptance of their present physical, emotional, and cognitive states (Brown, Ryan, & Creswell, 2007). Thus, mindfulness allows individuals to improve their levels of attention, emotional regulation, and self-concept (Eberth & Sedlmeier, 2012). In meta-analytic reviews, regular mindfulness practice has been linked to improved outcomes in the areas of physical health, attention, stress, burnout, mental health, and wellbeing (Eberth & Sedlmeier, 2012; Grossman et al., 2010). Therefore, research suggests that mindfulness may be an ideal resource for improving holistic employee functioning, through the integration of mindfulness practices in wellbeing/stress management interventions.

Workplace Mindfulness Theoretical Model

Several systematic reviews and theoretical models have recently emerged on the topic of mindfulness at work (Glomb, Duffy, Bono, & Yang, 2011; Good et al., 2016; Sutcliffe, Vogus, & Dane, 2016). Several key themes have emerged in relation to the mechanisms that drive positive, holistic employee functioning. According to these themes, mindfulness first facilitates employees' attention to and awareness of the present moment, which, in turn, reduces physiological, cognitive, emotional, and behavioral reactivity, which subsequently enables high levels of employee functioning (please see *Figure 1*). The following sections will detail each stage in greater depth.

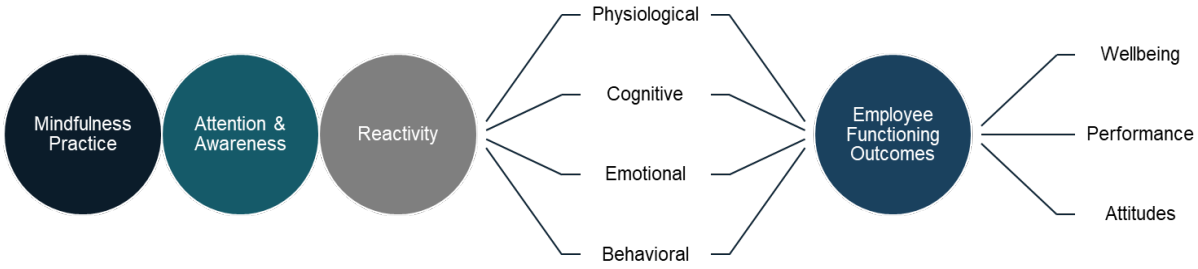

Figure 1.0 Mindfulness at Work Theoretical Framework.

Attention and Awareness

Mindfulness practice draws individuals' focus back to the present moment and facilitates increased attention and awareness (Sutcliffe et al., 2016). Both terms, attention and awareness, are said to be critical to achieving a mindful state (Good et al., 2016) because of the fact that, even with focus attention, researchers claim that there cannot be true mindfulness without "meta-awareness… an apprehension of the current state of the mind that monitors that focused attentiveness" (Dreyfus, 2011; Good et al., 2016, p. 117). Furthermore, mindfulness involves the continuous practice of bringing oneself back to present moments and experiences and letting go of future- or past-oriented thinking, by engaging in experiential processing (Brown et al., 2007; Good et al., 2016; Teasdale, 1999).

Experiential processing, or *decentering*, occurs when individuals attempt to place attention on internal and external stimuli in an approach that seeks to be factual and observational in nature (Good et al., 2016). Experiential processing allows individuals to cultivate attention and awareness on experiences in a stream of consciousness method,

void of judgments or storylines, which allows individuals to experience the present moment openly, without the association of positive or negative meanings (Brown et al., 2007; Creswell, Way, Eisenberger, & Lieberman, 2007; Good et al., 2016). When an experience can be accepted as is, without positive or negative implications regarding the self, this acceptance allows for mental disassociation (or distance) and for situations to be viewed more openly and objectively (Dreyfus, 2011; Eberth & Sedlmeier, 2012; Good et al., 2016). This mental distance is also referred to as a *decoupling* of the self from experiences (Glomb et al., 2011). Decoupling allows the individual to remove ego and perceived threats to self-esteem or self-concept when experiencing work situations or events (Glomb et al., 2011; Siegel, 2007). For example, a situation might occur in the workplace in which an employee must face an angry, loud, and shouting customer or client. If the employee is experienced in mindfulness practice, he or she would likely have an increased ability to decouple themselves from the situation and merely observe that the individual is upset and recognize that this anger may or may not have anything to do with them.

Furthermore, increased attention and awareness to the present moment allows for increased bodily awareness (Glomb et al., 2011; Shusterman, 2008). In other words, individuals who practice mindfulness are able to notice and identify when they are having a physiological reaction to internal or external stimuli. In the previous example, an employee well-versed in mindfulness practice may be able to recognize if his or her heart-rate increases or if another fight-or-flight sympathetic nervous system reaction is triggered by the angry customer. Hence, increased attention and awareness allows

employees to be more cognizant of their physiological reactions and improves the interpretation of these physical cues (Glomb et al., 2011).

Reactivity

When increased attention and awareness to the present moment engenders individual decentering/decoupling, mindfulness practice can be said to reduce employee *reactivity* (Good et al., 2016). In a mindfulness framework, reactivity is defined as the conscious or unconscious response to internal or external stimuli. There are four forms of reactivity that may be examined: physiological, cognitive, emotional, and behavioral.

Physiological Reactivity

Mindfulness practice has incredible impacts on *neuroplasticity*, the formation of neural structures in the brain. Explicitly, when examined via brain scans, experts in mindfulness practice have variable and identifiable brain structures, when compared to those that do not practice mindfulness (Good et al., 2016; Sato et al., 2012). Those who practice routine mindfulness practice have smaller amygdala regions (the brain region associated with aggression and fear) and greater neural pathways in the regions that have been linked to attention, memory, self, and emotion regulation than the normal population (Balleine & Killcross, 2006; Good et al., 2016). Consequently, evidence indicates that those who practice mindfulness experience reductions in the frequency and intensity of the physiological reactions (including physiological stress reactions, such as the release of stress hormones into the bloodstream or increases in heartrate) that occur in response to internal and external stimuli (Galantino, Baime, Maguire, Szapary, & Farrar, 2005; Garland et al., 2015; Good et al., 2016). This research provides evidence to

indicate that individuals who practice mindfulness will have lower levels of physiological reactivity and suggests that mindful employees will be less likely to have physiological reactions to negative stimuli at work, and if they do, they will be able to return more quickly to baseline.

Cognitive Reactivity

Mindfulness practice also reduces cognitive reactivity (Dekeyser, Raes, Leijssen, Leysen, & Dewulf, 2008; Glomb et al., 2011; Good et al., 2016; Skinner et al., 2008). By engaging in the present with focused attention and awareness, individuals are able to disengage with automatic thought processes regarding different situations and events (Glomb et al., 2011). While automaticity of mental processes can be cognitively efficient, often automatic thoughts are overlaid with positive and negative associations (Bargh & Chartrand, 1999; Glomb et al., 2011). For instance, if a boss sends his or her subordinate an email announcing that "they need to talk," the automatic thought process for the subordinate might be that they are having problems or have made a mistake. However, those practiced in mindfulness may be able to read the email more objectively and recognize that the email provides little information, indicating that the conversation could be either positive, neutral, or negative in nature. Therefore, reduced cognitive reactivity increases the range of responses available to the individual and increases cognitive flexibility (Glomb et al., 2011; Good et al., 2016).

Emotional Reactivity

Third, employees who practice mindfulness will benefit from reduced emotional reactivity (Glomb et al., 2011; Good et al., 2016). As a consequence of the decoupling or

psychological distance that is gained through mindfulness practice, individuals are less likely to relate external experiences to themselves. The absence of self-reference reduces the likelihood of an emotional reaction that might otherwise be experienced (Good et al., 2016). For instance, one study demonstrates that more mindful individuals experience less negative emotions when facing a high level of stressors (Creswell et al., 2007). Emotional lifecycles refer to how emotions arise, reach a peak, and then return to baseline levels (Good et al., 2016). Consequently, similar to physiological reactions, when emotional reactions do arise in individuals practiced in mindfulness, these reactions have a significantly shorter lifecycle (Good et al., 2016). Thus, in the workplace, mindful individuals will experience fewer emotional reactions to events or stressors. Additionally, when they do experience negative emotions, they will be able to calm themselves quicker and return to baseline (Glomb et al., 2011; Good et al., 2016; Ortner, Kilner, & Zelazo, 2007).

Behavioral Reactivity

Many individuals have behaviors that have become nearly automatic over time. Nevertheless, these habits may not be productive to holistic functioning. Increased experiential processing during mindfulness practice allows the individual to draw attention and awareness to these automatic behavioral responses and provides an increased opportunity for choice-making (Good et al., 2016). Pausing at decision-points allows the individual the opportunity to exercise increase self-regulation. Coupled with reduced physiological, cognitive, and emotional reactivity, mindful individuals have an increased capacity to behave or act in a rational, calm manner, in comparison to their less-mindful counterparts (Glomb et al., 2011). Therefore, it is easy to imagine the

benefits of reduced behavioral reactivity in the workplace, if mindful employees are able to react more professionally across situations and events. For instance, when receiving negative performance feedback at work, an employee may habitually and/or automatically physically turn away or verbally dismiss this feedback as it is being delivered. If this same employee has cultivated higher levels of mindfulness, they may be able to increase their receptivity to the message, respond in a calm manner, and even maintain a growth mindset regarding the negative feedback (in which negative feedback can be viewed as developmental, rather than a fixed, trait-based shortcoming; Wiersema et al., 2015).

Employee Functioning Outcomes

When mindfulness practice allows for increased attention and awareness and reduced physiological, cognitive, emotional, and behavioral reactivity, and, therefore, is likely to result in enhanced levels of employee functioning. Simply increasing attention and awareness of the present moment will allow employees to engage more fully in work activities and mitigate mistakes from distraction (Glomb et al., 2011; Good et al., 2016). Furthermore, reduced reactivity (physiologically, cognitively, emotionally, and behaviorally) will allow employees to experience stimuli more neutrally and/or positively. Additionally, reduced reactivity would increase employees' ability to self-regulate during events and situations that they perceived as negative (Glomb et al., 2011; Good et al., 2016). For all these reasons, mindfulness practice is expected to improve the three dimensions of holistic employee functioning: employee wellbeing, performance,

and attitudes. These three dimensions of employee functioning will be explored in more depth in the collected papers below (please see Chapters 2 and 3).

The Evolution of Mindfulness at Work

Mindfulness trainings and interventions in the workplace have evolved over time. The field has seen evolutions in workplace mindfulness intervention durations, intervention content, and intervention delivery methods. Mindfulness interventions were initially presented in the workplace within a multi-hour classroom learning model, best exemplified by the Mindfulness Based Stress Reduction (MBSR) program (Kabat-Zinn & Hanh, 2009). The MBSR model of employee mindfulness intervention consisted of two-hour sessions that persisted for eight successive weeks, accompanied by a day-long session (at week six) and 45 minutes of home practice per day (Kabat-Zinn, 1982; Kabat-Zinn & Hanh, 2009).

Since the initial conception of the foundational MBSR program and over the last three decades, workplace mindfulness interventions have trended towards shorter time-durations (Eby et al., 2017). Thus, mindfulness interventions began to branch-away from high-fidelity MBSR towards modified versions of the MBSR model and towards the use of other mindfulness interventions. Progressions are said to reflect organizational interests in increased intervention efficiency and in reaction to concerns regarding productivity and employee time away from work (Garrison et al., 2015; Moore, 2008). Moreover, recent evidence suggests that workplace mindfulness interventions can be effective whether employees receive 33 hours of classroom-based instruction or 15-minute mindfulness sessions (Fortney, Luchterhand, Zakletskaia, Zgierska, & Rakel,

2013; Melville, Chang, Colagiuri, Marshall, & Cheema, 2012). Additionally, research suggests that small, frequent doses of mindfulness may be more effective than massed mindfulness intervention sessions (Good et al., 2016).

Likewise, the intervention content of workplace mindfulness interventions has shifted over the years. Modern mindfulness interventions aim to facilitate *experiential learning* practices (i.e., training exercises), placing less emphasis on traditional, *didactic learning* methods (i.e., formal teaching methods, such as lecture; Good et al., 2016). For instance, modern, workplace mindfulness interventions might guide participants through a mindfulness meditation exercise, rather than provide a formal intervention session that informs participants on the conceptual components involved in mindfulness practice.

As mindfulness interventions shifted toward shorter and more experiential intervention sessions, the method of mindfulness intervention delivery has evolved as well. As mentioned above, original, workplace mindfulness interventions were delivered primarily in classroom-based settings, with formalized education delivered via a trained instructor (Garrison et al., 2015; Kabat-Zinn, 1982). As workplace mindfulness interventions began to incorporate experiential learning exercises, the methods of intervention delivery expanded to include: group discussions, written assignments, and off-site retreats, and eventually the technological integrations of audio recordings, video recordings, and online modules (Eby et al., 2017; Melville et al., 2012; Pflugeisen, Drummond, Ebersole, Mundell, & Chen, 2016). In addition, in *nonwork* contexts, preliminary research indicates that levels of mindfulness may be effectively increased through other advanced technologies, such as mindfulness-based video-games and virtual

reality simulations (Gackenbach & Bown, 2011; Navarro-Haro et al., 2017). These pilot studies suggest that increasingly technological methods of mindfulness intervention delivery may aid in the acceptance and attractiveness of workplace mindfulness intervention.

Empirical Research on Virtual Reality

Simultaneously, the popularity and accessibility of virtual reality has been on the rise. Virtual reality generates "interactive simulations… with computer hardware and software to present users with opportunities to engage in environments that appear and feel similar to real-world objects and events" (Weiss, Kizony, Feintuch, & Katz, 2006, p. 183). Modern-day virtual reality technologies typically consist of virtual reality goggles and earphones, which monitor the users' physical motions and adapts the program accordingly (Diemer, Mühlberger, Pauli, & Zwanzger, 2014). Virtual reality is presently used for everyday entertainment, but also has a growing number of applications in more formal domains, such as present-day medical care (Jeffs et al., 2014), education (Merchant, Goetz, Cifuentes, Keeney-Kennicutt, & Davis, 2014), therapy (Krijn, Emmelkamp, Olafsson, & Biemond, 2004), and the workplace (Pierce & Aguinis, 1997; Riva, Baños, Botella, Mantovani, & Gaggioli, 2016).

The growing adoption of virtual reality technologies is likely related to virtual reality's ability to generate unique and innovative user experiences. Accordingly, virtual reality may enhance employee experiences in the workplace by providing engaging, entertaining, and novel user experiences during training sessions (Johnson et al., 2016; Wrzesien & Alcañiz Raya, 2010). Specifically, these positive employee experiences may

be facilitated by virtual reality technologies, through elements of gamification and by facilitating "presence" in the virtual, simulated world (Johnson et al., 2016).

Game elements have been incorporated into education and interventions in numerous ways over the years, and is referred to as *gamification* (Deterding, Dixon, Khaled, & Nacke, 2011; Johnson et al., 2016). Serious games are gamified technologies that are created with the purpose of educating individuals or facilitating the development of new skillsets (Yee, 2006). Gamification is said to be beneficial for increased intervention appeal and improving learning outcomes (Johnson et al., 2016; Wrzesien & Alcañiz Raya, 2010). An intervention's appeal and effectiveness may improve when well-designed, gamified learning programs increase the learner's intrinsic motivation to repeatedly engage in the intervention program, through increased experiences of enjoyment and satisfaction during the learning process (Johnson et al., 2016; Yee, 2006). Additionally, gamified technologies have been demonstrated to have broad appeal across demographics (Fox, Arena, & Bailenson, 2009; Johnson et al., 2016).

Further, according to a recent systematic review, serious games have established success in teaching and developing skillsets in relation to individual health outcomes. When intervention developers efficaciously integrate intervention content with advanced tool or technologies (i.e., database tools, game engines, 3D design applications, augmented reality, or virtual reality), these integrations allow the user to learn interactively via games and simulations (Wattanasoontorn, Boada, García, & Sbert, 2013). As mentioned in the previously, meta-analytic evidence suggests that gamification can provide enhanced *mental* health and wellbeing outcomes as well

(Johnson et al., 2016). Further, gamification for health and wellbeing trainings or interventions have also been demonstrated to be effective for various audiences, including learners from a wide range of gaming skill levels (categorized as: newbie, casual and hardcore), ages (from children to the elderly), occupations, and disability statuses (Johnson et al., 2016; Wattanasoontorn et al., 2013).

Beyond the traditional gaming elements included in serious games, virtual reality also benefits from *presence* (Fox et al., 2009). Presence in virtual reality simulations refers to "the user's feelings that the mediated environment is real and that the user's sensations and actions are responsive to the mediated world as opposed to the real, physical one" (Fox et al., 2009, p. 98). Presence is the mechanism that allows users to feel as though they are being transported into another world and experiencing events and situations that they could not experience in day-to-day life (Riva et al., 2016). Thus, virtual reality simulations heighten emotional responses, self-reflection, and body and mind absorption during intervention content delivery (Riva, 2005; Riva et al., 2016).

Therefore, the combination of gamification and presence enables virtual reality simulations to deliver high-quality interventions (Riva et al., 2016), which will likely appeal to employees (of all demographics) and enable improved learning and transfer of training. For instance, virtual reality integrations with existing workplace mindfulness interventions may boost the training intervention's attractiveness and effectiveness. Additionally, virtual reality intervention programs often employ spaced learning, completed over a span of weeks or months through brief, recurring training sessions (typically ranging from four to 50 session in total; Riva et al., 2016; Valmaggia, Latif,

Kempton, & Rus-Calafell, 2016). Although research on organizational preferences is limited (Baldwin & Ford, 1988), interventions short in duration may be received more positively by management, and, in the case of mindfulness, lead to more effective intervention outcomes (Good et al., 2016). Given these points, the integration of virtual reality and workplace interventions (especially mental health interventions) should be critically examined in relation to organizational outcomes and employee functioning.

Purpose of Collected Papers

The purpose of the collected papers is to advance the field of Industrial/ Organizational Psychology by examining the impact of a workplace virtual reality mindfulness intervention on holistic employee functioning. The workplace virtual reality mindfulness intervention conducted in this study integrates the components of: a.) being attractive to employees, b.) short in duration, and c.) likely to effectively improve all three dimensions of holistic employee functioning (employee wellbeing, employee performance, and employee attitudes). Thus, the current collection of papers aims to shed light on how whole-employee functioning may be effectively improved through mindfulness, virtual reality intervention.

Description of Collected Papers

The fulfillment of the collected papers dissertation will take place across one study, yielding two collected papers, related to the topics of virtual reality mindfulness practice and holistic employee functioning. The collected papers dissertation takes a holistic approach in investigating employee functioning by examining the three subdimensions of employee wellbeing, employee performance, and employee attitudes.

The purpose, research questions, and methodology of the two collected papers will be detailed in the subsequent section.

The collected papers dissertation involves a research collaboration between Florida International University, the National Mental Health Innovation Center (NMHIC) at the University of Colorado Anschutz Medical Campus, and TRIPP Inc.:

- The NMHIC is a center that seeks to extend and innovate on current mental health research and practices, by researching new efficient and scalable mental health solutions. The University of Colorado Anschutz President, Bruce Benson, describes the importance of this program: "Finding innovative approaches to prevention, identification and treatment through intensive collaboration with partners all across our state, The Anschutz Foundation is investing in a brighter future for all people" (CU Medicine Today, 2018).
- TRIPP Inc. is a virtual reality technology company that develops mindfulness-based, virtual reality simulations, designed and targeted towards corporate employee populations. These virtual reality simulations developed by TRIPP Inc. leverage auditory and visual elements, gameplay mechanics, and meditation.

COLLECTED PAPER 1:

Purpose and Research Questions

The purpose of the first collected paper is to investigate the relationship between virtual reality mindfulness intervention and the first dimension of holistic employee functioning: employee wellbeing. While, the link between mindfulness and wellbeing is

well-established in the occupational health literature, prior studies have not yet examined this association through the medium of virtual reality. Thus, this study will provide further evidence for the heightened benefits of workplace mindfulness interventions, particularly when these interventions are integrated with virtual reality technologies.

Research questions:

What are the perceptions of a virtual reality mindfulness intervention?

a) Is VR perceived as innovative and attractive to employees?
b) Will a VR mindfulness intervention generate positive user experiences and post-program employee reactions?

What are the impacts of a virtual reality mindfulness intervention on employee wellbeing?

a) Will participation in a VR mindfulness intervention increase employee happiness?
b) Will participation in a VR mindfulness intervention decrease generalized work stress?
c) Will participation in a VR mindfulness intervention decrease employee burnout?
d) Will participation in a VR mindfulness intervention decrease employee depressive symptoms?

Method

Sample.

This study tested the aforementioned research questions through the implementation of a VR mindfulness intervention. This intervention was delivered to approximately 30 employees working in a corporate office setting. Additionally, all employees were sampled from the same branch, based out of the Rocky Mountain region. The organization from which participants were sampled can be described as a professional services firm in the United States.

Procedure.

The virtual reality mindfukness intervention utilized a quasi-experimental design to evaluate whether there were significant changes in holistic employee functioning before and after virtual reality mindfulness. Prior to engaging in virtual reality mindfulness simulations, employees received a link to an online Qualtrics questionnaire. This pre-intervention survey required approximately 15 minutes to complete. This questionnaire was be the first of two total employee surveys.

Next, TRIPP Inc. supplied the mindfulness-based virtual reality technologies to the organization. The virtual reality goggles were held at a docking station, which charged the virtual reality equipment when not in use. Employees received a memo notifying them of the virtual reality equipment location. This communication also informed employees that they may use the virtual reality goggles voluntarily at any time during their workday and encouraged employees to use the virtual reality at least five

times per week. After clear communication and virtual reality stations had been set-up, employees commenced their virtual reality mindfulness practice.

During the intervention period, an employee could go to the docking station, pick up the virtual reality goggles and headphones, and use the equipment in a private room. The employee would then place the goggles over their head and eyes, tighten the attached band to fit comfortably around their head, and place headphones in their ears. From here, the virtual reality, mindfulness simulation will begin. The participant would physically move their head to trigger the start of their virtual reality, mindfulness program, controlled by motion sensors in the virtual reality apparatus. An eight-minute virtual reality simulation will then commence. The simulation provides the user will an immersive, mindfulness experience, in which employees would practice mindfulness exercises. The exercises include bringing attention to the present moment, nonjudgmental awareness of physical sensations, deep-breathing, and focusing on different program elements (including trees, dimension portals, clouds and birds, and geometric shapes). The objectives of the virtual reality mindfulness experience are to calm the participant, increase his or her mindfulness, and improve mental/emotional functioning. Once the eight-minute simulation concludes, the participant would return the virtual reality equipment to the docking station and sanitize the equipment with a disinfectant wipe. Participants were asked to engage in this workplace mindfulness-based, virtual reality simulation three to five times a week. Upon program close, participants were sent another online, Qualtrics survey. The second, post-intervention survey was also estimated to take approximately 15 minutes to complete.

Measures.

General Work Stress will be assessed by a four-item subjective stress scale (Motowidlo, Packard, & Manning, 1986). A sample item is: "My job is extremely stressful" and participants' responses are measured on a five-point scale from 1= strongly disagree to 5= strongly agree.

Burnout will be measured through the Maslach burnout scale (Maslach & Jackson, 1981; Maslach, Jackson, Leiter, Schaufeli, & Schwab, 1986). Participants were prompted with "When you think about your work overall, how often do you feel the following?" and a sample item is: ""I've had it". Responses are measured on a five-point scale from rarely to almost always (1= Never, 2= Rarely, 3= Sometimes, 4= Often, 5= Almost Always).

Depressive Symptoms were measured with Dormann and Zapf's (2002) shortened version of Mohr's (1986) depressive symptoms scale (three items, Time 2 $\alpha = .80$). Participants were asked to indicate how often they experienced a variety of depressive symptom indicators, such as: "I feel alone even when I am with others." Individuals' responses were rated on a five-point scale from 1= seldom to 5= always.

Demographic Variables captured participants' gender, age, ethnicity, education level, employment contract, occupational tenure, and number of hours worked per week. Additionally, several items were also included to assess the extent to which virtual reality technologies were attractive and familiar to participants and to assess whether participants had previous experience with virtual reality technologies or mindfulness practice.

Data Analyses.

Once all surveys had been completed, pre and posttest data were downloaded from Qualtrics via an SPSS file. The two data files were then be merged by matching cases based on the unique participant identifier variable. Next, several analyses were conducted, including descriptive statistics, scale reliabilities, and t-tests. Descriptive statistics were run to observe the characteristics of the sample. Scale reliabilities were run on all measures (with the exception of demographic variables), as indexed by Cronbach's alpha (Cronbach, 1951). Scales were considered reliable if the alpha coefficient meets or exceeds a 0.70 level, as this is considered to be an acceptable reliability coefficient threshold (Nunnally, 1978). Lastly, to determine if significant differences existed between participants' scores from before and after the virtual reality, mindfulness intervention, paired t-tests were conducted. If the SPSS output indicated a statistical significance at an $\alpha = .05$ level, then measures at Time 1 were considered significantly different from Time 2.

Publication submission and formatting. The journal outlet for future manuscript submission is *Applied Research in Quality of Life*; all sections will be written in accordance with the APA Publication Manual (6th ed.).

COLLECTED PAPER 2:

Purpose and research questions. The purpose of the second collected paper was to explore the relationships between virtual reality mindfulness and the second and third dimensions of holistic employee functioning: employee performance and employee attitudes. While there is a vast amount of research examining mindfulness in relation to

employee wellbeing outcomes, there is significantly less research linking mindfulness practice to increased employee performance and attitudes that impact organizations' bottom-line. The second study diverges from the first by emphasizing the impact that mindfulness-based, virtual reality can have in sustaining and retaining high-performing employees, as well as maintaining and facilitating positive employee attitudes.

Research questions:

What is the impact of a virtual reality mindfulness intervention on employee performance outcomes?

a) Will the implementation of a virtual reality mindfulness intervention be related to employees' level of attention?
b) Will the implementation of a virtual reality mindfulness intervention be related to levels of task performance?
c) Will the implementation of a virtual reality mindfulness intervention be related to levels of contextual performance?
d) Will the implementation of a virtual reality mindfulness intervention be related to levels of counterproductive work behaviors?

What is the impact of a virtual reality mindfulness intervention on employee attitudes?

a) Will the implementation of a virtual reality mindfulness intervention be related to levels of job satisfaction?

b) Will the implementation of a virtual reality mindfulness intervention be related to levels of work engagement?
c) Will the implementation of a virtual reality mindfulness intervention be related to levels of turnover intentions?

Method.

Sample, Procedure, and Data Analyses.

The sample, procedure, and data analyses of the second collected paper mirrored those of the first collected paper exactly.

Measures.

Attention was measured with a three-item attentional focusing measure that assessed participants to rate their ability to intentionally hold focus on work activities and avoid distraction (Derryberry & Rothbart, 1988). A sample item is: "when I needed to concentrate and solve a problem, I had trouble focusing my attention". Participants were instructed to respond with a five-point scale ranging from strongly disagree to strongly agree. All items are reverse-coded and high scores reflect high levels of attentional ability.

Job Performance was captured through Koopmans and colleagues' (2012) Individual Work Performance Questionnaire (IWPQ). This questionnaire consisted of three subscales measuring task performance (six items) contextual performance (eight items), and CWBs (five items). Sample items are as follows, task performance: "I managed to plan my work so that it was done on time", contextual performance: "I took

on extra responsibilities", and CWBs: "I complained about unimportant matters at work". Individuals' responses were rated on a five-point scale from seldom to always for task and contextual performance, and from seldom to often for CWBs.

Job Satisfaction and *Turnover Intentions* were measured through two subscales (3-items each) of the Michigan Organizational Assessment Questionnaire (Cammann, Fichman, Jenkins, & Klesh, 1979). Sample items included "all in all, I am satisfied with my job" for job satisfaction and "I often think of leaving this organization or job" for turnover intentions. Responses were measured on a five-point scale from Strongly Disagree to Strongly Agree.

Work Engagement measures (9 items) were drawn from the Job Demands-Resources Questionnaire (Bakker & Demerouti, 2016). A sample item was: "I am immersed in my work." Responses were measured on a seven-point scale from 0= never to 6= always.

Demographic Variables captured participants' gender, age, ethnicity, education level, employment contract, occupational tenure, and number of hours worked per week. Additionally, several items were also included to assess the extent to which virtual reality technologies were attractive and familiar to participants and to assess whether participants had previous experience with virtual reality technologies or mindfulness practice.

Publication submission and formatting. This second collected paper will not be submitted for publication; all sections will be written in accordance with the APA Publication Manual (6th ed.).

COLLECTED PAPER 3:

Purpose and research questions. The purpose of the third collected paper is to examine the role of organizational context in implementing effective stress management interventions. Occupational health practitioners often face in high levels of attrition in workplace stress management programs, which poses a significant challenge to addressing elevated levels of employee stress. As a Practitioner Report, this third and final collected paper explored the barriers faced in implementing stress management interventions in an organizational context and provided recommendations on how these obstacles may be addressed or mitigated to achieve success in retaining employees in workplace stress management programs.

Research questions:

What are the barriers faced when implementing a stress management program in an organizational context?

How can occupational health practitioners overcome organizational barriers and reduce stress management program attrition?

Method.

Sample.

The Practitioners Report examined organizational barriers to effective, organizational stress management through the implementation of a virtual reality mindfulness program in two different organizations. In the first company, a West-coast law firm, the virtual reality mindfulness program was delivered to approximately 25 employees in one branch and placed another 25 employees (from a second branch) in a control group. The second company, a financial publishing firm loacted in the Mid-Atlantic region of the Southeastern United States, delivered the virtual reality mindfulness program to approximately 50 employees (with no control group).

Procedure.

The procedure of the third collected paper mirrored those of the first collected paper exactly.

Measures.

Pre-Program Perceptions examined participants' perceptions of VR, specifically the extent to which the VR technology was viewed as innovative, exciting, and familiar. For example, employees rated the extent to which they agreed with the following sample statement: "I am excited to use VR". Pre-program perception items were rated on a five-point scale (1=strongly disagree to 5=strongly agree).

Post-Program Measures assessed participants' reactions to the VR mindfulness program. *Time 2* survey participants rated their satisfaction with the mindfulness VR exercises, length of time, technological components, and overall delivery on a five-point scale (1 = extremely dissatisfied, 5 = extremely satisfied). Participants also rated the

following statements: “I enjoyed the VR intervention” and “I felt more mindful after completing the VR simulation” on a five-point scale (1 = strongly disagree, 5 = strongly agree).

Demographics captured employee age, gender, company tenure, and number of hours worked a week.

Data Analyses.

Once all surveys had been completed, pre and posttest data were downloaded from Qualtrics via an SPSS file. The two data files were then be merged by matching cases using the unique participant identifier variable. Next, several analyses were conducted, including descriptive statistics and rates of attrition. Descriptive statistics were run to describe the characteristics of the sample, pre-program perceptions, and post-program reaction. Further, the rate of attrition for each virtual reality mindfulness program were calculated through the following formula: Attrition Rate (%) = (Number of Final Employees / Number of Original Employees) X 100.

Publication submission and formatting. The third collected paper will be submitted for publication in the *Occupational Health Science*; all sections will be written in accordance with the APA Publication Manual (6th ed.).

Implications of Collected Papers Research

Virtual reality technologies allowed the mindfulness intervention to be delivered in a method that was attractive and engaging to employees, while remaining brief in duration (to address organizational time expenditure concerns). By taking a holistic

approach, the collected papers dissertation aimed to provide scientists and practitioners with an effective method of improving three aspects of employee functioning: employee wellbeing, employee performance, and employee attitudes. Nevertheless, the virtual reality mindfulness program was only partially successful in meeting these objectives. Manuscript 1 provided data to suggest that VR mindfulness at work is significantly related to decreased employee stress. Manuscript 2 failed to detect significant relationships between VR mindfulness and employee performance and attitudes. Manuscript 3 examined the barriers to stress management in an organizational setting and provided recommendations for overcoming these obstacles. In summary, this collected papers dissertation comprehensively examines holistic employee functioning and contributes to the literature by examining a novel, under-researched method of intervention delivery.

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II. MANUSCRIPT #1: VIRTUAL REALITY AND STRESS

Making Mindfulness a Reality: A VR Mindfulness Intervention for the Workplace

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Abstract

Amidst increasing complexity, volatility, ambiguity, and global disruptors, the present-day workplace is fraught with considerable stressors and challenges. Over time, constant exposure to stressors often causes employees to experience chronic strain and decreased happiness. More than ever, organizations are beginning to recognize the toll that chronic strain can have on critical outcomes (i.e., productivity and turnover) and are seeking new tools for increasing employee wellness. Virtual reality (VR) technologies may be the answer. The introduction of VR technologies in the workplace is a popular and noteworthy workplace trend. Specifically, VR technologies may provide a novel platform for delivering traditional workplace training content and exercises. The present study examined the relationship between VR mindfulness simulations and employee happiness and strain outcomes. Explicitly, through a quasi-experimental design, employees from a single organization were recruited to participate in a VR stress management intervention. Paired t-test analyses compared employees' reported levels of happiness and strain before and after the program. Results demonstrate that the VR mindfulness program generated high levels of participant enjoyment and satisfaction, while also significantly increasing employee happiness and reducing strain outcomes (as measured as through the variables of happiness, generalized work stress, burnout, and depressive symptoms). Through integrations of modern technology and employee stress management, the present study indicates that VR platforms may offer a fast and effective way to deliver stress management interventions.

Introduction: Making Mindfulness a Reality: A VR Mindfulness Intervention for the Workplace

The area of employee wellness has become increasingly relevant in the present-day workplace as organizations continue to recognize the critical role that employee wellbeing plays in achieving bottom-line outcomes (i.e., productivity and retention; Hubbard, 2009; Limm et al., 2011; Michie & Williams, 2003; Quick, Wright, Adkins, Nelson, & Quick, 2013). While there is abundant research validating that workplace stress management interventions improve employees' mental wellbeing (Grawitch et al., 2006; Meyer & Maltin, 2010; Skakon et al., 2010), there is continued demand for optimizing delivery methods to successfully incorporate these interventions into organizational practices.

When considering the successful adoption of employee wellness practices, the need is two-fold. First, there is a need to examine the practicality of providing employee wellbeing interventions, such that employees can easily and feasibly access these interventions during their standard workday or workweek. If interventions require excessive time, energy, or resources from the individual, it is unlikely that an employee will utilize the stress management intervention (Klatt et al., 2009; Nytrø et al., 2000). Additionally, if stress management programs are incongruent with employees' schedules, employees may incur more stress as a result of participating (rather than less). Similarly, a stress management intervention that requires substantial time or energy from the employee may even reduce organizations' willingness to offer such interventions.

Secondly, there is a need to provide stress management interventions that will be perceived favorably by the majority of individuals in the workforce. While the efficacy of wellbeing interventions may be established in the literature (Grossman et al., 2004; Hurrell & Murphy, 1996; Limm et al., 2011; van Berkel et al., 2013), it can often be difficult to garner "buy-in" from individuals, thus reducing the real-world effectiveness (Dariotis et al., 2017). Many effective stress management techniques are viewed as unnecessary or uncomfortable by participants (Gallagher et al., 2015; Giovannoni et al., 2015; Laurie & Blandford, 2016; Wilde et al., 2018). Therefore, employees may decline to participate in stress management interventions over the concern that peers may view them as wasting time (van Berkel et al., 2013). Moreover, without employee motivation, stress management interventions are likely to be less effective (Colquitt et al., 2000). One potential method of overcoming motivational barriers is by reframing stress-management practices to be perceived as more engaging to employees, such as leveraging the appeal of technological integration (Kleders et al., 2012).

When individuals have the ability to reframe or engage in these exercises in a manner that reduces negative perceptions of such activities, they may be more likely to initiate use of the stress management techniques and to continue to do so over time. For instance, engaging in mindfulness is one stress management technique that has been demonstrated to be extremely effective. However, workplace mindfulness interventions also have the potential to induce feelings of ridiculousness or awkwardness in individuals (Eckhardt & Dinsmore, 2012). Nonetheless, if mindfulness practices can be reframed to be perceived as more attractive, they may be positively received by employees, thus, allowing these stress management interventions to be more effective. For example, a

stress management program at Google invited participants to engage in meditative or contemplative techniques, and the organization promoted the program strategically by naming this program "Search Inside Yourself" to garner more employee buy-in (Glomb et al., 2011). Similarly, the use of technology may aid organizations in successfully reframing mindfulness practices. The increasing popularity of commercial technology-based mindfulness interventions indicates that innovative delivery methods tend to be viewed as more attractive to individuals (Fish et al., 2016; Kleders et al., 2012; Martín-Gutiérrez et al., 2015).

The present study employs a stress management intervention focused on mindfulness practices that are delivered via a virtual reality (VR) platform. The VR mindfulness intervention may be perceived as offering increased practical convenience (as VR mindfulness practice can be brief and immediately accessible to employees), while also positively "reframing" mindfulness practices through an interactive, technological platform. Thus, the current stress management intervention will observe employee perceptions of workplace VR mindfulness by assessing pre-program attitudes and post-program reactions. Further, the present study will examine the efficacy of the VR mindfulness intervention in increasing employee happiness and decreasing the employee strain outcomes of generalized employee stress, burnout, and depressive symptoms.

Mindfulness: Definition, Components, and Practices

Mindfulness is the act of "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994, p. 4, 2003). While contemplative practices are found in traditions around the world, mindfulness practice has been a central teaching within many Eastern cultural practices, particularly Buddhist meditation (Brown et al., 2007). Mindfulness interventions have been popularized in modern Western society through their disentanglement from any particular religious practice, endorsed instead as a science-informed, health-promoting exercise.

Prior literature has operationalized mindfulness as having two core components: self-regulation of attention and orientation to the present experience (Bishop et al., 2004). The first component, *self-regulation of attention*, addresses the actions that individuals' take to mentally tune in to the present moment and draw awareness to their mental cognitions. The second component, *orientation to experience*, addresses the perspective that the individual must seek to adopt. Specifically, this component involves an individual's willingness and ability to view their experiences with openness, curiosity, and acceptance (Bishop et al., 2004).

Mindfulness Practices

A wide number of practices have been utilized to aid individuals in cultivating mindfulness (Baer, 2003). A meta-analytic review on mindfulness methodologies discussed the therapeutic approaches of mindfulness-based stress reduction (MBSR), Mindfulness-Based Cognitive Therapy, Acceptance and Commitment Therapy, and multimethod therapies that utilized mindfulness exercises (Baer, 2003). In each of these therapeutic approaches, the mindfulness exercises employed required participants to

practice improving their self-regulation of attention and orientation to experience (Baer, 2003; Bishop et al., 2004). For instance, participants were asked to do any combination of the following activities: notice their thinking and opinions without judgment, focus on physical sensations, count their breath, practice self-acceptance mantras, or visualize thoughts as floating by (Baer, 2003). Further, Baer's (2003) meta-analytic review found that mindfulness practice significantly reduced participants' levels of stress, anxiety, and depressive symptoms (Baer, 2003). The Baer (2003) review, and others (Carlson & Garland, 2005; Chiesa & Serretti, 2009b; Grossman et al., 2004), document a wide variety of methodologies that can be employed to increase participation in mindfulness practice, while demonstrating that engaging in such practices is an effective method of improving mental health. Also of note, the mindfulness interventions which have demonstrated effectiveness range in time duration from 33 hours of classroom-based instruction to 15-minute single session activities (Fortney et al., 2013; Melville et al., 2012). Furthermore, mindfulness practice has been shown to effectively improve employee wellbeing outcomes in a range of formats, including delivery methods of classroom lectures, written assignments, audio recordings, video recordings, or online modules (Eby et al., 2017; Melville et al., 2012; Pflugeisen et al., 2016).

The Relationship Between Mindfulness and Employee Stress

Mindfulness practice has also been applied to the workplace to address employee stress. Employee strain is experienced in reaction to a high level of chronic workplace stressors (Bakker & Demerouti, 2017). High levels of occupational strain often lead to adverse organizational outcomes, including decreased productivity and increased

absenteeism, presenteeism, and turnover (Imtiaz & Ahmad, 2009). Unfortunately, as a result of globalization, new communication technologies, and the evolving nature of service work, modern-day work conditions have become increasingly challenging, and the number of modern workplace stressors is on the rise (Glaser et al., 2015). Contemporary workplace stressors include work overload, job insecurity, regulation demands, low social support, low autonomy, cognitive demands, work interferences, organizational constraints, emotional demands, and high work pressure, to name a few (Bakker & Demerouti, 2017; Glaser et al., 2015). As employees' exposure to and intensity of workplace stressors increases, so do their strain outcomes (Bakker & Demerouti, 2017).

Mindfulness practices are frequently employed as an employee stress management technique during stress management interventions (Good et al., 2016). Stress management interventions focus on the individual and seek to equip them with the tools to decrease their own elevated levels of strain. According to meta-analytic evidence, stress management interventions have demonstrated efficacy in alleviating employee strain, even when employees face a large number of workplace stressors (Neves de Jesus et al., 2014; Richardson & Rothstein, 2008; Van der Klink et al., 2001). Additionally, the effectiveness of stress management interventions has been demonstrated to generalize across employee populations (Neves de Jesus et al., 2014; Sailaxmi & Lalitha, 2015; Tsang et al., 2015).

Mindfulness is often utilized in stress management interventions as robust evidence indicates that mindfulness practice is a powerful tool in reducing high levels of

workplace strain (V. L. Anderson et al., 1999; Glomb et al., 2011; Good et al., 2016; Manocha et al., 2011). Broadly speaking, individuals skilled in mindfulness are able to engage with present tasks more fully, while also knowing when to take personal care to relax and be rejuvenated (Shapiro et al., 2005). Good et al. (2016) provided a comprehensive theoretical framework for conceptualizing the role of mindfulness at work. Explicitly, individuals who practice mindfulness first increase the attention to and awareness of the present moment (Glomb et al., 2011; Good et al., 2016). Increased attention to and awareness of one's present-moment physiology, cognitive and emotional states, and behavioral reactivity allows for increased self-regulation (Glomb et al., 2011; Good et al., 2016). Lastly, increased self-regulation allows for situations to be viewed less negatively and reduces the frequency and severity of physiological, cognitive, emotional, and behavioral reactions (Glomb et al., 2011; Good et al., 2016). Taken together, these mechanisms (attention, awareness, and self-regulation) are theorized to explain the improved employee wellbeing outcomes that occur when mindfulness practices are employed in stress management interventions (Good et al., 2016).

Mindfulness and Generalized Stress

Unsurprisingly, mindfulness stress management interventions have demonstrated effectiveness in reducing *generalized* occupational stress outcomes in a number of previous studies (Elder et al., 2014; Mackenzie et al., 2006; Munoz et al., 2018; Roeser et al., 2013; Shapiro et al., 2005; Weinstein et al., 2009). For instance, a recent study experimented with four randomized, controlled trials of mindfulness practices, which were provided to employees in the workplace. The researchers found that all mindfulness

practices effectively reduced key markers of employee stress (Wolever et al., 2012). As previously mentioned, recent theorizations on mindfulness in the workplace posit that the mechanisms that drive mindfulness's ability to reduce holistic ratings of employee stress (also referred to as generalized stress) are increased attention, awareness, and self-regulation (Glomb et al., 2011; Good et al., 2016). Thus, employees who engage in mindfulness practice will likely have an increased ability to tune into the present moment and focus their attention and awareness, reducing their levels of generalized stress through a heightened ability to regulate emotions, employ adaptive coping, and display resiliency (Good et al., 2016).

Mindfulness stress management inventions will likely benefit *all* employees. For instance, mindfulness stress management interventions have demonstrated efficacy in reducing stress levels for individuals with mental and physical disorders, as well as for individuals who researchers categorized as "healthy people" (Chiesa & Serretti, 2009a, p. 593). Thus, the employment of a mindfulness-based stress intervention would be advantageous for reducing generalized stress for a wide range of employee audiences and strain levels (even for those only experiencing mild strain levels).

Mindfulness and Burnout

Burnout is a workplace strain outcome, which occurs when employees face persistent stressors, causing an individual to experience emotional, physical, and mental exhaustion (Malach-Pines, 2005). Although it is important to note that emotional exhaustion is conceptualized as the core, intrinsic component of employee burnout experiences (Malach-Pines, 2005). The benefits of mindfulness stress management

interventions are also well-established in relation to employee burnout. Explicitly, a multitude of studies consistently demonstrate that as mindfulness increases, levels of burnout decrease (Elder et al., 2014; Flook et al., 2013; Luken & Sammons, 2016; Roeser et al., 2013; Taylor & Millear, 2016).

The mechanisms for reduced burnout, when mindfulness exercises are employed, are thought to be the same as those of generalized stress reduction. Specifically, mindfulness reduces burnout by bringing attention and awareness to the employee's physiological, emotional, cognitive, and physical reactions during stress-inducing situations (Good et al., 2016). Increased awareness allows the employee to pause and assess the stress reaction and to increase levels of self-regulation. Consequently, mindful employees are able to experiences stressors as neutral or positive more frequently, calm from stressful events more quickly, and employ better coping skills to address experienced strain (Glomb et al., 2011; Good et al., 2016; Roeser et al., 2013). As emotional exhaustion is a key component of burnout, if mindful employees experience less frequent and severe emotional reactions in the face of workplace stressors (Good et al., 2016), it follows that burnout will be reduced.

Mindfulness and Depressive Symptoms

Lastly, mindfulness stress management interventions may alleviate employee depressive symptoms. Employees' depressive symptoms are operationalized as

experiences “of reduced mood and interest that persist for at least 14 days” (Bonde, 2008, p. 439). Depressive symptoms are extremely pervasive, with nearly one-fourth of employees reporting depressive symptoms during a twelve-month period (Hakanen & Schaufeli, 2012). Furthermore, a high prevalence of depressive symptoms among workers is a concern for organizations, as employee depressive symptoms are positively related to self-reported conflict and job insecurity, and inversely related to employee motivation and perceived organizational support and organizational justice (Theorell et al., 2015).

Mindfulness stress management interventions can be utilized to effectively reduce employee depressive symptoms (Elder et al., 2014; Roche et al., 2014). When practicing habitual mindfulness, reductions in depressive symptoms are said to occur through reduced experiences of pain and distress, coupled with increased self-confidence and hope

(Manocha et al., 2011; Toneatto & Nguyen, 2007). Theoretically speaking, when the core mindfulness components, *attention, awareness,* and *self-regulation*, allow employees' to experience reductions in cognitive ruminations, negative storylines, and severity of emotional experiences (Glomb et al., 2011; Good et al., 2016), depressive symptoms will likely be reduced as well.

Exploring New Frontiers: Mindfulness VR

While VR technology has been around for quite some time (Pierce & Aguinis, 1997), the integration of VR within the workplace has never been so popular or pervasive as it is now (Gartner, 2018). Virtual reality has been named time and time again to be a

top technological and workplace trend for 2019 and beyond by key industry societies (i.e., SHRM and SIOP) and popular press outlets alike (Deloitte, 2019; Gartner, 2018; Marr, 2019; SAP, 2018; SHRM, 2018; SIOP, 2018). Authors refer to the place of VR in the workplace as a "megatrend" and extol VR as having a "profoundly transformative effect on the way we live and work" (Marr, 2019; SIOP, 2018). Thus, as the workplace continues to proceed with a "full speed ahead" mentality towards VR, there is a need for academia to keep pace. Explicitly, there is a demand for increased literature that seeks to assess and evaluate the impact that the use of VR is having on organizational outcomes, such as an examination of the effect that VR interventions have on employee happiness and stress outcomes.

Virtual reality can be defined as the "use of interactive simulations created with computer hardware and software to present users with opportunities to engage in environments that appear and feel similar to real-world objects and events" (Weiss et al., 2006, p. 183). While VR has not been examined in relation to *employee* stress management, VR has been extensively examined in relation to its ability to deliver interventions that improve physical and mental health conditions. When investigating physical health outcomes, VR-delivered interventions have been demonstrated to reduce levels of patient pain during burn wound care (Hoffman et al., 2011; Jeffs et al., 2014) and to enhance general psychomotor functioning and physical rehabilitation for patients post-stroke (Kaber et al., 2014; Trojan et al., 2014). Moreover, mindfulness is related to mental health improvements, including reductions in generalized anxiety and anxiety disorders, post-traumatic stress disorders (PTSD), disordered eating, and the severity of

phobias (Krijn et al., 2004; Opriş et al., 2012; Parsons & Rizzo, 2008; Powers & Emmelkamp, 2008; Riva, 2005; Riva et al., 2003).

In relation to mindfulness practice and VR integrations, a recent stream of literature has begun to investigate the relationship between VR-based mindfulness practice and physical and mental health. Several VR mindfulness interventions have been effective in reducing chronic pain (Botella et al., 2013; Gromala et al., 2015), suicidal urges, substance abuse impulses, negative emotions (Nararro-Haro et al., 2016), and self-criticizing behaviors (Falconer et al., 2016). Further, two recent studies have demonstrated VR-based mindfulness interventions' ability to reduce levels of depression (Botella et al., 2013; Falconer et al., 2016). Additionally, VR, mindfulness experiences have been found to be *more* effective than traditional therapeutic media methods (i.e., video and audio recordings), as VR engages the individual with gamified learning and a sense of presence in the simulated environment (Riva et al., 2016; Villani et al., 2007).

Thus, research suggests that mindfulness practices and VR may be successfully integrated to engage individuals in an immersive sensory experience and employed to reduce individuals' stress-related outcomes in the workplace as well. The relative ease of the VR mindfulness program's use during an employee's workday may increase the likelihood that employees will be excited and motivated to engage in stress management practices. The brevity of the simulation length minimizes the risk of employees' experiencing additional stress off-the-floor, when engaging in stress management sessions. Furthermore, there is reason to believe that utilizing VR technology to engage in mindfulness may be viewed as interesting and exciting by modern-day employees. As

such, the present study will explore whether the use of an innovative VR platform can foster positive employee perceptions and buy-in for mindfulness practice.

Research Question 1: *Is VR perceived as innovative and attractive to employees?*

Research Question 2: *Will a VR mindfulness program generate positive user experiences and post-program employee reactions?*

Further, the present study aims to contribute to the occupational health literature by delivering mindfulness techniques via VR to address workplace strain. Although there is a paucity of literature on the topic, VR methodologies may be applied to mindfulness-based stress management interventions to enhance employee wellbeing outcomes (Good et al., 2016). The present study hypothesizes that there will be significant within-subject, mean differences in employee happiness and strain (as measured through the outcomes of generalized stress, burnout, and depressive symptoms) before and after the implementation of a reality mindfulness stress management intervention.

Hypothesis 1: *Participation in VR mindfulness intervention will increase employee happiness.*

Hypothesis 2: *Participation in VR mindfulness intervention will decrease generalized work stress.*

Hypothesis 3: *Participation in VR mindfulness intervention will decrease employee burnout.*

Hypothesis 4: *Participation in VR mindfulness intervention will decrease employee depressive symptoms.*

Methods

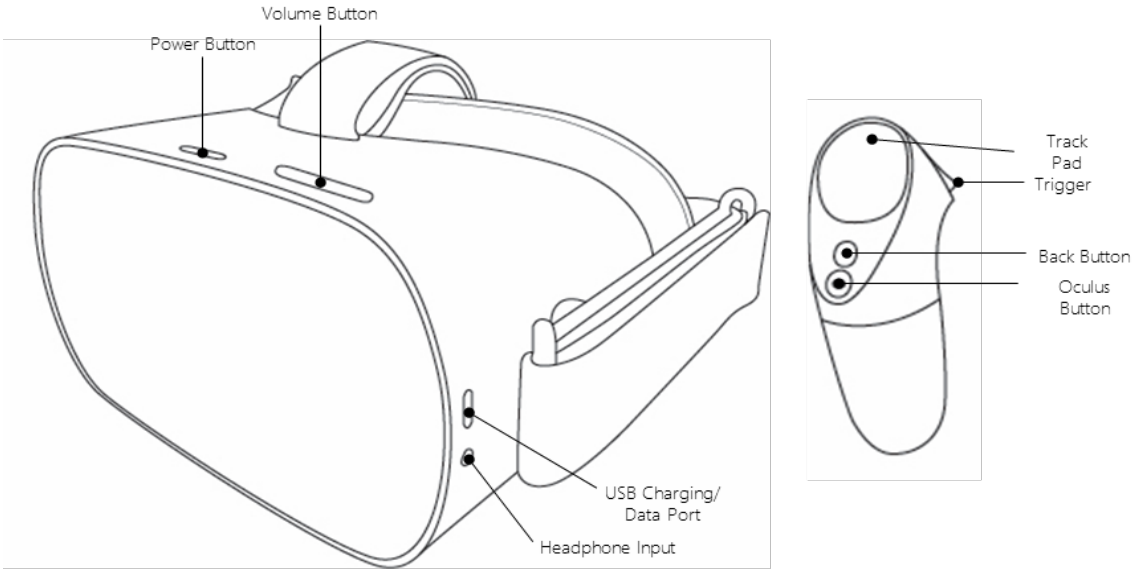
Participants

The present study sampled employees from a professional services firm, located in the Rocky Mountain region of the United States. The organization was invited to participate through an email communication with the branch's office manager. The organization was interested in the prospect of offering mindfulness in the workplace and the opportunity to increase employee wellbeing. After obtaining organizational consent, employees were recruited for the VR mindfulness intervention via an email communication outlining the program details, containing the link to a pre-program questionnaire, and providing additional information on the potential benefits of practicing VR mindfulness during the workday.

At the same time, employees also received a calendar invitation, from the organizational lead, inviting all employees to join the stress management program kick-off session. The branch-wide program kick-off session took place immediately following one of the firm's monthly Friday morning "huddle" meetings, to maximize the number of employees in attendance. During the kick-off session, employees learned about mindfulness and VR, were communicated the expectations of the program, watched a short video clip of a mindfulness simulation, and were shown the VR equipment. Next, a VR and mental health specialist trained employees on the technological controls of the "Oculus Go" VR equipment (please see *Exhibit 1*; Oculus Go, 2020) and provided an in-

person demonstration of how to use the VR technology. The VR demonstration included directions for how to: place the VR goggles on the head, plug in headphones, turn on the device, use the remote control, select the program via a motion-sensor interface, remove and turn off the device, and wipe the goggles down after use for employee health and sanitation reasons. Finally, all employee questions about the VR mindfulness program were addressed. The kick-off session lasted approximately 25-minutes.

Exhibit 1: VR Equipment Training Visual



During the kick-off session, all interested and consenting employees were asked to take the online pre-program survey by the end of the day. Further, all employees received a second follow-up email, including the same survey link. The VR equipment was then placed in two reserved private offices, where it was plugged into a wall outlet and charging when not in use. The VR "station" included the VR googles, remote control, instructions for VR use and mindfulness program selection, and sanitizing wipes. There were two VR stations (private spaces with the VR equipment), in total, and each

with a door sign to indicate when the VR station was in use, to minimize distractions to employees engaging in mindfulness practice. Per kick-off instructions and email communications, once participants completed the anonymous, pre-program survey, employees could begin participation in the VR mindfulness intervention the following Monday morning at work.

As a result of program attrition, demographic data will describe both participants at *Time 1* and the full sample of *Time 1 – Time 2* participants. The *Time 1* sample (n = 27) consisted one-third of males and two-thirds of females. The majority of employees identified as Caucasian (85.2% Caucasian, 3.7% Hispanic/Latino, and 8.3% Asian), with a mean age of 38.4 (SD = 12.5). The majority of *Time 1* employees held at least a bachelor's degree (88.9%) and worked an average of 50.6 hours a week (SD = 11.7), with an average company tenure of 4.7 years (SD = 5.3). The *Time 1 – Time 2* sample (n = 10) was composed of predominately female (91.7%) and Caucasian (91.7% Caucasian and 8.3% Hispanic/Latino) employees, with a mean age of 44.4 (SD = 15.7). The majority of *Time 1 – Time 2* employees held at least a bachelor's degree (75.0%) and worked an average of 46.8 hours a week (SD = 7.3), with an average company tenure of 5.8 years (SD = 5.7).

Using SPSS software, T-test analyses were run on all measures to identify if any significant differences existed between employees who completed the questionnaire at only *Time 1* and employees who completed both surveys (i.e. participated in surveys at Time 1 *and* Time 2). There were no significant differences on any of the study's measures, with the exception of gender and education level. The *Time 1* sample

contained a higher percentage of men and demonstrated higher levels of education, than the individuals that participated in both waves (t (25)= -2.69, $p < .05$ and t (25)= -2.20, $p < .05$, respectively).

Procedure

To test the study's research questions and hypothesized relationships, the workplace VR mindfulness intervention was tested using a quasi-experimental, pretest-posttest research design. For the intervention component, participants were provided access to eight-minute VR mindfulness simulations during all workdays; employees were able to use the VR technology voluntarily, as frequently or infrequently as they desired during work hours. The VR equipment was continuously accessible, via the two VR stations in private workrooms, to all participants for three weeks.

To begin a mindfulness session during the workday, employees would walk to the private room, place the "in-use" sign on the outside of the door, remove the VR headset from the charging station, and follow directions to place the VR goggles over their eyes, put the headphones into their ears, and hold the remote control in their hands (please see *Exhibit 2*). The stress management program utilized a VR software with mindfulness simulations developed by TRIPP Inc. (TRIPP, 2020). The TRIPP Inc. mindfulness program was a pre-installed program on each VR headset. Thus, once participants turned on the VR headset, they would use the remote to select the TRIPP Inc. application and select the mindfulness program entitled "Focus." Once the "Focus" mindfulness simulation was selected, participants would be to put the VR remote down and become

immersed in the mindfulness simulation. From this point onward, the participants would use motion sensors to engage with the program elements.

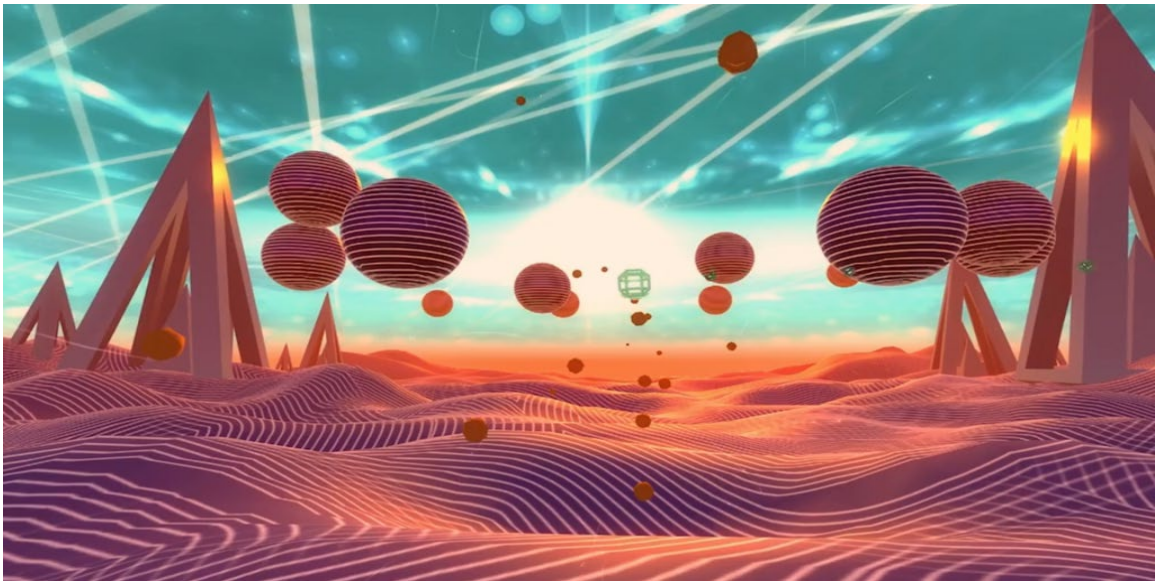
Exhibit 2: VR Set-Up: Sample Illustration

**Note: The individual depicted in this photograph is not a program participant.*

The mindfulness simulation employed in the current study prompted participants to check-in with their current physical and mental state, tune into the present, and practice cultivating a mindset of intentionality and calm through the immersive, VR platform. For instance, the simulation walked the employee through multiple exercises, where he or she practiced deep-breathing, focused on specific visual or auditory elements in the program, and practiced awareness and acceptance exercises. See *Exhibit 3* for a sample illustration of the TRIPP Inc. VR mindfulness simulation. Hence, this VR mindfulness intervention contained the two core, operational components of mindfulness (self-regulation of

attention and orientation to experience; Bishop et al., 2004). As mentioned, the "Focus" mindfulness simulation lasted for eight-minutes. Once complete, participants would remove the VR equipment, turn off the device, wipe down the device with a sanitation wipe, and return it to the charging position.

Exhibit 3: TRIPP Inc. Mindfulness Simulation: Sample Illustration



After the three-week period, the stress management program came to a conclusion. Upon the program close, all employees were emailed a link to the post-program questionnaire, requesting immediate participant completion. The second survey questionnaire assessed employee VR use, post-program reactions, and wellbeing outcomes.

For both the pretest and posttest questionnaire, all participant responses were collected online via Qualtrics. The online surveys required approximately 15-minutes to complete at each time-point. Levels of employee happiness, generalized stress, and

burnout were measured at *Time 1* and *Time* 2. In contrast, pre-program perceptions and demographics were assessed only at *Time 1* and post-program reactions were captured only at *Time 2*. An anonymous participant identifier linked *Time 1* and *Time 2* scores. Participants created their unique identifier by combining the last four digits of a phone number, the last three letters of their street address, and the name of their favorite color, in all caps and with no spaces (i.e., 9876ACKBLUE). Employees were asked to write down this exact identifier code in their records for *Time 1* and *Time 2* use.

Measures

Time 1 Only

Demographics assessed participants' gender, age, race/ethnicity, education level, occupational tenure, and hours worked per week.

Pre-Program Perceptions were included to assess the extent to which VR technologies were perceived as innovative, exciting, and familiar to participants. For instance, employees were asked to rate the extent to which they agreed with the following sample statement: "VR is innovative". Pre-program perception items were rated on a scale from 1 to 5 (strongly disagree to strongly agree).

Time 1 and 2

Happiness was assessed through a single-item happiness scale. Participants were asked to provide an appraisal of their general feelings after considering the following question: "Do you feel happy in general" (Abdel-Khalek, 2006). The rating scale for this measure spans from 1 to 10, with higher scores indicating higher levels of happiness.

General Work Stress was measured by a 4-item subjective stress scale (Time 2 α = .81; Motowidlo, Packard, & Manning, 1986). A sample item is: "My job is extremely stressful," and participants' responses were reported on a 5-point scale from 1= strongly disagree to 5= strongly agree.

Burnout was quantified through the Maslach burnout scale (Time 2 α = .93, Maslach et al., 1986; Maslach & Jackson, 1981). Participants were prompted with "When you think about your work overall, how often do you feel the following?" and a sample item is: "I've had it." Responses are measured on a 5-point scale from 1=never to 5=almost always.

Depressive Symptoms were measured with Dormann and Zapf's (2002) shortened version of Mohr's (1986) depressive symptoms scale (3 items, Time 2 α = .85). Participants were asked to indicate how often they experienced a variety of depressive symptom indicators, such as: "I feel alone even when I am with others." Responders used a 5-point scale from 1= seldom to 5= always.

Time 2 Only

Post-Program Measures comprised of items assessing the frequency of mindfulness practice at work and quantitative and qualitative items to capture participants' reactions to the VR mindfulness program. To measure the frequency of mindfulness practice at work, employees self-reported the average number of times they engaged in the mindfulness simulation (via the VR goggles) each week. To evaluate employees' post-program reactions, employees were asked to rate their satisfaction with the VR exercises, length of time, technological components, and overall delivery. These

reaction-level items were rated on a scale from 1 to 5 (extremely dissatisfied to extremely satisfied). Further, two items measured employees' experiences of the mindfulness simulation. Specifically, employees were asked to indicate the degree to which he or she agreed with each of the following statements: "I enjoyed the VR intervention" and "I felt more mindful after completing the VR simulation" (1 = strongly disagree, 5 = strongly agree). Lastly, two open-ended questions captured qualitative data on employees' likes and dislikes of the stress management program (e.g., "What did you like about this program?").

Results

Exploratory Research Questions: VR Mindfulness Program Perceptions

Table 1 displays descriptive data (item means and standard deviations) for all pre-program perception items. On average, all *Time 1* participants "agreed" or "strongly agreed" that the VR technology was innovative ($M = 4.67$, $SD = .48$) and exciting ($M = 4.22$, $SD = .85$). While participants indicated that they were only moderately familiar ($M = 3.74$, $SD = .76$) and experienced ($M = 3.07$, $SD = 1.41$) with the VR technology.

Table 1: *Means and Standard Deviations – Pre-Program Perceptions*

	All Participants			*Time 2 Participants*		
Pre-Program Perceptions *(Time 1)*	*N*	*M*	*SD*	*N*	*M*	*SD*
"VR is innovative"	27	4.67	.48	10	4.70	.48
"I am excited to use VR"	27	4.22	.85	10	4.30	.95

"I am familiar with VR"	27	3.74	.76	10	3.60	.97
"I have past experience with VR technologies"	27	3.07	1.41	10	2.90	1.52

Note: All program perception items were rated on a 5-point agreement scale (5 as the maximum).

At *Time 2*, post-program items measured the average weekly use of the VR mindfulness simulation and employee reactions to it. Participants used the VR mindfulness simulation between 1 and 3 times with a median and mode of two times per week (*Md* = 2; *Mo* = 2). *Table 2* displays descriptive data (item means and standard deviations) for all post-program reaction items, while *Table 3* displays open-ended reactions response data. On average, participants were "satisfied" or "extremely satisfied" with the VR mindfulness exercises (*M* = 4.30, *SD* = .67) and duration (*M* = 4.40, *SD* = .70). Further, employees reported feeling enjoyment and mindful after using the VR mindfulness simulations (*M* = 4.30, *SD* = .67 and *M* = 4.20, *SD* = .79, respectively). Open-ended responses suggest that the stress management intervention was a relaxing, enjoyable break during the workday. However, open-ended comments also suggest that the VR equipment was initially challenging to use, and employees desired an increased variety of mindfulness simulations. Lastly, employees noted that they would have preferred to have had more time during their workdays to engage in the stress management intervention.

Table 2: *Means and Standard Deviations – Program Reaction-Level Evaluation*

Program Reaction-Level Evaluation *(Time 2)*	*M*	*SD*

[Satisfaction with Program] “Exercises”	4.30	.67
[Satisfaction with Program] “Length (of time)”	4.40	.70
[Satisfaction with Program] “Technological Components”	3.80	.79
[Satisfaction with Program] “Overall Delivery”	4.10	.88
“I enjoyed the VR intervention”	4.30	.67
“I felt more mindful after completing the VR simulation”	4.20	.79

Note: N = 10. All program perception items were rated on a 1-5 scale (5 as the maximum).

Table 3: *Open-Ended Responses – Program Reaction-Level Evaluation*

Participant responses to: “What did you like about this program?”	**Participant responses to: “What did you dislike about this program?”**
“It forced me to use meditation”	“A little trouble with the equipment”
“It was relaxing”	“I couldn't figure out how to change the TRIPP mindfulness thing, I think it was the same”
“Nice break from the day”	“Just not enough moments to do it at the office”
“Quiet time alone doing something different”	“Not able to do VR headset enough”
“Really enjoyed the VR experience”	“Same module/exercise”

“The chance to use VR and take a break from my day to breathe”	“Sharing a headset during a coronavirus pandemic”
“The opportunity to experience VR”	“The VR meditation was the same each time”
“The VR Headset and programs”	“Was a little tough to figure out when I first started using it, it needed more explanation and wasn't very intuitive”

Hypothesized Outcomes

To examine the study’s hypothesized relationships, one-tailed, paired t-tests were computed using the statistical software of SPSS. *Time 1* and *Time 2* scales of happiness, generalized work stress, burnout, and depressive symptoms were entered as corresponding pairs. To be considered as statistically significant, one-tailed p-values were required to be equal to or less than .05. To further examine mean differences in the participants’ levels of happiness, generalized work stress, and burnout (before and after the intervention), data effect sizes were calculated to assess the practical significance of findings. Cohen’s D provides effect sizes in standard deviation units and evaluates the magnitude of the study’s effects on the following scale: small effects (d = .20-.49), medium effects (d =.50-.79), and large effects (d = .80 – 1.0; Lakens, 2013). The following effect size formula was used to calculate the effect sizes of the paired sample outcome variables:

$$d = \frac{|m_1 - m_2|}{\sqrt{s_1^2 + s_2^2 - (2rs_1s_2)}}$$

Please reference *Table 2 & 3* for the means, standard deviations, t-tests (with unadjusted and adjusted p-values), and effect sizes for all outcome variables.

Table 4: *Means and Standard Deviations – Employee Wellbeing Variables*

	Pretest - Time 1		*Posttest - Time 2*	
***Time 1* & *Time 2* Variables**	*M*	*SD*	*M*	*SD*
1. Happiness	6.50	1.65	7.50	1.43
2. General Work Stress	3.60	1.08	2.98	.72
3. Burnout	2.42	.75	2.16	.69
4. Depressive Symptoms	2.33	1.22	1.97	.87

Note: N = 10

Table 5: *Paired Samples T-Tests and Effect Sizes*

	Paired T-Tests							
Pairs: *Time 2 - Time 1*	*M Difference*	*SD*	*Std. Error Mean*	*t*	*df*	*p (one-tailed)*	*p* (one-tailed)*	*d*
1. Happiness	1.00	1.33	.42	2.37	9	.02	.03	.75
2. General Work Stress	-.63	.79	.25	-2.49	9	.02	.03	.78
3. Burnout	-.26	.35	.11	-2.35	9	.02	.03	.76

4. Depressive Symptoms	-.37	.60	.19	-1.94	9	.04	.04	.60

Note: $N = 10$, p^* = adjusted Benjamini–Hochberg p-value, d = Cohen's effect size

On average, employees experienced significantly higher mean levels of happiness after participating in the VR mindfulness intervention, $t(9) = 2.37$, $p = .02$, $d = .75$ (see *Table 5*). Examining employee strain variables, on average, participants experienced significantly lower levels of generalized work stress, $t(9) = -2.49$, $p = .02$, burnout, $t(9) = -2.35$, $p = .02$, and depressive symptoms, $t(9) = -1.94$, $p = .04$ at *Time 2*. The effect sizes for generalized work stress ($d = .78$), burnout ($d = .76$), and depressive symptoms ($d = .60$) also indicated moderate levels of practical significance.

To control for False Discovery Rates (FDR) when conducting multiple comparisons, the Benjamini–Hochberg procedure was employed. New, adjusted t-test p-values were computed via Alexander Coppock's (2017) multiple comparisons calculator. Even at adjusted p-values, the one-tailed t-tests remain significant at a $p < .05$ level.

Discussion

The results suggest that a VR mindfulness intervention may be an interesting and effective way to engage in employee stress management. First, addressing exploratory research questions, the VR technologies provide an innovative ($M = 4.7$ out of 5.0) and exciting ($M = 4.2$ out of 5.0) platform for engaging in stress management. Likewise, in the post-program evaluation, employees reported experiencing high levels of enjoyment ($M = 4.3$ out of 5.0) and mindfulness ($M = 4.2$ out of 5.0) when immersed in the VR simulation. The employee data suggest that VR technologies may provide an effective platform for garnering employee buy-in and delivering mindfulness in the workplace.

Second, in addition to promoting positive user perceptions, the VR mindfulness program significantly increased levels of employee happiness and reduced levels of employee strain. On average, employees who participated in the VR mindfulness intervention reported significantly higher happiness levels and lower levels of generalized work stress, burnout, and depressive symptoms from Time 1 to Time 2. Not only were findings statistically significant, but practical significance estimates (d =.60-.78) suggest that the VR mindfulness program generated moderate to large effects. The effect sizes indicate that the employee outcomes observed in the study are both statistically and practically significant, and, consequently, VR mindfulness may be an effective method for enhancing employee happiness and easing employee strain in an organizational setting.

Theoretical and Practical Implications

The evidence supporting VR mindfulness as an effective resource for employee stress management carries noteworthy implications for academics and practitioners alike. The present study advances scholarly knowledge pertaining to modern-day stress management interventions. It is among the first occupational health studies to examine the impact of VR and mindfulness in an employee context. While previous literature has implemented VR in other employee training contexts (Berg & Vance, 2017; Bertram et al., 2015; Goulding et al., 2012), the present study is the first to utilize VR for employee strain reduction. As a VR platform can deliver strain reduction techniques via simulations that are brief in duration and well-received by employees, VR may be

proposed as a new and useful medium for engaging in stress management in the workplace.

Furthermore, mindfulness techniques delivered via a VR platform may generate higher levels of employee buy-in and increase program attractiveness when compared to traditional mindfulness stress management interventions. In addition, the current study supports and extends previous theoretical frameworks that highlight the beneficial applications and outcomes of mindfulness in the workplace (Glomb et al., 2011; Good et al., 2016). Improved employee happiness and strain outcomes likely resulted from the VR simulation's ability to promote a.) self-regulation of attention and b.) orientation towards present experience through gamified mindfulness experiences (Bishop et al., 2004). Future research investigations should seek to test these mindfulness mechanisms. These findings provide additional evidence for the use of mindfulness in the workplace for optimizing employee functioning.

The present study provides evidence to support the use of VR mindfulness interventions in organizational settings for stress management and carries practical implications that may be of interest to practitioners working in areas of occupational health, talent management, and human resources. Virtual reality mindfulness programs enable employees to engage in stress management at any time during their workday, may be short in duration, and is reported to be an enjoyable experience. A happy and low-stress workforce has been shown to be productive, engaged, and helpful, and less likely to turnover or participate in counterproductive work behaviors (Imtiaz & Ahmad, 2009; Richardson & Rothstein, 2008; Thompson & Bruk-Lee, 2020). Thus, the evidence suggests that practitioners that opt for VR mindfulness as a method of stress management

will enable their workforce to experience elevated happiness and reduced strain and potentially enhanced organizational functioning.

Further, a second advantage is the ease of a VR program's implementation. In contrast to traditional stress management programs, a VR program requires no in-person trainer, no classroom training, flexible participation during the workday, no training content development, and few materials beyond the VR goggles and charger. These program elements would enable practitioners to administer an effective VR stress management program rapidly. Rapid stress management program design and implementation would be especially advantageous for organizations facing an immediate need for employee strain reduction. However, there will be expenses associated with the initial purchase or rental of VR equipment and ongoing subscriptions to third-party mindfulness applications, and this method of stress management may not be feasible in low-budget organizations. Likewise, although VR mindfulness may be an excellent resource for addressing elevated levels of employee strain, previous research suggests that there must be congruence between employee and organizational objectives and mindfulness offerings (Connolly et al., 2015). Therefore, all relevant situational factors should be weighed when making decisions regarding employee stress prevention.

Limitations and Future Directions

Future research should replicate and extend the present findings. Although the current paper presents significant results highlighting the potential benefits of VR mindfulness in the workplace, the study is limited by sample size. Therefore, to enhance the internal and external validity of the present results, future data collection will be necessary. The data were limited by a small intervention group, as a consequence of the

small branch size. The total number of office employees in the branch of the professional services firms was approximately 40, from which the original 27 intervention participants were recruited (68% enrollment rate). While the organizational sample and data source mitigated the risks to external validity that arise when leveraging snowball and student samples (Landers & Behrend, 2015), replications with larger sample sizes would increase the generalizability of results. Furthermore, future intervention designs containing upwards of 200 study participants would allow researchers to test the underlying mechanisms of the mindfulness VR – wellness relationship with a serial mediation statistical model. Explicitly, future research investigations are recommended to measure and test the extent to which participants cultivate increased attention and awareness of the present moment and decreased physiological, cognitive, emotional, and behavioral reactivity during the workday through habitual mindfulness practice. This is the mediation pathway that has been theorized to promote mental health and strain reduction in the workplace with mindfulness rehearsal (Good et al., 2016).

Further, the stress management program experienced a high rate of program attrition (approximately 64%) and ended with a final sample that was predominantly female and displayed a range of educational backgrounds. The program's attrition is consistent with other stress management interventions, as evidence from a systematic review on worksite health promotion programs indicates that rates of attrition are estimated to be 67% (Robroek et al., 2009). The level of attrition highlights the gap that exists between participants' attraction to a stress management intervention versus the rate of program retention in intervention research (Glasgow et al., 1993). Given the positive pre-program perceptions, indicating that the program was viewed as attractive to

employees, a high rate of program completion may have been anticipated. Nevertheless, the present study highlights that attraction to a stress management intervention is necessary, yet insufficient for maintaining high levels of program retention. When examining post-program, reaction-level commentary (i.e., "just not enough moments to do it at the office"), high levels of attrition may indicate that there were external, organizational barriers to stress management. Previous literature suggests that workplace interventions that do not provide adequate structural support for employees to engage in stress management during the workweek will likely face declines in program participation (Stephens et al., 2012), despite high levels of interest. For instance, if organizational cultures are misaligned with stress management intervention objectives or if employee workload is too high, then employees may be less likely to remain actively involved in workplace activities and programs that are intended to reduce elevated levels of strain. Inversely, data indicates that organizations that establish managerial support for wellness program initiatives and reduce time-related barriers significantly increase rates of employee participation (Kilpatrick et al., 2017). According to NIOSH and academic literature, interventions should consider job-related factors; improving employee well-being may require that the conditions of work environment be modified (i.e., job redesign or leadership training; Caruso et al., 2004; Connolly et al., 2015), in addition to the use of stress management practices that help the employee cope. Future VR mindfulness interventions may be most effective when organizations leverage both primary and secondary prevention strategies to ensure that the workplace environment supports the use of stress management strategies.

Additionally, program attrition data suggests that the VR mindfulness program may have appealed more to women than to men, consistent with literature, indicating that women participate at higher rates in both workplace stress management interventions (Robroek et al., 2009) and mindfulness interventions (Katz & Toner, 2013). While mindfulness interventions are equally as effective for both genders (Katz & Toner, 2013), research has not yet identified the underlying explanation for these differences in program attrition (Gilbert & Waltz, 2010; Katz & Toner, 2013). Given these data, VR mindfulness interventions may currently be more beneficial for high-risk, female-dominated occupations, such as nursing or social work (de Terte & Stephens, 2014; Johnson et al., 2005; Lu et al., 1997; Russell, 2014). However, future research should also explore how to reduce male attrition from mindfulness stress management interventions, as these programs can be equally as effective for men when men do remain engaged in the intervention.

Thirdly, the present study utilized a quasi-experimental design, and is, therefore, limited by the absence of an experimental control group. Accordingly, there may be unknown third variables or threats to internal validity, such as history effects, maturation, testing effects, or instrumentation (Shadish et al., 2002; Terpstra, 1981). To rule out third variables, experimental designs should be implemented when testing stress management interventions (Conrad et al., 1991). For instance, future researchers could implement VR mindfulness interventions with a control group by utilizing a geographic or departmental program role out. In these scenarios, the employees in the "experimental group" would receive the VR mindfulness intervention before the "control group" to rule out extraneous factors. The other two criteria for internal validity were met (Shadish et al., 2002): I.)

temporal precedence (e.g., the outcomes measured pre and post to detect changes resulting from intervention) and II.) the negative relationship between mindfulness and employee strain (established in previous theoretical models; Good et al., 2016).

Lastly, the present study only investigated the application of *mindfulness* for stress reduction via VR modalities. Therefore, because of the innovative and emerging nature of VR technologies, future research could continue to explore other opportunities for augmenting employee health. For instance, future research might examine the integration of VR with other empirically validated stress management techniques, such as engaging in progressive muscle relaxation, biofeedback, goal setting, time-management training, cognitive reframing, behavioral skills practice, assertiveness training, or nature-based relaxation and attention restoration (DeFrank & Cooper, 2013; Kaplan, 1995; Thompson & Bruk-Lee, 2019). Additionally, in future investigations, researchers would be encouraged to examine whether these VR technologies a.) offer an innovative way to "update" traditional stress management techniques to increase employee buy-in, and b.) serve as a brief, yet effective platform for delivering stress management techniques. Given these aforementioned benefits, integrations of VR technologies with traditional stress reduction techniques may have the potential to become the next significant advancement in the area of employee stress management.

Conclusion

The present study contributes new insights into the innovative delivery methods of stress management (i.e., VR) that are currently being offered to government, corporate, and nonprofit enterprises across the United States (Pipes, 2017; Rogers, 2019; TRIPP, 2020). While, undoubtedly, research investigating the stress reduction abilities of VR

mindfulness is still in its infancy, the present study provides valuable insights into how VR mindfulness programs may be effectively leveraged in an organizational context. Given these findings, the contributions of this study are two-fold. The present study establishes VR stress management interventions as an attractive, brief, and enjoyable method of providing stress reduction. Secondly, the data provides preliminary supporting evidence that mindfulness delivered via VR can significantly increase employee happiness levels and reduce employee strain. By leveraging partnerships with industry, this study shed light on the use of VR in employee stress management, helping academia keep pace with the technological advances shaping many of today's organizational practices.

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III. MANUSCRIPT #2: VIRTUAL REALITY AND PERFORMANCE

Mindfulness VR and Employee Performance and Attitudes

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Manuscript Format: Short Contribution Paper

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Abstract

The application of virtual reality (VR) technologies for addressing workplace needs and challenges is expanding area of interest for academics and practitioners alike. Similarly, the topic of mindfulness is trending in the modern-day workforce, as mindfulness gains recognition as useful and increasingly accepted resource for augmenting employee effectiveness. Combining the two, the present study sought to examine whether employee performance and attitudes may be significantly increased when a VR mindfulness program is implemented in an organizational context. Researchers employed a quasi-experimental program to examine these hypothesized relationships in a corporate setting. To assess employees' job performance and attitudes, pretest and posttest questionnaires were administered before and after a workplace VR mindfulness program. Paired t-test analyses indicated that employee job performance and attitudes (as measured through attention, task performance, contextual performance, counterproductive work behaviors, job satisfaction, work engagement, and turnover intentions) were not significantly improved, following the VR mindfulness program. Nevertheless, the present study discusses limitations and underscores how similar programs may be adapted, in the future, for improved employee attitudes and performance outcomes.

Introduction: Mindfulness VR and Employee Performance and Attitudes

Two of the workplaces most prominent trends in the area of talent management are the application of mindfulness and virtual reality (VR) for employee effectiveness and satisfaction (Deloitte, 2019; Gartner, 2018; Kim, 2019; Marr, 2019; SAP, 2018; SHRM, 2018; SIOP, 2018; Turissini, 2017). Despite the widespread attention to these workplace trends, there is a paucity of previous literature examining the integration of the two in an organizational setting, and whether the touted benefits of mindfulness and VR can be validated, when combined in a VR mindfulness workplace program. Therefore, the present study seeks to address this scientist-practitioner gap by examining the employee outcomes that result when a VR mindfulness program is deployed in an organizational context. Specifically, the present study investigates whether the implementation of a VR mindfulness program may contribute to enhanced employee performance and attitudes (as measured through attention, task performance, contextual performance, job satisfaction, counterproductive work behaviors, work engagement, and turnover intentions).

Mindfulness and Performance

Recently, an integrative review explored the practice of mindfulness at work (Good et al., 2016). This review provided clarity on the mechanisms that underlie the relationship between mindfulness practice and positive employee functioning. Explicitly, mindfulness practice mediates this mindfulness – functioning relationship by contributing to improved attention to the present moment (Good et al., 2016). Attention can be defined as individuals' ability to "intentionally hold attentional focus on desired channels

and thereby resist unintentional shifting to irrelevant or distracting channels" (Derryberry & Rothbart, 1988, p. 966). Mindfulness practices improve employees' attention by exercising the ability to quickly return to the present moment (Hasenkamp et al., 2012). Specifically, mindfulness stabilizes employees' attention (through reduced general mind-wanderings), reduces tendencies toward distractibility (when facing real distractions or competing demands), and improves attentional efficiency (through more effective utilization of attentional energies and cognitive resources; Good et al., 2016).

When mindfulness provides the increased ability to tune into the present moment and to maintain focused attention on work activities, this is theorized to aid in performance-related workplace outcomes (Good et al., 2016). Employee performance has been conceptualized as having three core dimensions: task performance, contextual performance, and counterproductive work behavior (Viswesvaran & Ones, 2000a). *Task performance* refers to the completion of work behaviors that relate directly to the individual's job position (i.e., completion of tasks that would be listed in a job description; Viswesvaran & Ones, 2000). *Contextual performance* addresses helping behaviors that are unrelated to individuals' task performance, but further the goals of the organization (e.g., taking on additional tasks or helping a coworker; Borman & Motowidlo, 1993). The term "contextual performance" is often used interchangeably with extra-role performance and organizational citizenship behaviors (OCBs; Motowidlo & Van Scotter, 1994). Inversely, *counterproductive work behaviors* (CWBs) are those that run counter to the goals of the organization, such as engaging in workplace incivility or theft (Gruys & Sackett, 2003). Therefore, mindfulness would be considered beneficial

to organizational functioning when it able to improve levels of task and contextual performance while reducing the occurrences of counterproductive work behavior.

As previously mentioned, the application of mindfulness practice to work performance outcomes is relatively new. Nevertheless, workplace mindfulness practice has significantly improved employee task performance in several recent studies (Dane & Brummel, 2014; Reb et al., 2014, 2015). These studies posit that increases in work performance result from employees' increased ability to focus attention in the face of many competing workplace priorities and demands and, thus, work more efficiently and reduce task-related errors (Dane & Brummel, 2014; Mesmer-Magnus et al., 2017; Reb et al., 2015). Additionally, the benefits of mindfulness practice may be multiplicative, as researchers have discovered that leaders who practiced mindfulness also improved their subordinates' job performance outcomes, as high levels of mindfulness were related to increased leadership functioning and relationship quality (Reb et al., 2014).

Reb et al. (2015) also provide preliminary data to indicate that mindfulness practice enhances contextual performance. Explicitly, exploratory analyses found that employee awareness positively predicted OCBs, while absent-mindedness negatively predicted OCBs (Reb et al., 2015). Additionally, leadership mindfulness has also been shown to be significantly and positively related to subordinates' contextual performance indicators (i.e., showing concern for the well-being of their coworkers), once again demonstrating the multiplicative benefits of mindfulness practice at work (Reb et al., 2014). While there is still a need to replicate research in this area, the positive relationship between employee mindfulness practice and contextual performance is

theorized to be a result of increased well-being, empathy, and compassion when practicing mindfulness, which likely results increased employee prosocial behaviors (Condon et al., 2013; Flook et al., 2015; Fortney et al., 2013; Good et al., 2016; Leary & Tate, 2007; Leiberg et al., 2011).

Lastly, workplace mindfulness practices may aid in reducing the prevalence of CWBs (Good et al., 2016). While few studies have examined this construct directly, several studies shed light on the mindfulness – CWB relationship. For instance, Reb et al. (2015) discovered that as employees' absent-mindedness increased, so did levels of workplace deviance. Further, Krishnakumar and Robinson (2015) found that employee dispositional mindfulness was inversely related to CWBs. This relationship was mediated by feelings of hostility (i.e., anger or irritation), indicating that mindfulness reduces feelings of hostility and, thus, reduces instances of CWB (Good et al., 2016; Krishnakumar & Robinson, 2015; Langer & Imber, 1980; Long & Christian, 2015).

Mindfulness and Employee Attitudes

Interestingly, in comparison to performance, there is a wealth of literature linking mindfulness to positive attitudes (Chambers, Gullone, & Allen, 2009; Garland, Gaylord, & Park, 2009; Garland, Hanley, Farb, & Froeliger, 2015; Troy, Shallcross, Davis, & Mauss, 2013). Researchers have discovered that those who practice mindfulness, or otherwise demonstrate a mindful disposition, exhibit more positive attitudes and display less negativity bias (Kiken & Shook, 2011; Nezlek et al., 2016). When examining increased rates of positivity, researchers point to emotional regulation as the mechanism

for which mindfulness improves positive attitudes (Chambers et al., 2009; Garland et al., 2009; Reb, Narayanan, Chaturvedi, & Ekkirala, 2017).

Emotional regulation addresses the conscious ability to modulate ones' own emotional responses to external stimuli or demands, often to comply with societal norms regarding displays of emotions (Chambers et al., 2009; Hülsheger et al., 2013). Mindfulness practices aid in emotional regulation when individuals' attention is brought to the present moment and facilitates: a.) increased awareness of emotional experiences, and b.) the nonjudgmental acceptance of such emotions (Chambers et al., 2009). In the workplace, this process allows employees' emotional responses to be more openly experienced, discussed, and relinquished, which, in turn, reduces rumination, false storylines, and unfavorable emotional-behavioral reactions (Chambers et al., 2009; Hülsheger et al., 2013; Teper et al., 2013). Thus, it is likely that workplace mindfulness practices promote more positive employee attitudes, as assessed by the variables of job satisfaction, work engagement, and reduced turnover intentions.

Due to increased emotional regulation, employees may experience increase job satisfaction when they practice mindfulness at work. In fact, two recent studies have identified self-regulation as a mediating variable in the mindfulness – job satisfaction relationship (Andrews, Michele Kacmar, & Kacmar, 2014; Hülsheger et al., 2013). Employees are hypothesized to experience increased job satisfaction when they can nonjudgmentally experience, acknowledge, and release negative emotions and perceptions that arise during the workday, and, simultaneously, maintain increased receptivity for the positive features of their job (Andrews et al., 2014; Hülsheger et al.,

2013). Thus, while there is evidence to suggest that job satisfaction will be improved with workplace mindfulness practices, however, due to the small sample of studies, there is a need to replicate and extend these findings through modern mindfulness delivery methods.

Similarly, work engagement is likely to increase with mindfulness practice (Good et al., 2016). Work engagement occurs when employees feel energized by and connected to their work (Schaufeli et al., 2006). Operationally defined, work engagement is "a positive, fulfilling work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 74). A recent study provides evidence that mindfulness and work engagement are indeed positively related (Malinowski & Lim, 2015). Additionally, Leroy, Anseel, Dimitrova, and Sels (2013) discovered that employee work engagement significantly increases when a workplace mindfulness program is employed. Additionally, this study also provides evidence that the mindfulness – engagement relationship is fully mediated by self-awareness and self-regulation (which the authors referred to as authentic functioning, Leroy et al., 2013).

Lastly, increased mindfulness practice reduces employee turnover intentions (Andrews et al., 2014; Dane & Brummel, 2014; Reb et al., 2017). Mindfulness has even demonstrated incremental validity in predicting turnover intentions above and beyond work engagement (Dane & Brummel, 2014). Dane and Brummel (2014) hypothesized that turnover intentions are reduced when mindfulness practices provide increased self-regulation and the ability to cope with demanding work environments, and, hence,

reduces employees' need to exit from their present work environment. Thus, converging and extending two domains of previous literature, the following hypotheses are proposed:

Hypothesis 1: Participation in a VR mindfulness program will increase a.) attention, b.) task performance, and c.) contextual performance.

Hypothesis 2: Participation in a VR mindfulness program will decrease counterproductive work behaviors.

Hypothesis 3: Participation in a VR mindfulness program will increase a.) job satisfaction and b.) work engagement.

Hypothesis 4: Participation in a VR mindfulness program will decrease turnover intentions.

Methods

Participants

Employees from a corporate work setting were sampled for study participation; the organization can be described as a professional services consulting firm in the United States. In total, the initial 27 employees enrolled in the VR mindfulness program were predominantly female (66.7%), Caucasian (85.2% Caucasian, 3.7% Hispanic/Latino, and 8.3% Asian) and averaged 38.4 years of age (*SD* = 12.5). Of the enrolled participants, 88.9% held at least a bachelor's degree. Further, employees worked 50.6 hours a week on average (*SD* = 11.7), and have been employed at the organization for an average of 4.7 years (*SD* = 5.3). In contrast, after program attrition, the final samples included 10 employees (*Time 1 – Time* 2). The *Time 1 – Time* 2 sample still contained a majority of

female (91.7%), Caucasian (91.7% Caucasian and 8.3% Hispanic/Latino) employees, averaging 44.4 years of age (*SD* = 15.7). *Time 1 – Time 2* employees held a bachelor's degree or higher (75.0%), worked 46.8 hours a week (*SD* = 7.3), and reported a company tenure of 5.8 years (*SD* = 5.7), on average.

To test for significant differences between the participants who enrolled in the VR mindfulness program but completed the questionnaire at only *Time 1* and the participants who completed both *Time 1 – Time 2* surveys, t-test analyses were conducted on all study scales. Significant differences were detected only for gender and education level. The *Time 1 – Time 2* sample contained a higher percentage of women and slightly lower levels of education (t (25)= -2.69, $p < .05$ and t (25)= -2.20, $p < .05$, respectively).

Procedure

A pretest-posttest research design was utilized to test the study's hypothesized relationships. Throughout the VR mindfulness program, participants were provided access to an 8-minute VR mindfulness simulation during all workdays. During the VR mindfulness simulation, the simulation led participants through different virtual environments and situations that utilized key mindfulness components (including focused attention and awareness and emphasizing the importance of being in the present moment; Good et al., 2016). The simulation began by asking users to cultivate a mindset of intentionality and calm, and walked the participant through deep-breathing, self-acceptance exercises. Next, the participant was "transported" to another virtual space, where participants' were asked to focus attention on and physically move toward (via head motions, captured by the VR equipment's sensors) different elements in the virtual

space. Finally, the session ended with a third virtual space, where the participant engaged with the present moment and practiced deep-breathing exercise once again. The VR equipment was available via a VR charging/ docking station and was accessible to all participants for a three-week period. Participants had the opportunity to use the VR technology voluntarily, as frequently or infrequently as they desired, during work hours. The median number of times per week that employees engaged in VR mindfulness was two. Employees were given pre- and post- program questionnaires that assessed self-reported employee levels of mindfulness, job performance, and job attitudes, administered through an online platform (Qualtrics). Both online surveys took participants approximately 15 minutes to complete. The first questionnaire served as the program pretest and was administered prior to the VR mindfulness program. The second questionnaire, or posttest, was sent to all participants one day after program completion.

Measures

Attention was measured with a three-item attentional focusing measure (Time 2 α = .97) that assessed participants to rate their ability to intentionally hold focus on work activities and avoid distraction (Derryberry & Rothbart, 1988). A sample item is: "when I needed to concentrate and solve a problem, I had trouble focusing my attention". Participants were instructed to respond with a five-point scale ranging from strongly disagree to strongly agree. All items are reverse-coded, and high scores reflect high levels of attentional ability.

Job Performance was captured through the Individual Work Performance Questionnaire (IWPQ; Koopmans et al., 2012). This questionnaire consisted of three

subscales measuring task performance (six items, Time 2 α = .92), contextual performance (eight items, Time 2 α = .77), and CWBs (five items, Time 2 α = .74). Sample items are as follows, task performance: "I managed to plan my work so that it was done on time", contextual performance: "I took on extra responsibilities", and CWBs: "I complained about unimportant matters at work". Individuals' responses were rated on a five-point scale from 1= seldom to 5 = always for task and contextual performance, and from seldom to often for CWBs.

Job Satisfaction and *Turnover Intentions* were measured through two subscales (three-items each, Time 2 α = .81 and .97, respectively) of the Michigan Organizational Assessment Questionnaire (Cammann et al., 1979). Sample items included "all in all, I am satisfied with my job" for job satisfaction and "I often think of leaving this organization or job" for turnover intentions. Responses were measured on a five-point scale from 1 = strongly disagree to 5 = strongly agree.

Work Engagement items (nine items, Time 2 α = .75) were drawn from the Job Demands-Resources Questionnaire (Bakker & Demerouti, 2016). A sample item was: "I am immersed in my work." Responses were measured on a seven-point scale from 0= never to 6= always.

Demographic Variables captured participants' gender, age, ethnicity, and education level. Additionally, demographics included variables related to the individuals' employment contract, occupational tenure, and number of hours worked per week.

Results

The statistical software of SPSS was used to test the proposed hypotheses. One-tailed, paired t-test analyses were run using *Time 1* and *Time 2* data for the following variables: attention, task performance, contextual performance, counterproductive work behaviors, job satisfaction, work engagement, and turnover intentions. Refer to *Tables 1 & 2* for all variable means, standard deviations, and paired t-tests. Statistical analyses detected no significant improvements to employee performance or attitudes after the VR mindfulness program completion, with the exception of CWBs. There was a significant mean difference in reported CWBs between *Time 1* and *Time 2*, $t(9) = -2.41$, $p = .04$, $d = .76$. However, when p-values are adjusted with the Benjamini–Hochberg procedure to control the familywise error rate (Thissen et al., 2002), the CWB findings is no longer statistically significant. Lastly, the *Time 1* and *Time 2* mean difference for work engagement was significant, $t(9) = -4.79$, $p = .00$, $d = 1.50$; variable means indicate that work engagement *decreased* after employees participated in the VR mindfulness program.

Table 1: *Means and Standard Deviations*

	Pretest - Time 1		*Posttest - Time 2*	
***Time 1* & *Time 2* Variables**	*M*	*SD*	*M*	*SD*
Attention	3.03	1.31	2.67	1.22
Task Performance	3.70	.90	3.63	.86

Contextual Performance	3.03	.85	3.09	.62
Counterproductive Work Behaviors	2.70	.95	2.30	.54
Job Satisfaction	4.17	.74	4.37	.53
Turnover Intentions	2.43	1.07	2.13	.93
Work Engagement	3.34	.63	2.58	.44

Note: $N = 10$

Table 2: *Paired Samples T-Tests*

	Paired T-Tests							
Pairs: *Time 2 - Time 1*	*M Difference*	*SD*	*St. Error Mean*	*t*	*df*	*p (one-tailed)*	*p* (one-tailed)*	*Cohen's d*
Attention	-.37	.87	.27	-1.34	9	.10	.21	.42
Task Performance	-.07	.48	.15	-.44	9	.34	.36	.15
Contextual Performance	.06	.54	.17	.37	9	.36	.36	.11
Counterproductive Work Behaviors	-.40	.52	.17	-2.41	9	.02	.07	.76
Job Satisfaction	.20	.53	.17	1.20	9	.13	.21	.38
Turnover Intentions	-.30	.87	.27	-1.09	9	.15	.21	.35
Work Engagement	-.77	.51	.16	-4.79	9	.00	.01	1.50

Note: $N = 10$, p^* = adjusted Benjamini–Hochberg p-value, d = Cohen's effect size

Discussion

While it was hypothesized that VR mindfulness in the workplace would increase employee job functioning, the study results indicate that there were no significant improvements to focal outcomes following the implementation and evaluation of the VR mindfulness program. Specifically, after three weeks of engaging in VR mindfulness simulations, employees' reported levels of attention, task performance, contextual

performance, job satisfaction, and work engagement did not significantly increase, and CWBS and turnover intentions did not significantly decrease. However, employees reported lowered levels of work engagement after completion of the VR mindfulness program. This work engagement finding was unexpected, and there may be a variety of reasons for this outcome. One possible explanation is that work engagement and mindfulness may not be expected to positively correlate at all times during the workday. In a recent investigation of the state mindfulness to state work engagement relationship, weak within-day associations between mindfulness and work engagement were discovered (Tuckey et al., 2018). Nevertheless, in this same study, state mindfulness was a predictor of higher state work engagement (Tuckey et al., 2018). This may indicate that the relationship between employee mindfulness practice and work engagement is not a direct path. Researchers theorize that mindfulness practice at work may be mediated or moderated by psychological capital (hope, optimism, self-efficacy, and resilience); thus, mindfulness practice may increase reported levels of employee work engagement over time, as mindfulness increases these personal resources (Kotzé, 2018; Malinowski & Lim, 2015; Tuckey et al., 2018).

We hypothesized increases in employee performance and attitudes, as past literature suggests that mindfulness facilitates increased awareness of present mental and emotional experiences and the nonjudgmental acceptance of one's present state (Chambers et al., 2009), which was predicted to enhance employees' workplace functioning. For instance, mindfulness practice has previously been linked to a reduced amount of rumination, false storylines, and adverse emotional-behavioral reactions (Chambers et al., 2009; Hülsheger et al., 2013; Teper et al., 2013). Null findings suggest

that the present VR mindfulness program may have been limited by a number of research design constraints.

Limitations and Future Directions

Several limitations should be considered when evaluating the null results found in this study. The first limitation is the participant sample size. Due to the researcher constraints of pursuing an organizational sample, the final sample consisted of ten employees that completed the VR mindfulness program and pre-/post-evaluation questionnaires. Thus, the present study may have lacked the statistical power necessary to detect the significant effects that may have been present with a larger sample. While the original sample size was 27 employees in total, after program attrition, only 10 participants remained enrolled by program close. This rate of program attrition has been reported across well-being and organizational stress research, ranging from smartphone-delivered mental wellness interventions to workplace fitness center programs (Linardon & Fuller-Tyszkiewicz, 2020; Robroek et al., 2009). While researchers have not identified the underlying reasons for these rates of attrition (Linardon & Fuller-Tyszkiewicz, 2020), low program retention may be an indication of a demanding work environment. As such, retention may have been increased by offering incentives for program completion or containing additional program options (e.g., components for stress management a.) learning and b.) exercise; Linardon & Fuller-Tyszkiewicz, 2020; Robroek et al., 2009). Therefore, future studies may benefit from the replication of the VR mindfulness program, in which researchers attain a greater *Time 1 – Time 2* organizational sample and mitigate attrition through monetary program incentives and increased mindfulness practice offerings (i.e., a greater variety of VR mindfulness simulations).

The second limitation is the length of the VR mindfulness program, which lasted for three weeks in total. Engaging in VR mindfulness twice a week over a period of three weeks may be an insufficient for employee mindfulness practice to impact outcomes of interest. For instance, a systematic review of occupational health programs assigned greater statistical weight to programs that persisted for three or more months (Breslin et al., 2010). As mentioned, the practice of mindfulness stabilizes employees' attention, reduces tendencies toward distractibility, and improves attentional efficiency (Good et al., 2016). However, for employees to experiences these outcomes, there must be regular and enduring mindfulness practice. This suggests that mindfulness-based programs may not be expected to significantly improve job performance and employee attitudes in a short time span, and, consequently, researchers may have detected significant effects if the VR mindfulness program period was extended. In fact, in a recent workplace mindfulness meditation program, researchers implemented a traditional mindfulness program that spanned three months in total and, subsequently, detected significantly increased job performance outcomes (Shonin et al., 2014). Further, recent well-being – performance interventions utilized research designs that spanned 10-months to one-year, as researchers maintained an assumption that improvements in job performance will take longer to manifest than other strain variables (Odle-Dusseau et al., 2016; van Wingerden et al., 2017). Accordingly, future investigations should examine the impacts of VR mindfulness programs that are longer in duration, as mindfulness practice for longer than three weeks may be necessary to improve employee performance and attitudes.

Lastly, the measures used to assess job performance may present a final limitation of the results presented in this study. According to Viswesvaran and Ones (2000), the

measurement of job performance is a methodological challenge for a variety of reasons, including the abstract nature of job performance, a heavy reliance on subjective judgments from raters, and criterion contamination and deficiency. Therefore, the self-reported measures captured in this study may be insufficient for accurately assessing employee job performance outcomes. However, challenges in the measurement of job performance will likely always be present, and, nonetheless, employee performance and attitudes are critical for maintaining high levels of organizational effectiveness (Ostroff, 1992). For this reason, researchers tend to agree that leveraging a heuristic framework to assess individual work performance, through the dimensions of task performance, contextual performance, and counterproductive work behavior, is the most effective way of measuring employee job performance (Koopmans et al., 2011; Viswesvaran & Ones, 2000). Thus, future VR mindfulness programs may benefit from an evaluation method that maintains the current, self-reported job performance measures, but also utilizes of cross-source data, including assessments by managers or others familiar with the employee's job and/or objective measures of employee performance. Using a cross-source data to collect job performance data would likely enable researchers to demonstrate higher levels of job performance construct validity (as nomological networks of associations allow validity, reliability, convergent validity, and divergent validity to be examined; Campbell & Fiske, 1959).

Conclusion

Leveraging VR technologies, this research investigation engaged in an innovative exploration of mindfulness in the workplace. The results from this paper suggest that additional inquiry will be necessary to establish VR mindfulness programs as a resource

for increasing employee attention, task performance, contextual performance, job satisfaction, and work engagement, and decreasing counterproductive work behaviors and turnover intentions. Thus, future research investigations may explore the impacts of VR mindfulness and employee attitudes and performance with a modified research design. More specifically, academia would likely benefit from a replication study that employs a VR mindfulness program that contains 40 or more participants, is three months or longer, and assesses employee performance through a multi-method approach. Despite null findings, the present research investigation contributes to our understanding of VR mindfulness programs in an organizational context. Further, this study highlights how VR mindfulness programs might be modified in the future for improved employee attitudes and performance outcomes.

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IV. MANUSCRIPT #3: PRACTITIONER REPORT

In the Trenches: Practitioners' Lessons Learned When Delivering an Innovative Stress Management Program

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Manuscript Format: Practitioner Report

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Abstract

This Practitioner Report aims to examine how organizational factors impact the ability to implement effective stress management programs. This paper will detail the circumstances of two organizations that implemented a virtual reality (VR) mindfulness program aimed at workplace stress reduction. Despite careful planning and implementation, the VR mindfulness program faced a high level of attrition at both organizations. While occupational health research seeks to provide practitioners and

organizational leaders with evidence-based stress management interventions, if these interventions fail to retain employees from start to finish, then they will likely be unable to reduce rising rates of employee stress. Thus, this Practitioner Report endeavors to a.) showcase how innovative stress management interventions are being employed, in practice, to help mitigate and reduce adverse employee stress outcomes, and b.) identify barriers to stress management program success and suggest methods of lowering program attrition in the future.

Introduction: In the Trenches: Practitioners' Lessons Learned When Delivering an Innovative Stress Management Program

Abundant literature in the occupational health domain underscores the advantages of employee well-being for optimizing organizational effectiveness. For instance, a plethora of research and meta-analytic evidence indicates that happy, healthier, and less stressed employees will be more productive, creative, helpful, engaged, and committed (Chiesa & Serretti, 2009; Ganster & Rosen, 2013; Halkos & Bousinakis, 2010; Richardson, 2017; Richardson & Rothstein, 2008; Thompson & Bruk-Lee, 2020). Nevertheless, according to academics and practitioners alike, it appears that rates of employee stress continue to rise (Boyd, 2020; Richardson, 2017; WHO, 2020). Further, high levels of employee stress have not gone unnoticed by the public and popular press outlets; for example, the CNBC says "workplace stress has reached near-epidemic levels" (Brussard, 2019, para. 1), while Forbes' survey data "indicate that levels of stress have risen nearly 20% in three decades" (Lipman, 2019, para. 8). Therefore, despite the efforts of occupational health researchers and practitioners, implementing solutions for employee stress management remains a challenge for organizations in the United States.

This Practitioner Report examines the obstacles faced when delivering a stress management program in an organizational context. This paper will describe an innovative, mindfulness virtual reality (VR) program, which was delivered for employee stress-reduction at two different organizations. Specifically, the present Practitioner Report will detail the literature on mindfulness at work, the methods of the VR mindfulness program delivery, discuss common barriers to stress management, and

suggest ways that future stress management programs may be implemented more effectively.

Why Implement a Workplace Mindfulness Program?

Mindfulness practice involves "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994, p. 4). Mindfulness exercises have the primary objectives of engaging the individual with the present moment, living every moment intentionally, and practicing self-acceptance (Taren et al., 2013). For example, mindfulness exercises may involve bringing nonjudgmental attention to thoughts or emotions, noticing physical sensations in the body, or practicing deep-breathing techniques (Baer, 2003).

Traditionally, the literature on mindfulness at work has focused on the benefits of mindfulness practice for increased well-being outcomes, demonstrating how increased mindfulness can result in reduced employee stress in general, burnout, anxiety, and depressive symptoms (Elder et al., 2014; Mackenzie et al., 2006; Munoz et al., 2018; Roeser et al., 2013; Shapiro et al., 2005; Weinstein et al., 2009). However, there has recently been a shift to examining the benefits of mindfulness practice concerning other organizational outcomes, including safety performance, job performance, relationship quality, leadership effectiveness, interpersonal conflict, and team functioning (Good et al., 2016). For instance, a recent integrative review explored the practice of mindfulness at work (Good et al., 2016). This review summarized the well-researched mechanisms that underlie the relationship between mindfulness practice and positive employee functioning. Explicitly, mindfulness practice mediates this mindfulness – functioning

relationship by contributing to improved attention to the present moment (Good et al., 2016). Attention is defined as individuals' ability to "intentionally hold attentional focus on desired channels and thereby resist unintentional shifting to irrelevant or distracting channels" (Derryberry & Rothbart, 1988, p. 966). Mindfulness practices improve employees' attention by exercising the ability to quickly return to the present moment (Hasenkamp et al., 2012). Specifically, mindfulness stabilizes employees' attention (through reduced general mind-wanderings), reduces tendencies toward distractibility (when facing real distractions or competing demands), and improves attentional efficiency (through more effective utilization of attentional energies and cognitive resources; Good et al., 2016). When mindfulness provides the increased ability to tune into the present moment and to maintain focused attention on work activities, this is theorized to aid in performance-related workplace outcomes (Good et al., 2016).

The Growing Application of VR at Work

VR is defined as the "use of interactive simulations created with computer hardware and software to present users with opportunities to engage in environments that appear and feel similar to real-world objects and events" (Weiss et al., 2006, p. 183). VR has been gradually gaining popularity as a method of improving employee training and intervention outcomes since the 1990s (Pierce & Aguinis, 1997). However, while VR may have existed at this time, researchers in the 1990s concluded that VR "barely" worked and that significant technological advancements would be necessary before VR could be considered efficacious (Brooks, 1999, p. 16). Nevertheless, with the nearly exponential growth of technological innovations since this time, VR is now regarded as

state-of-the-art and said to be an affordable and valuable tool for a variety of disciplines and domains (Berg & Vance, 2017).

These sentiments appear to be shared by academics and practitioners, as popular press outlets and professional societies publicize the use of VR as a growing, top trend in the workplace (Deloitte, 2019; Gartner, 2018; Marr, 2019; SAP, 2018; SHRM, 2018; SIOP, 2018). For instance, SHRM recently published an article entitled: "Why Virtual-Reality Training for Employees Is Catching On" (SHRM, 2018) and Forbes Magazine just pronounced VR as a top technological trend and predicted that VR "will increasingly be used in training and teaching" (Marr, 2019, para. 10). This suggests that research on VR-based, workplace interventions is both timely and crucial for mitigating future scientist-practitioner gaps in the area of employee training and intervention.

In academia, publications have begun to take an invigorated approach in investigating the benefits of VR at work. One of the first applications of VR technology in the workplace is in the area of employee selection (Anderson, 2003). In an employee selection context, VR is being leveraged for game-based assessments in selecting for job candidate competencies (Bhatia & Ryan, 2018; Fetzer & Tuzinski, 2013; Viswesvaran & Ones, 2018). Further, recent publications have noted the efficacy of VR interventions in improving job knowledge and transfer of training in many occupations and contexts, including in the discipline of workplace safety (Stone et al., 2015; Wang et al., 2018), the medical industry (Barsom et al., 2016; Colt et al., 2001; Gallagher et al., 1999; Piromchai et al., 2015), the construction industry (Goulding et al., 2012; Squelch, 2001; Teizer et al., 2013; Van Wyk & De Villiers, 2009; Zhao & Lucas, 2015), job interview trainings

for individuals with mental disabilities (Smith, Ginger, Wright, Wright, Humm, et al., 2014), and police trainings (Bertram et al., 2015). When considering future intervention applications, there are numerous workplace domains that VR technology has the potential to improve (i.e., employee citizenship behavior, managerial influence tactics, nonverbal behavior, leadership, and employee conflict; Pierce & Aguinis, 1997).

Although organizations are adopting this new technology at a rapid rate, the utilization of VR for stress management and employee well-being has been scarcely researched. In a non-work context, a recent publication demonstrated success in increasing participant levels of mindfulness through a VR mindfulness program (Chandrasiri et al., 2020). VR may be an ideal medium for enhancing mindfulness-based workplace interventions. These simulations can incorporate visual and auditory experiences to enable individuals to become immersed in a VR environment (Berg & Vance, 2017). In other words, VR technology utilizes digital sensors, which allow VR programming to capture users' sensory activity and adapt simulated environments in real-time (Diemer et al., 2014). Accordingly, VR mindfulness programs utilize an immersive-experience approach to guide the user through mindfulness exercises in an interactive landscape.

Thus, a VR mindfulness program was implemented across two organizations as an innovative method of engaging in employee stress management. Nevertheless, participant attrition prevented the statistical comparison of pre-program and post-program employee outcomes. For this reason, this Practitioner Report will examine the

organizational barriers to stress management program success and outline practical recommendations for reducing program attrition in the future.

Method

Information about the Consultants and Clients

This Practitioner Report documents the events that transpired when two companies (these companies will be referred to as *Organization X* and *Y*) participated in a VR mindfulness stress management program. In both investigations, human resources (HR) leaders authorized the VR mindfulness program for employee stress reduction. All stakeholders were interested in examining the extent to which a VR mindfulness program would improve employee well-being and other critical organizational outcomes of interest. In the first investigation, examining *Organization X*, employees from a West-coast, United States law firm were recruited for participation in a VR mindfulness program. *Organization X* provides legal services to life science and technology companies. In the subsequent investigation, assessing *Organization Y*, employees from a second corporate work setting were recruited. *Organization Y* can be described as a Mid-Atlantic financial consulting and publishing company in the United States.

For free delivery of the VR mindfulness program, both companies agreed to partner with the VR mindfulness provider and collect employee data on employee stress levels; this partnership was viewed as a win-win situation for all parties. Thus, in both scenarios, the stakeholder relationships can be best be described as a collaborative partnership. The VR mindfulness program developers were enthusiastic about capturing data on the effectiveness of their VR mindfulness program. Meanwhile, the company

heads of HR were interested in providing their employees with an innovative stress-reduction program at no cost.

Procedure

Employees were recruited for study participation by their respective HR departments. Explicitly, all company employees were notified of the upcoming VR mindfulness program through HR email communications. These emails detailed the program's intent of providing mindfulness VR for increased well-being, the duration of the stress management program, and details for enrolling for participation. Employees were invited to enroll in study participation via email reply.

In total, nearly 50 employees were enrolled for participation from *Organization X*. Specifically, *Organization X* recruited employees from two company branches (approximately 25 employees from each) to participate in the stress management program: one branch serving as the experimental group (employees immediately receive the stress management program) and one branch serving as the control group (employees would receive the VR mindfulness program after six-weeks). Thus, a pretest/posttest experimental research design with a control group was designed to test the effects of VR mindfulness on employee well-being. Once the participants in the experimental group completed a 15-minute pre-program assessment on their own during their workday, they could begin the VR mindfulness program through the use of the VR equipment.

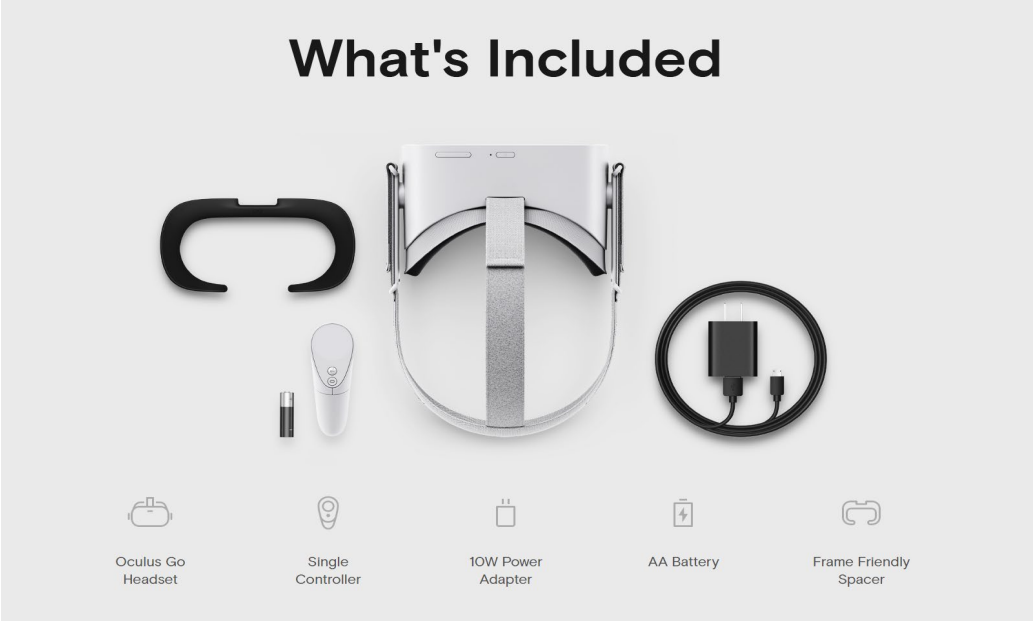
Fifty one employees from a single location were enrolled in *Organization Y*'s VR mindfulness program. Therefore, this research design would be considered a pretest/posttest quasi-experimental design, with no control group. Unlike *Organization*

X, *Organization Y* did not have a second geographic location to leverage as a control group and wanted to provide the program to all of their employees at one time. While *Organization X*'s stress management program began via an organizational email, *Organization Y*'s VR mindfulness program commenced with a 45-minute employee kickoff breakfast and presentation, held onsite in a large company conference room. During this session, participants a.) received brief educational training on VR mindfulness, b.) voluntarily completed the pre-program survey, and c.) were informed about the logistical details of accessing and using the VR mindfulness technology. After the kickoff session, participants from *Organization Y* were able to begin the stress management program through the use of the VR equipment.

For all organizations, The VR equipment employed in the stress management program was the Oculus Go VR setup (see *Exhibit 1*; *Oculus Go*, 2020), complete with a preinstalled VR mindfulness application. In both workplaces, the VR equipment was located in an employee common area at a VR docking station with a charging cable and sanitizing wipes (see *Exhibit 1*). Each company received two sets of Oculus Go VR devices in total (see *Exhibit 2*). The participants were able to sign out the equipment from the VR for private use at any time.

Exhibit 1: TRIPP Inc. VR Stand

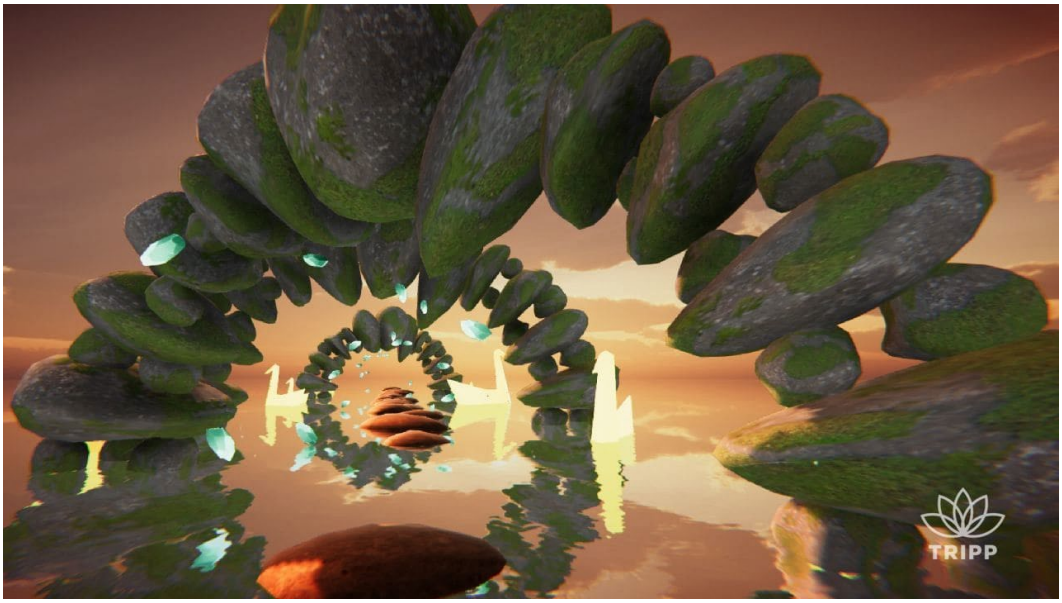
Exhibit 2: Oculus Go VR Device Components



Once, checked-out for use, the employee took the VR headsets back to a private room or workspace for use. Participants placed the VR goggles over the eyes and the headphones in the ears to produce a fully immersive virtual mindfulness experience. Next, the participant selected the TRIPP Inc. application with the Oculus Go remote and motioned with his or her head (aided by the motion sensors in the Oculus Go headset) to select and begin the VR mindfulness simulation, which was 8-minutes in length. The simulation led participants through different virtual environments and situations that utilized key mindfulness components, including focused attention and awareness and emphasizing the importance of being in the present moment (Good et al., 2016). The simulation began by asking users to cultivate a mindset of intentionality and calm and walked the participant through deep-breathing, self-acceptance exercises. Next, the participant was "transported" to another virtual space, where participants' were asked to focus attention on and physically move toward (via head motions) different elements in

the virtual space. For instance, participants experience a simulated flying experience, where they are encouraged to move towards visual targets (see *Exhibit 3*). Finally, the mindfulness session ended with a third virtual space, where the participant engaged with the present moment and practiced deep-breathing exercise once again. After each VR mindfulness session, the participant would remove the VR equipment, wipe the device down with a sanitizing wipe, and return it to the community stand to charge until the next use.

Exhibit 3: TRIPP Inc. Interactive Mindfulness Activity: *Sample Screenshot*



The VR mindfulness program lasted six weeks in total for both organizations. At *Organization X*, employees were emailed the post-program evaluation survey after the completion of the VR mindfulness stress management intervention. For *Organization Y*, employees were invited to attend an official close-out lunch for a program debrief and survey evaluation. *Organization Y* had a formal lunch catered in for employees, and the

HR emphasized that this session was mandatory for employees that participated in the program.

Measures

For both organizations, a survey questionnaire was administered to employees before and after the VR mindfulness program. While a variety of data were collected, only pre-program perceptions, post-program reactions and demographic variables are focal to this practitioner report.

Pre-Program Perceptions examined participants' perceptions of VR, specifically the extent to which the VR technology was viewed as innovative, exciting, and familiar. For example, employees rated the extent to which they agreed with the following sample statement: "I am excited to use VR". Pre-program perception items were rated on a five-point scale (1=strongly disagree to 5=strongly agree).

Post-Program Measures assessed participants' reactions to the VR mindfulness program. *Time 2* survey participants rated their satisfaction with the mindfulness VR exercises, length of time, technological components, and overall delivery on a five-point scale (1 = extremely dissatisfied, 5 = extremely satisfied). Participants also rated the following statements: "I enjoyed the VR intervention" and "I felt more mindful after completing the VR simulation" on a five-point scale (1 = strongly disagree, 5 = strongly agree).

Demographics captured employee age, gender, company tenure, and number of hours worked a week.

Results

The VR mindfulness program experienced an attrition rate of 79% at *Organization X* and 67% at *Organization Y* (see *Table 1*). Please see *Tables 2-4* for item means and standard deviations. On average, all *Time 1* participants "agreed" or "strongly agreed" that the VR technology was innovative ($M = 4.67$, $SD = .48$) and exciting ($M = 4.22$, $SD = .85$). While participants indicated that they were only moderately familiar ($M = 3.74$, $SD = .76$) and experienced ($M = 3.07$, $SD = 1.41$) with the VR technology.

Table 1: *Rate of Program Attrition*

	Time 1	**Time 2**	**Attrition Rate**
Organization X	$N = 24$	$N = 5$	79%
Organization Y	$N = 51$	$N = 17$	67%

Note: Attrition Rate (%) = (Number of Final Employees / Number of Original Employees) X 100

Table 2: *Means and Standard Deviations – Demographics*

	Time 1	**Time 2**

Organization X	***N***	***M***	***SD***	***N***	***M***	***SD***
Age	24	45.75	10.79	5	46.6	11.63
Gender	24	1.58	0.50	5	2.00	0.00
Company Tenure	24	12.26	10.65	5	18.46	15.00
Working Hours/Week	24	48.19	9.09	5	43.5	9.29
Organization Y	***N***	***M***	***SD***	***N***	***M***	***SD***
Age	51	35.53	9.12	17	37.41	9.29
Gender	51	1.76	0.84	17	1.47	0.51
Company Tenure	51	2.94	3.44	17	3.21	2.04
Working Hours/Week	51	44.69	7.08	17	43.24	5.57

Note: Organization X data from the experimental group; Gender items: 1 = male, 2 = female.

Table 3: *Means and Standard Deviations – Pre-Program Perceptions*

	Organization X	***Organization Y***

Time 1: Pre-Program Perceptions	*N*	*M*	*SD*	*N*	*M*	*SD*
"VR is innovative"	24	4.42	0.78	51	4.69	0.58
"I am excited to use VR"	24	3.96	1.20	51	4.63	0.49
"I am familiar with VR"	24	3.50	1.38	51	3.84	1.08
"I have past experience with VR technologies"	24	2.92	1.59	51	3.43	1.47

Note: Organization X data from the experimental group; All program perception items were rated on a 5-point agreement scale (5 as the maximum).

Table 4: *Means and Standard Deviations – Time 2 Program Reactions*

	Organization X	***Organization Y***

Time 2: Program Reactions	*N*	*M*	*SD*	*N*	*M*	*SD*
[Satisfaction with Program] "Exercises"	5	3.60	1.14	17	4.00	0.61
[Satisfaction with Program] "Length (of time)"	5	4.00	0.71	17	4.06	0.83
[Satisfaction with Program] "Technological Components"	5	3.20	1.30	17	3.47	1.13
[Satisfaction with Program] "Overall Delivery"	5	3.20	1.30	17	3.88	0.60
"I enjoyed the VR intervention"	5	4.40	0.89	17	4.35	0.79
"I felt more mindful after completing the VR simulation"	5	4.20	0.84	17	4.24	0.83

Note: Organization X data from the experimental group; All program perception items were rated on a 5-point agreement scale (5 as the maximum).

Discussion

Despite stakeholder efforts to retain employees in the VR mindfulness program, rates of participant attrition from the VR mindfulness program were high. In the program close, *Organization X* had four employees complete the final evaluation, and *Organization Y* had seventeen. In both investigations, all stakeholders were disappointed with the levels of the VR mindfulness program attrition, and both HR leaders decided that the rate of attrition would preclude their organization from evaluating levels of employee stress reduction. This practitioner report discussion focuses on the obstacles/resistance faced in implementing the VR mindfulness stress management intervention. Additionally, we suggest practical recommendations for overcoming these barriers in future organizational stress management programs.

Barrier 1: Perceptions of Stress Management

The first barrier, identified as a threat to stress management success, is the perception of employee stress management in an organizational setting. While occupational health psychologists and others in related disciplines may be well-versed on the advantages of engaging in stress management, this worldview may not be shared with organizational leaders. For instance, allocating time, money, and resources to stress reduction may be perceived as nonessential or frivolous. Nevertheless, devoting time, energy, and financial resources to workplace wellness program is critical to program participation (Glasgow et al., 1993). A systematic review on workplace health programs found that rates of program retention are typically below 50% and suggests that work-related factors are a significant contributor to high rates of program attrition (Robroek et al., 2009).

Stakeholder Quote(s):

- *"The work culture perceives self-care as not important to the bottom line. Therefore, helping a company determine ROI is an important part of our selling process."* – TRIPP Inc. CEO, VR Mindfulness Developer

Further, even when organizations and employees *do* recognize the benefits associated with reduced stress, they often do not appreciate these activities in practice due to negative perceptions or feelings of discomfort with stress management techniques (Gallagher et al., 2015; Giovannoni et al., 2015; Laurie & Blandford, 2016; Wilde et al., 2018). For instance, although employees in both investigations reported perceiving the VR mindfulness program as exciting and innovative, they may have also felt mental

discomfort around trying out the mindfulness simulation with meditative elements. Negative perceptions of stress management exercises, by individual employees, may be a significant initial obstacle that must be overcome in order to engage employees in stress management interventions.

Stakeholder Quote(s):

- *"I am excited to try to VR program, but I don't have any idea what mindfulness practice is."* – Employee from *Organization Y*, Program Kickoff Breakfast
- *"A common challenge is the perception that meditation is "woo woo" hippy stuff… The HR team must work with us on a committed internal marketing communication creates awareness and drives adoption. Enabling a privacy screen or a private location for the employee to retreat to is extremely important. Employees also feel vulnerable or "silly" sitting in an open space meditating or even more so with a VR device on their heads."* – TRIPP Inc. CEO, VR Mindfulness Developer

Recommendation: Practitioners seeking to reduce elevated levels of employee stress are recommended to help organizational stakeholders to understand the severe productivity losses that result from worker stress, and provide estimates of a stress management program's expected return-on-investment. Prior to the launch of the stress management intervention, practitioners should gauge employees' level of comfort around stress management techniques and inform them that feeling "uncomfortable" with stress management exercises is a common reaction and regular part of the learning process.

After the program is launched, organizations must continue to communicate their support of the stress management program and provide a private space for employees to test out and engage with the stress management techniques in a comfortable and psychologically safe environment.

Barrier 2: Modern Organizational Cultures

A second barrier and common misconception around stress management at work is that leveraging stress management behaviors and engaging in productive task performance are mutually exclusive. Therefore, even when employees do feel comfortable completing stress management techniques, they may not prioritize these practices in their day-to-day work lives. When asked, in both investigations, employees and HR leaders vocalized a keen interest and excitement over engaging in an innovative stress management intervention via VR mindfulness. However, despite positive intentions, stress management appears to be considered a secondary and noncritical workplace behavior. Said differently, when employees face daily workplace demands, there appears to be a lower prioritization of stress management activities, even if the interest in these programs is present. When high levels of productivity are required or expected, employees appear to default to prioritizing work tasks over engaging in stress management exercises.

Stakeholder Quote(s):

- *"The immersion of VR is a powerful mechanism to trigger a shift in your mood and mindset. We need these support solutions throughout our day."* – TRIPP Inc. CEO, VR Mindfulness Developer

When employees face high levels of workload, work pressure, and/or other workplace demands, employees often become cognitively stress-activated (Ursin & Eriksen, 2004) and report not having the time or bandwidth to make use of stress management techniques and technologies (Eriksen, 2002). This reality may generate a logical fallacy in the workplace that there is no time for stress management. Nevertheless, the VR mindfulness program only requires 8-minutes in total and may enable higher levels of concentration and productivity as a result (Good et al., 2016). This suggests that, in actuality, employees may have more to lose from *not* engaging stress management, especially as research indicates that employee stress and productivity are inversely related (Halkos & Bousinakis, 2010).

Stakeholder Quote(s):

- *"People often prioritize productivity over employee happiness and stress management, not realizing that one can often lead to another."* – TRIPP Inc. CEO, VR Mindfulness Developer

Additionally, confusion around the benefits of utilizing stress management techniques during the workday could be further compounded if the organizational culture does not support program participation. The United States ethos often encourages companies to establish cultures of "busyness" (Darrah, 2007). Being "busy" and having a lack of leisure time is viewed as a status symbol in today's society (Bellezza et al., 2017). Therefore, taking time "off the floor" and away from work to engage in stress management may, consciously or unconsciously, be perceived by employees, their supervisors, and senior leadership as laziness, an inability to work hard, and an indication

of one's moral character (Amos et al., 2019). Thus, participation in a stress management program may be verbally supported by an organization, yet the cultural subtext may prevent its utilization in practice.

Stakeholder Quote(s):

- *"I think a lot of the others did not end up using the VR as much as they thought they would be able to."* – Employee from *Organization Y*, Post-Program Luncheon
- *"I'm guessing that the people who dropped off on participation towards the end are not completing the final survey because they don't believe their feedback will be helpful. I'm not sure though."* – HR Leader, *Organization Y*
- *"There is stigma within companies associated with a perception that employees are "slacking" when they are "taking time for themselves". Even with an employer-sponsored wellness program, this is the biggest challenge for incorporating a wellness program successfully."* – TRIPP Inc. CEO, VR Mindfulness Developer

Recommendation: Organizations seeking to reduce employee stress are recommended to develop business practices and cultures that reflect this priority. For instance, companies can provide daily/weekly stress management practice, supervisor support, a less demanding work environment, and adequate rewards systems. To start, the practice of stress management must be feasible for employees during the typical workday. In practice, this means allocating time during the employees' workday specifically for stress

management exercises. Next, organizations are recommended to provide supervisor support for engaging in stress management on a daily or weekly basis. Supervisors that voice their support for engaging in stress management and practice the techniques are likely to have employees that do the same. Further, organizations are heavily encouraged to examine their expectations around employee workload and other environmental, workplace demands. For example, if employees simply have too much work to complete, stress management practice is less likely to occur. Lastly, organizations have a long history of rewarding one behavior in the workplace, while seeking another, and this approach often causes a workplace intervention to fail to meet its objectives (Kerr, 1975). Therefore, companies are be encouraged to reward both wellness and productivity to achieve stress management goals. Thus, when organizational cultures value, support, and reward employee wellbeing, in addition to high profit margins, companies will likely sustain a high level of participation in workplace stress management programs and succeed in reducing employee stress.

Barrier 3: Top-Down Leadership Support

If engaging in stress management may be considered countercultural in the United States workplace, top-down program support may be a key factor for achieving stress management program goals. As many of the barriers to employee stress management have addressed a lack of prioritization of employee stress reduction and incongruence with modern organizational factors, senior leadership buy-in is likely critical for stress

management programs' success. In the two investigations, HR leaders headed the stress management initiative and were invested in program success. Nevertheless, there was a lack of top-down, senior leadership support that led to program delays, extended chains of communication, and may have been salient to employees as well. In both companies, the HR leaders faced challenges in obtaining authorization from senior leaders to launch the stress management program. Further, upon program launch, the companies' senior leadership team failed to provide the time or allocate resources to support the success of the stress management program.

Stakeholder Quote(s):

- *"I understand the timing is important. We followed up with our COO again today. As soon as I get word I will get in touch with you."* – HR Leader, *Organization X*
- *"[I sent an] email to the Chief of Staff as well as a few other higher ups at the company to try and urge employees to complete the survey… At this point, I'm not sure what else I can do."* – HR Leader, *Organization Y*

Senior leaders set the example and drive success in organizational change initiatives (Hayes, 2018; Lines & Reddy Vardireddy, 2017). Further, top-down support for stress management has been identified as a critical factor for reducing employee stress (Jacobs et al., 2018). Senior leaders must concur that the stress management program is integral for achieving employee well-being and recognize the strategic value in engaging in occupational stress prevention and management. In the stage of stress management program development or initiation, there is a need for senior leadership involvement in

developing the program's vision and critical objectives (Donovan & Kleiner, 1994). For instance, before the program launch, senior leadership would be encouraged to attend key stakeholder meetings, contribute to the conversation around identifying program goals, and support the stress management program launch through organization-wide communications.

Once launched, senior leaders can support stress management behaviors through modeling and continued communications with the broader organization. Previous occupational health interventions suggest that perceived management support is directly related to wellness program participation, behavioral corrections, and employees' likelihood of engaging in positive daily habits (Cole & Brown, 1996). In the case of a VR mindfulness program, senior leaders could reinforce support for the stress management program by checking out the VR equipment and engaging in a mindfulness simulation themselves. Direct program engagement by senior leadership may be observed by employees and normalized the practice of stress management in the workplace.

Stakeholder Quote(s):

- *"Ensuring leadership buy-in is very important. If top management is seen as setting the example for incorporating wellness practices in their own day-to-day, the rest of the company will follow his or her lead."* – TRIPP Inc. CEO, VR Mindfulness Developer

Nonetheless, organizational leaders may need leadership training to support the successful implementation of stress management initiatives. It is common for corporate

leaders to be promoted due to their technical expertise rather than their leadership abilities (Allen, 2003), and, as a consequence, organizational leaders may not have the leadership acumen to successfully engage in change management. Thus, if senior leaders do not have the knowledge, skills, or abilities to oversee a stress management initiative or empower employees successfully, organizations would be encouraged to increase leadership acumen through a leadership development training program. Not only do leadership development programs generate higher levels of problem-solving, decision-making, interpersonal abilities, and general leadership abilities (Day et al., 2014), but there are also positive relationships between leadership development training and occupational health and safety outcomes (Kelloway & Barling, 2010). Therefore, organizations that seek to optimize organizational effectiveness and to manage employee stress must increase top-down support for employee stress management programs, which may be aided through leadership development training for senior leaders.

Recommendation: To effectively reduce employee stress, stress management initiatives must be embraced by senior leaders in a top-down approach. It is recommended that practitioners work closely with senior leadership to generate buy-in for any stress management program that is implemented. Senior leadership must be an active part of the conversation, model the stress management practices, and voice their support to the entire organization. Lastly, the senior leadership team may require leadership development training, prior to the development and implementation of stress management initiatives.

Barrier 4: New Technologies

Lastly, the new VR technology may have been a barrier to the success rates of the two workplace stress management programs. Innovation technologies enable stress management techniques to be delivered in a short, entertaining, and engaging manner. Despite these advantages, becoming comfortable with and adopting new technologies frequently comes with a learning curve (Ramsay et al., 2000). When individuals have the perception that VR technology is a.) challenging to understand, or b.) challenging to use, the rate of VR technology adoption will be slow (Alfalah, 2018). Inversely, if the VR technology is perceived to be simple to use, advantageous for personal performance, and supported by the environmental context and superiors, then individuals' intentions to engage with VR has been shown to increase (Shen et al., 2019). Therefore, additional training and resources that seek to enhance employees' abilities to use new technology will likely increase stress management program retention rates.

Stakeholder Quote(s):

- *"It took me a little while to figure out how to use the VR headset- you know, how to turn it on and how to move my head to select the program."* – Employee from *Organization Y*, Post-Program Luncheon
- *"Create areas that are serviced by hands-on associates who are there to help people with self-care practices - helping them get over the intimidation with using new technology solutions as well as new techniques that might seem awkward at first. Having that advocate or*

wellness concierge would be a game-changer." – TRIPP Inc. CEO, VR Mindfulness Developer

Recommendation: To address participant anxiety or uncertainty around the use of new equipment, practitioners are encouraged to go beyond merely presenting new technologies (i.e., VR equipment) to participants in a group kickoff session. For instance, in a VR mindfulness program, each participant could receive a one-on-one training session on how to use the VR headset and remote properly, or there could be a technology specialist on standby for the occasions when participants require further technological assistance. Alternatively, the physical presence of the practitioner may be an effective additional resource. An onsite practitioner would enable participants to directly ask questions regarding the technological components, the stress management practice, or other relevant program details and, therefore, contribute to employees' comfort with the program elements. Overall, the presence of a technical support individual would likely facilitate increases in employees' comfort with novel technologies (Aldunate & Nussbaum, 2013) and subsequent retention rates in stress management programs. After the introductory period, the new technology is likely to become familiar and comfortable to use.

Conclusion

If stress management programs are unable to retain employees, then organizations are likely to be unsuccessful in reducing elevated levels of employee stress. Nevertheless, despite the innovations to stress management delivery and technological platforms, program adherence appears to be a consistent challenge in employee strain

reduction. The contributing factors for this lack of adherence remain unexplained (Brown et al., 2016). Thus, exploring the reasons for high levels of stress management program attrition may be considered a critical need for the occupational health domain.

This Practitioner Report sheds light on modern-day stress management practices and innovative program delivery methods and provides data on the severity of stress management program attrition. The present paper examines numerous organizational barriers that arose during two organizational stress management programs and provides recommendations on how practitioners may tackle these obstacles to reduce employee stress successfully. This study contributes to occupational health literature by a.) informing academic literature of the practical limitations faced when implementing stress management interventions in an organizational context, and b.) highlighting the external factors that may impact practitioners' ability to implement an effective stress management program. Collectively, this Practitioner Report intends to aid in the successful implementation of innovative, high-tech stress management programs and to reduce the heightened levels of employee stress in the United States.

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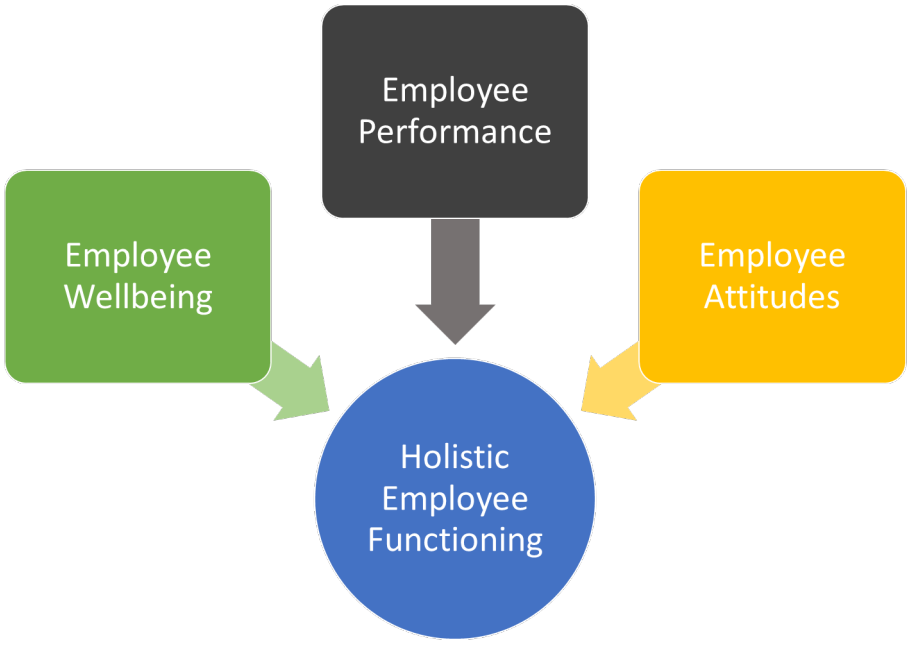
V. CONCLUSIONS

The collected papers final chapter will comprise of four sections. The first section will recap the collected papers' purpose, review the unique contributions of each manuscript, offer an overview of collective findings, and address the extent to which the objectives of the collected papers were achieved. The second section will expand on the theoretical implications of the collective papers and suggest future avenues of research. Third, the next section will examine how this collected papers dissertation may contribute to the understanding of holistic employee functioning in the workplace and make recommendations for practice. Integrating and extending collected papers findings with previous research, the third section will propose a comprehensive consulting framework to aid practitioners working in the occupational health space. Lastly, this chapter will conclude with final remarks.

Overall Purpose and Findings of the Collected Papers

The purpose of the collected papers was to advance the field of Industrial/Organizational Psychology by examining the impact of a workplace VR mindfulness intervention on holistic employee functioning. To investigate outcomes of interest, a VR mindfulness program was conducted in three corporate organizations in the United States. Each VR mindfulness intervention was developed and delivered with the intent of being a.) attractive to employees, b.) short in duration, and c.) effective in improving all three dimensions of holistic employee functioning (employee wellbeing, employee performance, and employee attitudes). The extent to which these specified, collected paper objectives were accomplished will be discussed in greater length below.

Figure I: *Holistic Employee Functioning*



When examining the first two objectives of this collected papers dissertation: delivering a wellbeing intervention that was brief and perceived as attractive to employees, all three organizational samples were successful. Concerning program perceptions, the VR elements were viewed as exciting, novel, and innovative. In day-to-day use, the VR mindfulness simulations could be used at any time during the workday, took only 8-minutes to complete, and did not require any additional trainer assistance. Further, in post-program reactions, the data indicated that the simulated mindfulness spaces were perceived as relaxing and as beneficial for increasing personal mindfulness. This suggests that VR platforms may indeed be an attractive and easy-to-implement resource for employee stress management, especially when paired with mindfulness techniques.

The third collected papers objective was to determine if programmatic VR mindfulness practice is an effective method of improving the three dimensions of holistic employee functioning: employee wellbeing, employee performance, and employee attitudes (*please see Figure 1*). *Manuscript #1* demonstrates evidence to support that employee wellbeing can be increased with VR mindfulness. The employee mindfulness practice led to increased happiness and reduced stress (e.g., generalized stress outcomes, burnout, and depressive symptoms). Further, these improvements in wellbeing were significant in their effect sizes. Therefore, the VR mindfulness program appears to improve the wellbeing dimension of holistic employee functioning significantly.

There was no evidence to support increases in the latter two dimensions of holistic employee functioning: employee performance and employee attitudes. *Manuscript #2* examined these findings in greater detail and expands on several explanations for why the VR mindfulness program yielded nonsignificant effects. It was suggested that the stress management program length may have been too short for stress-reduction. Thus, while job performance and job attitudes did not increase in the three-week period of VR mindfulness practice, there is reason to suggest that increases in job performance and employee attitudes would manifest if employees engaged in VR mindfulness practice for three months or longer.

Lastly, *Manuscript #3*, the Practitioner Report, contributed to this collected papers dissertation in a surprising manner. The collected papers dissertation initially proposed a data collection and research methodology based on implementing a VR mindfulness program in only *one* organizational setting. However, due to high levels of stress management participant attrition, two subsequent research investigations and

interventions were necessary to gather evidence to examine the impact of VR mindfulness at work. Thus, unexpectedly, these multiple, organizational data collections enabled an exploration of the common obstacles and challenges that practitioners face in stress management interventions, as well as what might be done in the future for increased employee wellbeing outcomes.

Together, this collection of papers contributes to occupational health psychology literature and depicts how employee functioning may be effectively improved through modern stress management strategies (i.e., VR mindfulness), which are short and attractive to employees. Unfortunately, the objective of increasing all three dimensions of holistic employee functioning: a.) employee wellbeing, b.) employee performance, and c.) employee attitudes through an innovative stress management program was only partially successful. This indicates that, although short, attractive, and exciting stress management interventions may successfully increase employee wellbeing, removing barriers to implementation may be necessary to enhance job performance outcomes and established job attitudes.

Theoretical Implications of the Collection of Papers and Future Directions

Overall, the collected papers showcase how employee wellbeing can be significantly improved with new and innovative methods of stress management program delivery (i.e., mindfulness techniques via VR). As discussed in length in *Manuscript 1 and 3*, employee wellbeing is critical for organizational effectiveness. Nevertheless, levels of employee stress may be said to be on the rise and likely to intensify; for instance, the modern-day worker may likely face increasing rates of technology-related challenges (i.e., technostress), global complexity, market volatility, and international

pandemics and uncertainty (Richardson, 2017). Thus, to counterbalance these workplace stressors, supporting wellbeing at work will enable employees to remain healthy and cognitively, emotionally, and physically engaged in their job tasks, workplace relationships, and able to continue to show up to work consistently, with focused attention and energy (Bakker & Demerouti, 2007; DeFrank & Cooper, 2013; Richardson & Rothstein, 2008). Therefore, implementing an attractive and brief stress management program contributes to the literature and will likely continue to be a critical need in the majority of organizational settings (Bakker & Demerouti, 2007). Future researchers would be encouraged to continue to develop short, attractive stress management interventions that effectively increase employee wellbeing.

Furthermore, future research should begin to assess the extent to which there is transfer of training with mindfulness practice. Beyond the advantages of engaging in mindfulness during specified sessions, future research investigations may seek to measure the extent to which employees experience increased mindfulness during other times during the workday (such as increased mindfulness during task completion or during social interactions/meetings). While there is a need for quantitative data on this topic, researchers posit that employees who practice mindfulness will naturally experience a high level of transfer of training by cultivating a habit of returning to present moment with attention and nonjudgmental awareness (Saks & Gruman, 2015).

There is also a need to continue to collect additional evidence to support and expand upon existing theories of mindfulness in the workplace. As discussed in *Manuscript 1*, future research should examine the mechanisms involved in the mindfulness – workplace outcome pathways, specifically testing the mediating variables

of attention, awareness, acceptance of one's present circumstances, and reactivity (physiological, cognitive, emotional, and behavioral reactivity; Good et al., 2016). Similarly, there is ample opportunity to explore new mediating or moderating factors that may be present or vary as a function of increased employee mindfulness. For example, perceptions of organizational justice may be impacted by employee mindfulness practice. Recent publications suggest that employees that practice mindfulness will be less likely to engage in retaliatory behaviors in the face of workplace injustices and leaders that practice mindfulness will cultivate more fair and healthy work environments for their employees (Long & Christian, 2015; Reb et al., 2019). Nevertheless, practicing mindfulness may highlight problematic aspects of the work environment through increased awareness and attention to the job environment. For instance, research indicates that employee mindfulness can positively buffer the detriments to wellbeing that often result from abusive supervision (Zheng & Liu, 2017), but in other contexts mindfulness amplifies the negative impact of abusive supervision on employee well-being (Walsh & Arnold, 2020). Thus, academic theory must continue to investigate and quantify the wide-reaching impacts of mindfulness practice in a workplace context.

The high level of attrition and null findings for the two dimensions of employee performance and employee attitudes showcases the importance of organizational leadership for holistic employee functioning. Detailed in the three collected papers manuscripts, many organizational leaders are beginning to understand the value of increased employee wellbeing, and some have even taken measures to deliver stress management programs in their companies. Thus, future occupational health literature would benefit from interventions that leverage senior leadership support in debunking

misconceptions and logical fallacies in stress management. For instance, the collected papers qualitative data suggests that engaging daily or weekly in stress management may be perceived to be less critical than everyday workplace tasks and demands. However, this is a misconception as the prioritization of mindfulness or other stress management techniques is likely to increase an employees' ability to engage in high productivity, creativity, and communication (Dane, 2011; Good et al., 2016; Kiken & Shook, 2011). This mental restoration is likely, in turn, to *expedite* the completion of job tasks, rather than pose a hindrance. However, without top-down support, *Manuscript 3* evidence suggests it will be challenging to cultivate an organizational culture that supports the practice, integration, and embodiment of stress management and employee wellbeing. Future research in this area should investigate methodologies that help practitioners garner top-down organizational support from corporate leaders and quantify the financial return-on-investment (ROI) of stress management interventions for increased senior leadership buy-in.

Similarly, if there is not adequate cultural support, then it will be unlikely for organizations to maintain a high level of employee participation in the stress management program tools and resources (*Manuscript 3*). As discussed in the Practitioner Report, an absence of leadership and cultural support may reduce the likelihood that companies will observe lasting effects in relation to improved employee wellbeing, if progressively more employees quit the stress management program over time. However, perhaps more importantly, without the support of time and encouragement to participate, organizations are unlikely to increase employee performance and attitudes, as desired. Consequently, stress management programs and policies must be integrated into organizational cultures

to become "business-as-usual" practices, routines, and events. Thus, if the organizational culture does not provide support as the initial foundation of stress management, then holistic employee functioning will not be able to increase, as low scores on any one dimension will impact the whole. Consequently, as academics, we must take care to avoid the previously documented temptations to encourage the promotion of *either* employee wellbeing *or* employee job performance, as the two may be equally as crucial for optimizing organizational effectiveness. Nonetheless, the multiple organizational examples documented in this collected papers dissertation suggest that leadership and organizational culture may be the missing link for augmenting employee functioning. As such, the relationships between the holistic employee functioning dimensions, organizational culture, and stress management program retention should be studied in greater depth in future research investigations.

Finally, occupational health psychologists have the opportunity and challenge of researching how stress management interventions can be effectively implemented in remote (work-from-home) settings. According to recent data from the National Bureau of Economic Research (NBER), due to the 2020 COVID pandemic, nearly 40% or more of the current workforce is currently telecommuting to work from home (Brynjolfsson et al., 2020). This significant and immediate cultural shift in present-day work practices may increase technostress (Molino et al., 2020), and decrease organizations' abilities to provide stress management interventions. To address rising levels of employee stress, future research must begin to investigate effective methods of engaging employees in stress management programs that can be implemented remotely.

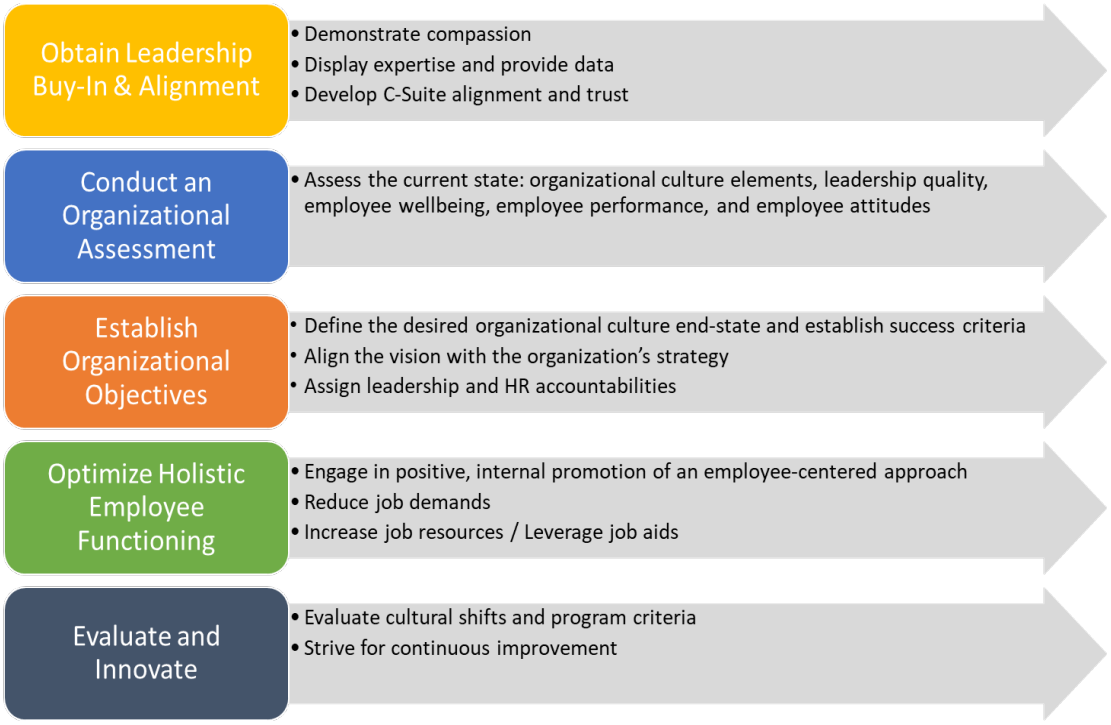
Recommendations for Practice

Due to the high levels of chronic, job-related strain that employees experience in their daily work lives, practitioners and organizational leaders require clear and effective processes and programs for the promotion of holistic employee functioning. Further, when organizational leaders and organizational cultures prioritize holistic employee functioning, high employee functioning will likely lead to increased organizational effectiveness. For instance, organizations exhibiting high levels of holistic employee functioning will likely be characterized by enhanced employee health, high levels of job performance, a psychological commitment to the organization, and high satisfaction with job-elements. Thus, the organizations that take a proactive, holistic approach to talent management, will likely see a significant return down the line.

Further, a culture that fosters holistic employee functioning is likely to have fewer expenditures as it relates to employee recruitment and selection, training and onboarding, and performance management. For instance, companies committed to employee wellbeing are view as more attractive to job seekers, resulting in increased job pursuit intentions (Merriman et al., 2016) and organizational support (Casper & Buffardi, 2004). Alternatively, since employee wellbeing is inversely related to burnout and turnover intentions (Anderson et al., 1999; Tuten & Neidermeyer, 2004), organizations that embody holistic employee functioning will likely have fewer costs associated with employee turnover, such as expenditures on employee selection, orientation, training, productivity losses (O'Connell & Kung, 2007; Waldman et al., 2004). Thus, holistic employee functioning may be considered as essential to individual employees, leaders and managers, organizations, and the United States and worldwide economy (Kalia, 2002).

Extrapolating findings from the collected papers manuscripts, and drawing on previous literature, a practitioner framework for holistic employee functioning is presented (*please see Figure II*). This framework will provide a comprehensive, step-by-step process detailing how to deliver a holistic employee functioning, workplace program that defines, assesses, and improves employee wellbeing, performance, and attitudes. This consulting framework may serve as an additional resource for internal and external consultants who specialize in the fields of occupational health, human resources, organizational development, leadership training, and talent management and seek to optimize organizational effectiveness.

Figure II: *Practitioner Framework for Holistic Employee Functioning*



Step 1: Cultivate Leadership Alignment

This collected paper dissertation describes how cultivating an organizational culture that promotes holistic employee functioning will likely require a top-down approach. As such, practitioners would be recommended to start by helping organizations to develop a clear organizational wellbeing leadership point-of-view (POV). Organizational leadership research indicates that developing clear POVs is critical to taking forward leadership action and organizational decision-making; a POV can be a strategic tool to drive actions towards a goal and may be viewed as an interaction between senior leadership, employees ("followers"), and the outside third party investigator (i.e., a consultant (Harter, 2012). For instance, to prioritize holistic employee functioning, senior leaders will likely have to take the POV that employee wellbeing, performance, and attitudes are all critical for organizational success. Nevertheless, as discussed in the collected papers, this POV may currently be undervalued by senior leadership teams. For this reason, it will be the role of the practitioners (as the third-party investigator) to aid in dispelling previous misconceptions and generating new POVs around this topic.

To consider how specialists can support organizations in promoting holistic employee functioning through clear and genuine communications, a practitioner model of trust will be examined. Harvard Business School professor, Dr. Frei, characterizes workplace trust as having three components: logic, authenticity, and empathy (Frei & Morriss, 2020). These core components of trust are underscored in other academic models of leadership and trust, as well (Gordon & Gilley, 2012). Thus, practitioners seeking to promote holistic employee functioning may cultivate trust and buy-in with senior leaders by providing a logical rationale for the benefits of taking an employee-

centered approach for increased organizational effectiveness by showcasing academic statistics, such as the data displayed in these collected papers. Provide leaders with evidence regarding the trends in employee stress, the impact of employee strain on relevant organizational outcomes (i.e., high levels of burnout), and how investing in holistic functioning may have a high ROI. If this logical explanation for holistic employee functioning is accepted, then it is more likely these leaders may alter their POV on the importance of holistic employee functioning.

While logic is a critical factor for building trust with senior leaders, compassion for an organization's current state will likely also be crucial to success. It is said that "it is lonely at the top", and data indicates that senior leaders are heavily burdened with high levels of work pressure, exhaustion, and a lack of emotional support (Zumaeta, 2019). Therefore, practitioners will be most likely to succeed in improving holistic employee function if they take a compassionate approach to build trust through an empathic and authentic partnership, rather than attempting to "sell" their services in a transactional manner (Glückler & Armbrüster, 2003). For example, practitioners would be encouraged to display empathy for the daily challenges faced by senior leaders, and then authentically present new potential avenues that would support a shift towards holistic employee functioning.

Step 2: Conduct an Organizational Assessment

Once senior leadership trust and a POV supporting holistic employee functioning are developed, an organizational assessment may be conducted. An audit of the current state of a company's organizational and employee functioning may be assessed via validated measures of organizational culture elements, leadership quality, employee

wellbeing, employee performance, and employee attitudes. The purpose of a comprehensive initial assessment is to obtain a better understanding of the contributors and detractors of organizational wellbeing, leadership, and engagement through the quantification of a company's culture, job demands, and employee resources. In this way, the organization assessment acts both as a training needs assessment (Brown, 2002) and a change management, force field analysis (Baulcomb, 2003).

As referenced in the *Introduction*, there are numerous methods practitioners can employ to collect information regarding the scope and sources of employee and organizational functioning, These data collection methodologies include survey, panel discussions, interview, or collecting objective data (e.g., absenteeism, sick days, and turnover). However, in most cases, it is recommended that organizational leaders be interviewed to obtain in-depth, qualitative data. On the other hand, company-wide employees will likely be surveyed via questionnaires for increased efficiency and to obtain quantitative metrics (Richardson, 2017). For example, in assessing the criteria of employee stress, the organizational assessment might collect scores to examine employees' generalized stress levels and particular strain outcomes, such as burnout or depressive symptoms.

Step 3: Establish Organizational Objectives

An organizational needs assessment is a critical starting point for any organizational program that seeks to change employee behaviors (Blanchard, 2014). Without data from an organizational assessment, it will be unclear where the gaps and barriers to holistic employee functioning lie and how to best assist companies in progressing forward. After completed, findings from the comprehensive assessment

enable practitioners to work in collaboration with organizational leaders to establish a new vision for the future state of employee and organizational functioning. In other words, an organizational assessment illuminates the present conditions of a company's current state so that this may be compared with the company's ideal end state to generate organizational objectives and strategic next steps for holistic employee functioning. Nevertheless, any cultural shift and corresponding objectives must be in alignment with the organization's broader goals and competitive strategy to be successful in creating positive change (Gill, 2002).

Once there is a clear direction for the holistic employee functioning initiative (based on an articulated vision and defined objectives), the next step is to mobilize resources towards the organizational change. While senior leadership buy-in is central to program success, this does not mean to suggest that senior leaders must be tasked with leading the change initiative. The ability to delegate is a core competency for effective leadership (Eales-White, 2005). Thus, senior leaders may set the direction of the program and then, through effective delegation, form a leadership or HR task force to implement new programs, plan and deliver communications to employees, and measure program success over time (Higgs & Rowland, 2000). Nonetheless, clear leadership and HR accountabilities should be defined before taking further action. Further, senior leaders may enhance employee wellbeing, performance, and attitudes through senior leadership modeling of stress management, maintaining top-down accountability for these goals, challenging the status quo, providing financial resources, and encouraging middle management alignment to organization program objectives and leadership training (Graetz, 2000).

Step 4: Optimize Holistic Employee Functioning

By *Step 4*, it is recommended that all stakeholders have firmly established senior leadership support for holistic employee functioning, a clear understanding of a company's current state, barriers to success, and other influencing organizational factors, concrete objectives for new initiatives, a task force to engage in change management, and a plan of action for optimizing employee functioning. Thus, by this stage, relevant stakeholders are prepared to implement strategies for increased holistic employee functioning. Next, by taking a multimethod approach to holistic employee functioning (through a blend of primary and secondary prevention strategies, see the *Introduction Chapter*), practitioners are likely to be successful in aiding organizations to achieve their objectives (Goldgruber & Ahrens, 2010). For instance, while traditional stress management programs will typically occur at the secondary level of prevention (Richardson & Rothstein, 2008), to achieve holistic employee functioning objectives, practitioners are recommended to prioritize methods of primary prevention as well. This multimethod approach to holistic employee functioning intends to minimize the extent to which negative employee wellbeing, performance, and attitudes manifest from the onset (Cooper & Cartwright, 1997; Murphy, 1995). For example, in practice, a holistic employee functioning initiative may consist of reducing workplace demands (i.e., workload, work pressure, organizational constraints), increasing job resources (i.e., autonomy, feedback, meaningfulness), providing stress management programs (i.e., mindfulness, deep breathing, job crafting), leveraging job aids (i.e., advanced technology, third-party vendors, database memberships), engaging in employee and leadership development (i.e., building trust, creativity, and time management), and/or implementing

new policies and procedure to promote wellbeing (i.e., work-life balance, walking meetings, healthy snacks/lunches).

The primary and secondary prevention methods and strategies that will be most effective in increasing employee wellbeing, employee performance, and employee attitudes will be directly related to the areas of opportunity identified in the organizational assessment (Bakker & Demerouti, 2007). For instance, if a company's assessment data reveals that employees experience a taxing workload, then organizations could hire additional personnel to reduce the number of tasks that employees must complete every day by (primary prevention) and engage employees in a VR mindfulness program (secondary prevention). Thus, the type of changes needed for holistic employee functioning will depend heavily on the organizational assessment results, and practitioners must tailor their initiatives to each organization's unique needs. Similarly, practitioners are recommended to consider other moderating factors when selecting the best optimization strategy (Bakker & Demerouti, 2007), such as financial resources, internal expertise, organizational reward systems, or industry type. For instance, the type of wellbeing initiative that will be most effective in increasing holistic employee functioning and achieving organizational objectives at a government agency may differ from that of a construction company.

Step 5: Evaluate and Innovate

Once new, organizational holistic employee functioning initiatives have been fully implemented, program stakeholders are recommended to examine their objectives and the scope of their initiatives before evaluating progress towards holistic employee functioning objectives (*Manuscript 2*). For instance, a quarterly or semi-annual

evaluation of holistic employee functioning may be a suitable timeframe for reviewing the criteria for success, comparing the start and current state, and determining if critical objectives have been met. Kirkpatrick's model (see the *Introduction Chapter*) provides a useful framework for examining program reactions, learning, behavior, and results (Kirkpatrick, 1975). To evaluate reactions and learning, practitioners are recommended to collect employee perceptions regarding holistic employee functioning initiatives and to assess the amount of learning that has occurred in training and/or stress management interventions, if applicable. As it relates to employee behavior and organizational results, Kirkpatrick's model allows stakeholders to measure the behavioral impact of holistic employee functioning initiatives on employee wellbeing, performance, and attitudes, and, lastly, to quantify the ROI of increased holistic employee functioning and organizational effectiveness (Arthur et al., 2003; Kirkpatrick, 1975).

Upon weighing evaluation evidence, if objectives are *not* achieved, stakeholders are recommended to identify the organizational barriers (i.e., a lack of top-down support; *Manuscript 3*), make course corrections and refinements, and continue to evaluate holistic employee functioning initiatives over time, through a continuous feedback loop (Goetzel et al., 2014). Once holistic employee functioning objectives are achieved, stakeholders are recommended to communicate the initiative's success to employees, align organizational systems and processes to reinforce the organizational changes, and internalize the change as the new normal (Hayes, 2018). Finally, to maintain a competitive advantage, organizations must continuously seek ways to innovate and improve holistic employee functioning with emerging, attractive, and innovative strategies (Hayes, 2018). Organizational cultures that actively foster holistic employee

functioning will be more likely to maintain high levels of employee wellbeing, performance, and attitudes over time. This is congruent with literature supporting the development of psychologically healthy workplace (PHW), in which companies "are dedicated to promoting and supporting the physical and psychological health and well-being of their employees while simultaneously incorporating solid business practices to remain as an efficient and productive business entity and having a positive impact on the their clients and community" (Day et al., 2014, p. 10).

Final Remarks

When considering the highly taxing and stress-inducing nature of the modern-day workplace, there is a serious need for organizations to take a strategic, employee-first approach to talent management and organizational culture development. At increasing rates, employees experience high levels of stress, burnout, depressive symptoms, and other adverse strain outcomes. What is often less salient to organizations is the impact that elevated levels of strain have on employee performance and attitudes, and how employees experiencing high levels of strain will be more prone to irritability, reactivity, presenteeism, absenteeism, counterproductive work behaviors, relational conflict, and more. Therefore, it is becoming increasingly evident that taking a whole-employee approach is strategic, rather than "fluffy" or "frivolous" in nature. However, despite mounting evidence, organizations tend to remain highly skeptical of spending time, energy, and financial resources on organizational initiatives that emphasize employee wellbeing as a key outcome. Accordingly, it was proposed that the best method for improving holistic employee functioning in the workplace was a workplace intervention that met the criteria of being: a.) attractive to employees, b.) short in duration, and c.)

able effectively improve all three dimensions of holistic employee functioning (employee wellbeing, employee performance, and employee attitudes).

For these reasons, the collected papers leveraged a VR mindfulness stress management intervention as a short and attractive method of improving holistic employee functioning. While this innovative stress management program garnered positive pre-program, organizations also faced unexpectedly high levels of employee attrition and were not always able to improve all three dimensions of holistic employee functioning. Nevertheless, when short, attractive, and effective stress management programs are paired with senior leadership support, there may be an increased likelihood of success. In other words, the leadership and organizational context may be equally as important as the specific qualities of the holistic employee functioning initiative. For this reason, the findings from the collective papers were used to develop a comprehensive practitioner framework. This framework seeks to integrate academically validated stress management solutions into an effective consulting process to increase holistic employee functioning objectives in a workplace context.

The reality is that employee wellbeing matters and impacts performance and attitudes. Thus, there is a need for organizations and senior leaders to foster employee wellbeing as a critical, strategic business objective. This collected papers dissertation will inform academics on innovative stress management practices, as well as the practical challenges faced when stress management strategies are employed in an organizational context. Further, the collected papers dissertation will enable practitioners to have more success in implementing attractive and effective holistic employee functioning initiatives. However, this strategic approach to optimizing talent and organizational effectiveness

will require time, effort, and a shift in senior leaders' POV on employee wellbeing. Nonetheless, when implemented effectively, the prioritization and optimization of holistic employee functioning in the modern-day workplace is likely to cultivate happier, healthier, and more effective employees (leaders included). In turn, the presence of high-functioning employees will likely enable innovative, dynamic organization cultures, supercharge company productivity and success, and empower companies to achieve their core missions.

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PUBLICATIONS AND PRESENTATIONS

Thompson, A., & Bruk-Lee, V. (2020). *Employee Happiness: Why We Should Care.* Applied Research in Quality of Life, 1-19.

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