2010

Workplace nutrition and exercise climate: Scale development and preliminary model test

Joseph J. Mazzola
University of South Florida

Workplace Nutrition and Exercise Climate: Scale Development and Preliminary Model Test

by

Joseph J. Mazzola

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Psychology
College of Arts and Sciences
University of South Florida

Major Professor: Paul E. Spector, Ph.D.
Tammy Allen, Ph.D.
Michael Brannick, Ph.D.
Joseph Vandello, Ph.D.
Chu-Hsiang Chang, Ph.D.

Date of Approval:
March 15, 2010

Keywords: Organizational climate, nutrition, exercise, health, & work environment

Dedication

I wish to dedicate this dissertation to several important people in my life. To my parents, who made me the person I am today and helped me in every way imaginable to get to this point in my personal and professional life. To my entire family, who have always supported me and believed I could do great things. To the teachers, professors and colleagues, from 1st grade through graduate school, who helped mold me and pushed me to do more than I even knew I had the ability to do. Most recently, that list includes, but is not limited to: Dr. Paul Spector, Dr. Jane Noll, Dr. Steve Jex, Dr. Craig Crossley, Dr. Robert Sinclair, and Dr. Irvin Schonfeld. You all inspire me to be the best teacher, researcher, and advisor that I possibly can.

Acknowledgements

I want to acknowledge Dr. Paul Spector, my graduate advisor. Without his guidance, revisions, advice, and infinite patience, I would not be graduating and moving on to my dream of working in academia. I would also like to acknowledge Dr. Tammy Allen, Dr. Michael Brannick, Dr. Joseph Vandello, Dr. Chu-Hsiang Chang, and Dr. Thomas Bernard who provided me with invaluable feedback and direction at all levels of this dissertation. Finally, I would like to acknowledge the Sunshine Education and Research Center at the University of South Florida who partially funded my work on this dissertation.

Table of Contents

List of Tables

List of Figures

Workplace Nutrition and Exercise Climate: Scale Development and Preliminary Model Test

Joseph J. Mazzola

ABSTRACT

Obesity is a major concern in the United States and has a multitude of negative physical and mental health consequences. Proper nutrition and exercise are important elements to initiating and maintaining a healthy lifestyle. Since most people spend a large amount of their time working, it is important that organizations create an atmosphere that is conducive to employees being able to eat healthy diets and exercise regularly. The social and environmental climate in terms of health was examined through the construct of a Workplace Nutrition and Exercise Climate (WNEC), defined here as the situational, social, and environmental factors within an organization that encourage and provide support to employees interested in eating healthy and exercising. This study sought to develop a scale for this construct and test its reliability, validity, and relationships to important health behavior and outcome variables. One-hundred and fifty-six participants were recruited to take an online survey, as well as provide contact information for 2 co-workers. Forty-three of these participants were successfully matched directly to 1 or 2 co-workers in their organization.

The scale showed evidence for reliability, through high internal consistency and interrater reliability. The results showed that the scale should be considered a single construct, but that individual nutrition or exercise can be measured if the user has

empirical evidence that it is necessary for their research question. The scale also improved on a previous measure of health climate in a number of ways. The construct was directly related to organizational health benefits, self-reported healthy diet, job satisfaction, and depression. Additionally, while the initial simple mediation model proposed was not supported by the data (neither proper diet nor exercising behaviors individually mediated the relationship between the new construct of workplace nutrition and exercise climate and the physical and mental health variables), some exploratory moderation models showed promising leads for future researchers. Specifically, males and females differed on their relationships between the current climate construct and the self-reported healthy diet and total exercise frequency variables.

Given the wealth of previous research that shows the negative effects of obesity, if these findings continue to be supported, it may indicate that WNEC plays a crucial, primary prevention role in helping employees get and/or stay healthy. Future research should continue to look at this new construct of WNEC, design studies that allow for aggregation and investigation of the shared climate, and determine how researchers and practitioners can create a healthy WNEC in an organization.

Introduction

Obesity is one of the major health issues facing the United States. As of 2003-2004, 66% of Americans were obese or overweight, and 33% were obese (Odgen, et al., 2006), putting them at risk for numerous health problems, such as cardiovascular disease (Krauss, Winston, Fletcher, & Grundy, 1998) and diabetes (Mokdad et al., 2003), the number one and number six causes of death in the U.S. (National Center for Health Statistics, 2008). Furthermore, research shows that obese individuals are often subject to prejudice and discrimination, and often deal with profound mental issues, such as low self-esteem and depression (Stroebe, 2008). While obesity is a problem worldwide, the obesity rate in the U.S. (33%) is much higher than that in countries with similar economic and social conditions, such as Canada (24%), the United Kingdom (24%), and Australia (15%; Stroebe, 2008), showing both the extent of the problem here in the U.S. and the real possibility that this percentage can be lowered. Proper nutrition and exercise are important parts of maintaining a healthy lifestyle and lowering body fat composition (e.g. Carlson, 1982; Akande, de Van Wyk, & Osagie, 2000). However, only 32% of Americans regularly engage in vigorous exercise (Gallup, 2007), and only 24% of them describe their diet as very nutritious (Gallup, 2008).

Despite these low adherence rates, few people would say that they wish to be less healthy and/or more out of shape. Therefore, almost everyone would like to improve or maintain his or her current fitness level. Research suggests that the initiation of health

behaviors, even small ones, needs to be part of a permanent life change, and not seen as a short-term fix (Snow & Harris, 1985). Moreover, most people juggle several responsibilities (e.g., work, school, family, etc.), and it can be difficult to make taking care of one's physical health a top priority through proper diet and exercise (e.g., Tavares & Plotnikoff, 2008). For these reasons, it is imperative that work environments, where people typically spend a large portion of their waking time, support these healthy behaviors. Some organizations now provide in-house gyms, fitness classes, health screening, and/or nutritional counseling to aid employees in maintaining a healthy lifestyle, and most previous research shows the value and importance of these interventions (e.g., Bertera, 1990; Heaney & Goetzel, 1997; Proper, Hildebrandt, Van Der Beek, Twisk, &Van Mechlen, 2003). However, the research on exercise and nutrition in the workplace has focused primarily on these interventions, and an employee's ability to begin or maintain their healthy lifestyle may go beyond just these benefits and promotion efforts. Thus, research must examine how the entire work environment, or organizational climate, supports healthy behaviors.

Organizational Climate and Workplace Health Climate

An organization's climate can have a profound effect on employee's thoughts, feelings, and behaviors. Organizational climate can be defined as the overall perceptions people have of their work settings (Schneider, 1975). Moran and Volkwein further clarified and formalized the definition with their cultural approach (1992), stating that organizational climate is "created by a group of interacting individuals who share a common, abstract frame of reference, i.e., the organization's culture, as they come to terms with situational contingencies, i.e., the demands imposed by organizational

conditions (p. 35).” Furthermore, climate can be conceptualized at the organization-, group-, or individual-level (Field & Abelson, 1982). For example, an organization may have a certain climate, but different work groups could have a climate distinct from other groups and/or the whole organization. Individuals also have a perception of climate around them, which may differ from that of the whole group/organization. While the individual perception probably plays a role in a person’s behaviors, most researchers support the view of climate as shared perceptions (e.g., Schneider, 1975; Reichers & Schneider, 1990). In the current study, climate will be measured at the individual-level, but the extent to which the climate is shared will also be investigated, as well as how the climate perceptions of others relates to important personal variables.

Finally, organizational climate can refer to the general climate in the workplace, or to a more specific aspect of the environment, such as a safety or health climate (DeJoy, Schaffer, Wilson, Vandenburg, & Butts, 2004; Basen-Engquiest, Hudmon, Tripp, & Chamberlain, 1998). In terms of facet-specific climate, Zohar (1980) posited this safety facet-specific definition: the overall “perceptions employees share about their work environment…a frame of reference for guiding appropriate and adaptive behaviors” (p. 96). Safety climate refers to how the work environment emphasizes and supports safe behaviors in the workplace, and in a recent meta-analysis, it related strongly to accident/injury prevalence (ρ = .22; Clarke, 2006). At any time, there will be any number of different climates within a workplace affecting the behaviors of employees. It is quite likely that a “health climate” exists as well, which communicates to the employees’ how much concern the organization and their co-workers have for their health and healthy

habits, and that may, in part, affect the frequency of healthy behaviors, such as nutritious eating and proper exercise, and individual health.

Previous research has shown the importance of organizational support, environment, and social aspects on individual eating and exercising behaviors, especially in the workplace. For example, managerial and organizational support are crucial factors in the effectiveness of health promotion and workplace health interventions (Pelletier, 2001), where the support of upper management influences the use of those programs, and likely communicates support for the employees' overall health. This sense of support may also affect whether employees engage in healthy behaviors on their own. Golaszewski, Allen, and Edington created the Organizational Health Environment Model (2008), which includes several aspects of the workplace that go into creating the health environment, including the organizational leadership, exogenous factors, and the employees themselves. In addition, the health environment itself was made up of work factors (i.e. industry, physical comfort, and job design), structural factors (facilities, services, and policies), and cultural factors (norms, values, and peer support). All of these factors would likely play a role in creating a healthy climate. Yancey and colleagues (2007) have suggested that in order to promote a public health infrastructure that supports behavioral changes for higher physical activity and energy expenditures, it is necessary to create social norms and promote policy and environmental factors. Therefore, many different factors, including environmental and social factors, may play a role in the health climate and the health behaviors of individuals.

Situational and environmental changes related to nutrition and exercise within the workplace can have a profound effect on healthy behaviors as well. In one study, a

program was implemented to increase fruit and salad options in the worksite cafeterias, as well as lower their price (Jeffrey, French, Raether, & Baxter, 1994). Employees' consumption of fruits and salad nearly tripled during the 3-week intervention period, although it returned to slightly above baseline 3 weeks after options and prices were returned to normal. Additionally, several environmental changes, such as painting the stairwell, putting up motivational signs, and adding music, were able to increase the use of stairs in a worksite (Kerr, Yore, Ham, & Dietz, 2004). These studies emphasizes the importance of environmental work factors in both eating and exercise behaviors, as well as the fact that health promotion activities do not need to be large-scale, expensive interventions, such as building a gym or offering health counseling.

Social factors can also have a very strong impact on whether someone adopts and/or maintains healthy behaviors. Social support was a significant predictor of adoption of health behaviors in army and civilian employees (Wynd & Ryan-Wegner, 2004). Undergraduates indicated having friends uninterested in healthy lifestyles, and going out with friends to eat and drink as two of the more common barriers to maintaining a healthy diet and exercising (Cason & Weinrich, 2002). Additionally, when asked what would help facilitate such a change, they mentioned one such factor would be having friends who encouraged healthy behaviors. Finally, Sorensen, Linnan, and Hunt (2004) suggested that initiatives to improve eating habits, specifically through increased fruit and vegetable consumption, require managerial commitment and supportive organizational structures and should address the social contextual factors that drive behaviors.

Based in part on some of the above findings, Ribisl and Reischl (1993) developed the first construct and measure of workplace health climate. Their conceptualization of

"health" encompassed the concepts of nutrition, exercise, smoking habits, and stress. The Worksite Health Climate Scale (WHCS), as they called their scale, included the areas of organizational support, interpersonal support, and health norms, which were further broken into 10 specific subscales, such as job flexibility to exercise, supervisor social support, and smoking norms. Each subscale contained between 2 and 9 items and had an alpha coefficient between .61-.95. The highest reliabilities were for the social support subscales (.88-.95), while the subscales containing information about exercise and nutrition climates had comparatively lower reliabilities: job flexibility to exercise (.61), nutrition norms (.69), exercise norms (.79), and pro-exercise attitudes (.62). Despite these low reliabilities, some of the subscales had important relationships. Specifically, nutrition norms were related to nutrition habits, and exercise norms were related to exercise habits. Several of the social support and flexibility subscales were also related to job satisfaction. Thus, in regards to the nutrition and exercise specific components of health climate, the WHCS appears to lack adequate internal consistency, but it did illustrate the promise of a construct of health climate.

Another scale was later developed to measure organizational health and safety climate (Basen-Engquiest et al., 1998). The final scale had both a safety factor and a health factor, which was confirmed by a factor analysis after poor items were deleted. The health factor represents a general health climate indicator, encompassing such topics as disease prevention, health consciousness, and smoking policies, but did not specifically take nutrition and exercise climate factors into account. The final health climate scale of 5 items (reduced from 9 based on factor and item analysis) had an alpha coefficient of .74. This health climate scale was also related to health-related criteria

measured in that study. However, the criterion measures used in that study should likely be considered a part of the health climate, as they further tap how health is supported in the organization. For example, participants were asked if they received encouragement from co-workers for eating low-fat foods and whether management seemed concerned whether they ate a healthy diet for outcome measures. This type of information taps the social and environmental factors surrounding health, especially exercise and nutrition, and should be considered part of the health, or nutrition-specific, climate. However, the strong correlations (.48 and .89, respectively) between those criterion items and the measure of workplace health climate from that study support the idea that these concepts may be heavily intertwined within the context of health climate. However, once again, this measure of health climate had low reliability and did not seem to adequately tap the climate specific to nutrition and exercise behaviors.

Finally, in previous research on health climate with the previously available scales, it was found that health climate increased more over a three year period in the Working Well Intervention companies than in control companies (Abrams et al., 1994). The Working Well Intervention was a sustained 2-year cancer control worksite health promotion intervention that included awareness materials, self-assessments, and direct education on a variety of health-related issues. The fact that the climate became healthier in these organizations shows that health climate is a potentially viable and fluid construct and that organizations may be able to improve their climate by creating environments that foster healthy behaviors.

Workplace Nutrition and Exercise Climate

These measures of workplace health climate were valuable building blocks in the development of the concept of nutrition and exercise climate, but there is a need for a more focused concept/measure with greater reliability. For one, both previous scales (Ribisl & Reischl, 1993; Basen-Engquist et al., 1998) included elements of overall health, smoking habits, and stress management, which may not be relevant to exercise and nutrition behavior, and thus, may not be of interest to some researchers and practitioners who try to measure climate. Smoking and stress are complicated variables, in relation to both their causes and their outcomes, and focusing on only nutrition and exercise, which are complex variables in their own right, may help to simplify the workplace climate being measured. Furthermore, most researchers focus their health promotion efforts on increasing physical activity and/or promoting proper nutrition, and they may want to know if their promotion had an effect on these specific areas of the workplace climate, not a more general measure of health climate. Due to the nature of the previous health climate scales, it is not currently possible for researchers to determine a score for climate relevant to only nutrition and exercise. Also, the more recent health climate scale published (Basen-Engquist et al., 1998) often used simply the term "health" in many of the items, which can be problematic for participants to interpret, as it assumes that the researcher and participant have the same definition of this term. The word "health" can be construed in many different ways (e.g., referring to any number of health behaviors, personal fitness levels, lack of sickness, and/or mental health, just to name a few), and without telling participants how it is being defined within the question, it could lead to participants essentially responding to the different questions within the same item.

Second, the previous health climate scales had relatively low reliabilities (.61-.79 for exercise or nutrition subscales in Ribisl & Reischl, 1993; .74 for Basen-Engquist et al., 1998) due to the small number of items and broad constructs. A larger scale, especially one that has a very specific focus like nutrition and exercise climate, should lead to improved internal consistency. Higher reliability will result in more precise measurement for researchers investigating these topics.

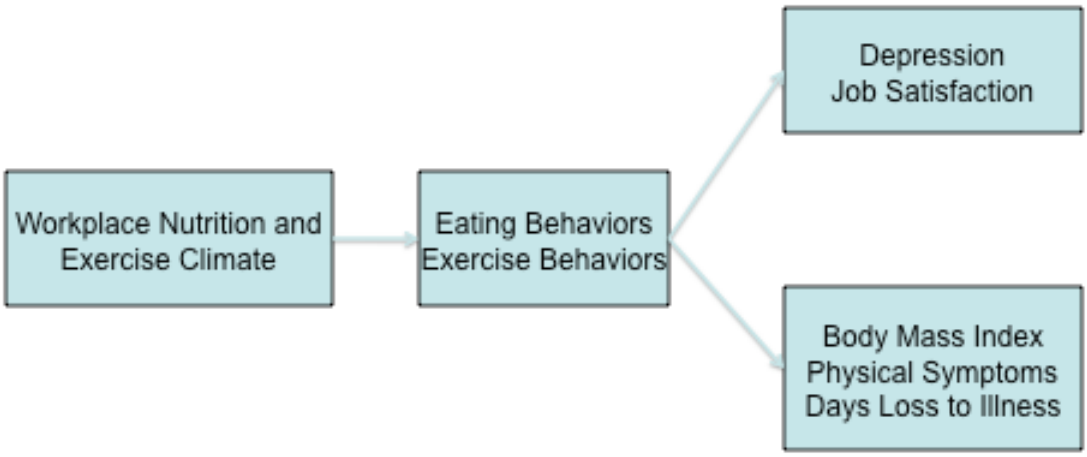
For the purpose of this study, workplace nutrition and exercise climate (WNEC) was defined as the situational, social, and environmental factors within an organization that encourage and provide support to employees interested in maintaining a healthy diet and exercising. This dissertation is meant to establish the existence of the construct of workplace nutrition and exercise climate, develop a scale to measure it (the Workplace Nutrition and Exercise Climate Scale, or WNECS), and test that scale for evidence of reliability and validity. Additionally, scores on the most recent health climate scale (Basen-Engqueist et al., 1998) were collected and compared to the WNECS scores for evidence of convergent validity, as well as show why the WNECS might be a superior scale for some researchers, depending on their research question.

It will also seek to test a preliminary model of how the construct interacts with other important health behaviors and health outcomes; this model is presented in Figure 1. Based on the previous findings on health climate, the new construct of WNEC was expected to relate to eating and exercise behaviors, since creating an environment supportive of these activities should increase their frequency. Furthermore, based on previous research, eating and exercise behaviors should be related to improved physical (e.g., body mass index) and psychological health (e.g., depression) indicators. Thus,

WNEC should also be related to the health indicators, but this relationship should be mediated by the eating and exercise behaviors. Each of the variables in this model and their relationships with adjacent variables will be discussed below.

Figure 1

Workplace Nutrition and Exercise Climate and Its Proposed Relationship



Eating and Exercise Behaviors

Physical health is an important issue in today's world, and just about everyone is concerned about his or her health in some way. Despite this concern, most people are failing to get enough exercise and/or are not eating a healthy diet (Gallup, 2007; 2008). One study surveying college students showed that most of them said they were not close

to living a healthy lifestyle (Cason & Weinrich, 2002). Thus, research suggests that young adults are not initiating healthy behaviors early in life, nor are the majority of adults maintaining them. These behaviors are important for maintaining both physical and psychological health as shown by extensive research throughout the years (e.g., Pauly, Palmer, Wright, & Pfeffier, 1982; Akande, et al., 2000; Donnelly et al., 2004). For example, one of the major differences found between individuals with poor physical health versus good or moderate health is that they tended to both exercise less and consider proper food choices less important (Harris & Guten, 1979). From a psychological standpoint, exercise has also been prescribed as a treatment in conjunction with psychotherapy (Hays, 1999). People who make conscious decisions to eat right and get regular physical activity are going to be healthier mentally as well as physically. Many factors go into determining a person's physical health, including but not limited to: nutrition, exercise, smoking and drinking habits, stress, and genetics. Thus, while there are several ways that individuals may try to increase their health, in this investigation, exercise and nutrition behaviors will be the main focus, as they are the behaviors most often suggested by professionals/scientists/doctors (e.g., Fogelman et al., 2002) and participated in by individuals (e.g., Harris & Guten, 1979; Levy & Heaton, 1993) to improve or maintain health and fitness levels.

Proper diet and exercise are difficult to define, as different people may find that different combinations of these behaviors work for them as compared to others. However, many behaviors are considered fairly universally by researchers to be healthy habits. For this study, eating behaviors was conceptualized through self-perceived healthiness of one's diet and the amount of fatty foods eaten. It is expected that individuals have a

relatively good idea of how healthy their diets are as a whole. Also, while eating a certain amount of some types of fat can be part of healthy diet, it is likely that those who consume a large amount of any type of fat have less healthy diets than those eating less fatty foods. Exercise was conceptualized by a number of different physical activities that were broken down by their intensity: strenuous (e.g., running, soccer), moderate (e.g., fast walking, moderate weightlifting), and mild (e.g., easy walking, golf).

It is expected that working within a positive climate for nutrition and exercise will reduce some barriers for proper nutrition and exercise behaviors. Therefore, those who have a work environment high in WNEC should eat better and exercise more. In previous climate research, a strong positive safety climate was shown to relate to safety behaviors (Clarke, 2006). Furthermore, exercise and nutrition norms were positively related to their respective health behaviors, meaning at least the norms of an organization play some role in determining if employees engage in healthy habits (Ribisl & Reischl, 1993). Therefore, it seems plausible that a healthy nutrition and exercise climate will be related to appropriate eating and exercise behaviors.

Hypothesis 1a: Workplace nutrition and exercise climate will be positively related to the self-perception of the healthiness of one's diet and fat intake.

Hypothesis 1b: Workplace nutrition and exercise climate will be positively related to total and strenuous exercise frequency.

Physical Health

While physical health can also be operationalized in a variety of ways, here it defines one's ability to maintain a healthy weight and avoid illnesses. Specifically, in this study, the physical health of individuals was measured with three constructs: body

type/body fat composition (measured through body mass index based on self-reported height and weight), physical symptoms, and days lost at work due to illness.

The first, body mass index (BMI), is a measure of whether an individual is underweight, normal weight, overweight, or obese. High BMI, or obesity, has been shown to be a risk factor for a wide variety of health problems, including high blood pressure, high cholesterol, diabetes, asthma, and arthritis (Mokdad et al., 2003; Stroebe, 2008), as well as cardiovascular disease (CVD; Krauss & Winston, 1998), which is the number one leading cause of death in the United States (National Center for Health Statistics, 2008). Additionally, obesity during middle age has been shown to relate to lower quality of life in old age (Daviglus et al., 2003). If individuals are able to reach and/or maintain a healthy weight, their overall physical health and lifestyle should improve. Finally, obesity has consequences for organizations as well. In a study of group-level health care expenditures, being overweight was linked to significant organization expenditures (Anderson et al., 2000). Therefore, organizations have both a social responsibility and economic imperative to support healthy behaviors and weight management in their employees as much as possible.

The problems associated with obesity and overall poor health can manifest themselves in variety of long-term (e.g., CVD and diabetes) and short-term (e.g., fatigue, stomachache) health problems. The second health indicator, physical symptoms, is an inventory of how often a person feels a variety of smaller physical ailments. Since getting sick is a direct indication of poor health, this is an effective way to look at how a person's physical health is suffering. Individuals may experience physical symptoms because of a short-term illness (like the flu) or a more permanent problem (like CVD) and research

does show that individuals who exercise have fewer physical symptoms than those who do not (Ensel & Lin, 2004). Finally, the third health indicator to be measured, days lost due to illness, is related to the effects of physical symptoms. When an employee is feeling ill for any reason, it is likely he or she will miss one or more days of work. Employers seek to minimize absenteeism because it can have a profound financial impact on the organization, above and beyond the wages of the lost employee (Pauly et al., 2002). An employee with poor health is likely to miss more days at work, whether from a short- or long-term illness. In fact, BMI has been directly linked to absence, with overweight and obese employees having significantly more days lost (Bungum, Satterwhite, Jackson, & Morrow, 2003).

Eating a nutritious diet and exercising are two of the best ways to control weight and maintain a healthy body mass index (e.g. Wang, Patterson, & Hills, 2003; Donnelly et al., 2004). Numerous research studies support the link between physical health and maintaining a healthy diet (e.g. Harris & Guten, 1979) and exercise habits (e.g., Marcus, Bock, Pinto, Napolitano, & Clark, 1996), but the few examples given here focus particularly on organizational research. In a study of availability and participation in health programs, those who participated in at least one exercise program provided by their workplace were healthier in terms body mass index (Grosch, Alterman, Peterson, & Murphy, 1998). For nutrition, Allen and Armstrong (2006) found that fatty food consumption was related to body mass index. A diet rich in protein and carbohydrates, and relatively low in fat, is another commonly used method for weight control, and it is even more effective when combined with exercise. Proper and colleagues (2003) found that employees randomly assigned to the intervention group and given the opportunity to

receive individual counseling on physical activity and healthy nutrition habits showed an improvement in total energy expenditure, percentage of body fat, and blood cholesterol after the 9 month intervention. Thus, both types of healthy behaviors were expected to relate to body mass index.

Hypothesis 2a: Self-perception of the healthiness of one's diet and fat intake will be negatively correlated to body mass index.

Hypothesis 2b: Total and strenuous exercise frequency will be negatively correlated to body mass index.

It also is expected that nutrition and exercise behaviors will be negatively related to the experience of physical health symptoms, specifically upset stomach, fatigue, chest pain, headaches, and other minor health problems. There is strong evidence that proper nutrition habits are related to physical health in a variety of ways. For example, eating the daily recommendation of fruits and vegetables works as a protective factor against various cancers, coronary heart disease, and stroke (Van Duyn & Pivonka, 2000). Higher physical fitness, as measured by a maximal treadmill exercise test, was related to lowered all-cause mortality over an 8-year follow-up (Blair et al., 1989). Allen and Armstrong (2006) further found that fatty food consumption was negatively related to overall health, and physical activity was positively related to overall health and negatively related to health disorders. Staying fit through exercise has been shown to delay mortality in these individuals, particularly by lessening the occurrences of cardiovascular disease and cancer. These findings support the link between health behaviors and serious health complications and emphasize the importance of finding ways to support these behaviors. However, it is difficult, particularly with self-report to get an accurate measure of these

serious illnesses. Nonetheless, it is possible to get information about short-term health symptoms that may be more proximal to health behaviors.

In terms of short-term illness, poor health choices are linked with lowered physical fitness through resting heart rate and systolic blood pressure (e.g. Pauly et al., 1982; Blair, 1985), which may increase the likelihood of minor problems such as fatigue, shortness of breath, and heartburn. Also, exercise is often used to cope with stress (Sinyor, Schwartz, Peronnet, Brisson, Seraganian, 1983), which research consistently shows is related to physical symptoms (e.g., Jex & Beehr, 1991; Spector & Jex, 1998, Nixon, Mazzola, Bauer, Spector, & Krueger, in press). Therefore, proper diet and exercise behaviors should improve health and lead to fewer symptoms, through a lowered prevalence long- and short-term illnesses.

Hypothesis 3a: Self-perception of the healthiness of one's diet and fat intake will be negatively correlated to physical symptoms.

Hypothesis 3b: Total and strenuous exercise frequency will be negatively correlated to physical symptoms.

Finally, in addition to the fact that physical symptoms will lead to increased absence in the form of sick days, some research has also looked at how employee health behaviors relate directly to absenteeism. Specifically, those employees who were high adherents to a health promotion program showed a significant decrease in absenteeism (Cox, Shepard, & Corey, 1981). Another study showed that taking part in an employee fitness program had the potential to lower absenteeism in both regular and irregular participants (Kerr & Vos, 1993). Similar findings have been found in other studies on health promotion programs (e.g., Waston & Gauthier, 2003; Bertera, 1990). This research

has been predominantly based on health promotion interventions because companies who implement these programs want to see that they are getting a return on their investment in the form of less productive days lost. Nonetheless, these studies show that healthy behaviors do have the potential to lower all absenteeism, particularly due to illness, and the current study sought to establish this relationship directly.

Hypothesis 4a: Self-perception of the healthiness of one's diet and fat intake will be negatively correlated to days lost due to illness.

Hypothesis 4b: Total and strenuous exercise frequency will be negatively correlated to days lost due to illness

Mental Well-Being

An individual's mental health can also be operationalized and measured in many different ways. There are different indicators for a positive mental outlook, but only a few were chosen for measurement in this investigation. Given the adult, high-functioning, working population investigated in this study and the constraints of the survey, the concentration will be on two variables: depression levels and job satisfaction.

Job satisfaction, or one's satisfaction level with his or her job, is an often studied concept because of the important role it plays in the life of an employee (e.g., Agho, Mueller, & Price, 1993; Judge, Thoresen, Bono, & Patton, 2001), and it was utilized in this study as measure of personal mental well-being. Job dissatisfaction can have a negative impact on the organization and on other aspects of the individual's life. If an employee is dissatisfied, it may negatively affect their job performance (Judge et al., 2001) and/or overall life satisfaction (Judge & Watanabe, 1993). Many factors go into a person's perception of job satisfaction or dissatisfaction with their job, including

characteristics of the job and person (Agho et al., 1993), but the positive mood effects of good health and healthy behaviors should also lead to perceptions of lower dissatisfaction with all aspects of life, including their job.

Depression is a serious psychological problem that can hinder an individual's ability to function in day-to-day life, especially for those diagnosed with severe cases. However, everyone experiences some levels of depression from time to time. In this study, we are more interested in minor, daily fluctuations of depression, not clinical diagnoses, defined here as unpleasant emotions of sadness and negative mood (Ledwidge, 1980).

In addition to the important physical benefits of nutrition and exercise, research has shown they can have positive mental health effects as well. In one study, high-fit individuals were found to be more intellectual, emotionally stable, self-confident, easygoing, and relaxed than their low-fit counterparts (Young & Ismail, 1976). While it is not possible to determine if healthy behaviors caused these personality traits or vice versa, it does suggest that those who do exercise tended to be more mentally healthy. Additionally, participation in a worksite exercise program was shown to decrease trait anxiety and improve self-concept (Pauly et al., 1982), and thus, those individuals have an overall better feeling about themselves and their lives. Furthermore, individuals placed in a moderate training program, 20 minutes of jogging or walking to raise heart rate to 60-65% of HRmax, which is the normal maximum heart rate of an individual during exercise, had significantly lower depression than controls (Steptoe, Edwards, Moses, & Mathews, 1989). Another study showed that exercise-induced reductions of state anxiety lasted up to 2 to 3 hours (Raglin & Morgan, 1987). Finally, Falkenburg (1987) suggests

that physical activity is an effective way to cope with work and life stressors that could lead to any number of mental strains, such as burnout or depression (Jex & Beehr, 1991). All in all, the research in this area shows that individuals who exercise have significantly lower levels of depression. Unfortunately, there is currently little research on the relationship between nutrition and mental health, but at least one researcher suggests that long lasting changes in attitudes and lifestyle related to proper nutrition can affect body image and self-esteem (Cusack, 2000). This study investigated the direct link between healthy eating and exercise behaviors and depression.

Hypothesis 5a: Self-perception of the healthiness of one's diet and fat intake will be negatively correlated to depression.

Hypothesis 5b: Total and strenuous exercise frequency will be negatively correlated to depression.

While research on the relationship between physical activity promotion programs and job satisfaction remains inconclusive (Proper et al., 2003), there has been very little research on the direct link between healthy behaviors and job satisfaction. One study did find exercise to be directly related to enthusiasm at work and indirectly related job satisfaction (Thogersen-Ntoumani, Fox, & Ntoumanis, 2004). Finally, some of the original health climate subscales (Ribisl & Reischl, 1993) were correlated to job satisfaction. The current study will seek to establish a more direct connection between both nutrition and exercise behaviors and job satisfaction.

Hypothesis 6a: Self-perception of the healthiness of one's diet and fat intake will be positively correlated with job satisfaction.

Hypothesis 6b: Total and strenuous exercise frequency will be positively correlated with job satisfaction.

Workplace Nutrition and Exercise Climate to Health Outcomes

Finally, since the construct of workplace nutrition and exercise climate is expected to relate to the healthy behaviors of eating and exercise, and those behaviors are expected to relate to both the physical health and mental health indicators, it is hypothesized that WNEC will be related to all health indicators.

Despite the expected mediation, climate should also relate directly to the health outcomes. Due to the scarcity of health climate research, there is currently little evidence on the nature of these relationships. However, Ribisl and Reischl (1993) did look at the correlations between their health climate subscales to a few outcome variables. Several key climate subscales had significant relationships with physical symptoms (e.g., supervisor and co-worker social support), stress (e.g., supervisor support), and job satisfaction (e.g., supervisor and co-worker support, employer's health orientation, and job flexibility to exercise).

Hypothesis 7a: Workplace nutrition and exercise climate will be negatively correlated with body mass index.

Hypothesis 7b Workplace nutrition and exercise climate will be negatively correlated with physical symptoms.

Hypothesis 7c: Workplace nutrition and exercise climate will be negatively correlated with days lost to illness.

Hypothesis 7d: Workplace nutrition and exercise climate will be positively correlated with job satisfaction.

Hypothesis 7e: Workplace nutrition and exercise climate will be negatively correlated with depression.

Previous health researchers (Ribisl & Reischel, 1995; Basen-Engquist et al., 1998) examined only direct relationships with behaviors and outcomes and did not examine any broader models. Thus, the proposed mediation model (see Figure 1) has not been previously tested with any measure of health climate, so this will mark the first research to investigate more complex relationships between health climate, behaviors and outcomes.

Hypothesis 8a: The relationship between workplace nutrition and exercise climate and body mass index will be mediated by self-perception of the healthiness of one's diet, fat intake, total exercise, and/or strenuous exercise.

Hypothesis 8b: The relationship between workplace nutrition and exercise climate and physical symptoms will be mediated by self-perception of the healthiness of one's diet, fat intake, total exercise, and/or strenuous exercise.

Hypothesis 8c: The relationship between workplace nutrition and exercise climate and days lost to illness will be mediated by self-perception of the healthiness of one's diet, fat intake, total exercise, and/or strenuous exercise.

Hypothesis 8d: The relationship between workplace nutrition and exercise climate and depression will be mediated by self-perception of the healthiness of one's diet, fat intake, total exercise, and/or strenuous exercise.

Hypothesis 8e: The relationship between workplace nutrition and exercise climate and job satisfaction will be mediated by self-perception of the healthiness of one's diet, fat intake, total exercise, and/or strenuous exercise.

In summary, the purposes of this study are to (1) create a scale to measure the construct of workplace nutrition and exercise climate, (2) test the scale for evidence of reliability and validity, check the factor structure, and compare it to a previously-validated health climate scale (3) examine important relationship between climate, behaviors, and health outcomes, and (4) conduct a test of the proposed preliminary mediation model presented in this study.

Method

Participants

One-hundred and fifty-six full-time workers (working at least 32 hours per week on average) participated in the study. Participants were 68.6% female with a mean age of 30.6 (*SD* = 10.7) and tenure of 4.4 years (*SD* = 2.1). The ethnicity distribution was 77.4% White/Caucasian, 8.4% African-American/Black, 6.5% Asian, and 3.2% Hispanic. Additionally, in terms of body type, over half of the participants were normal weight (52.6%), while 29.5% were overweight and 15.4% were obese. This makes the sample healthier than the overall U.S. population, in which about 1/3 of people are obese (Ogden et al., 2006).

Participants were either recruited through a university participant pool (*N* = 64) or through recruitment emails (See Appendix A) sent to employees in a variety of positions and organizations (*N* = 92). When recruited from university classes, participants were given class participation or extra credit for filling out the survey. The two groups were compared for differences in demographics, and the only differences were that the working university students were younger and had shorter tenure, which is to be expected. All participants were sent a survey (See Appendix B) asked to provide two email addresses of co-workers, who were then emailed a link to another shorter survey (See Appendix B), as well as a participant number used to link them to the main survey partcipant. Participants in both the main and co-worker surveys (regardless of how they

were recruited) were placed in a random drawing to receive 1 of 25 pedometers. These prizes should have been enough compensate the participants for their time, but not enough to coerce them to participate against their will.

All participants were asked to provide the name of the organization they worked for, and the sampling procedure utilized resulted in participants from a wide variety of organizations. The organizations included, but were not limited to: universities, grocery stores, electronic stores, construction companies, and even an amusement park. No information was provided by the participants about exactly what type of work they did in these organizations (i.e., clerical, sales, etc.), but based on the different types of organizations represented, it is likely that a wide variation in job types was present.

Once the final 20-item WNECS was created, a total score was calculated for each participant, considered a measure of the participant (or perceptual)-level climate measure. Additionally, forty-three participants from 39 different organizations could be linked directly to at least one co-worker based on the participant number provided by the co-worker in the survey (12 of which could be linked to 2 co-worker surveys). Based on these connections, in addition to the individual-level WNECS scores, a co-worker-level WNECS score was calculated for each participant, which included the average of the 1 or 2 connected co-workers for those 42 participants (one co-worker filled out only the health climate measure). This same procedure was done for the health climate measure, resulting in both a participant- and co-worker-level score for that metric as well (this time all 43 participants connected to the co-worker data).

Measures

Workplace Nutrition and Exercise Climate Scale. The Workplace Nutrition and Exercise Climate Scale (WNECS) tested in this study contained 23 items. The complete scale can be found in the main survey in Appendix B. The WNECS was constructed with the aforementioned definition in mind, based on earlier pilot work testing a larger sample of items and determining if the item wording was clear. These items were created by several researchers at the University of South Florida who were familiar with the subject and utilized the literature on nutrition, exercise, and climate. The items include "Employees in this organization support the exercise habits of others." and "My coworkers openly discuss if they eat a healthy diet." The scale was answered on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Worksite Health Climate. The 5-item scale developed by Basen-Engquist and colleagues (1998) was included in both the main and co-worker surveys (See Appendix B). This scale is meant to measure a general health climate and is answered on a 5-point Likert scale from 1 (Disagree Strongly) to 5 (Agree Strongly). Internal consistency of this scale in its initial testing was .74.

Health Benefits. The health benefits scale, which was also developed during the pilot study, was created specifically for the current study. It contains 9 items, and for each one, participants are asked if their organization has the specific benefits and if the person uses it. These benefits include: health insurance, health screening, on-site medical professionals, on-site workout facilities, exercise or fitness challenges, free or reduced gym membership costs, health counseling, personal trainers, and flexible work hours.

Eating Behaviors. Eating behaviors was measured in two ways. First, a modified version of the Fat Intake Scale was utilized (Retzlaff, Dowdy, Walden, Bovbjerg, & Knopp, 1997). The 10 items have varying response option, but are all meant to tap how much fat an individual consumes on average. Also, an additional one-item measure was included to gauge self-perceptions of the healthiness of the person's diet: "I have a healthy diet." This item was answered on a 7-point Likert scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

Exercising Behaviors. Exercise frequency was measured using a modified version of the Godin Leisure Time Exercise Questionnaire (Godin & Shephard, 1985). This scale asks participants how often in an average week they exercise, breaking the activities into three intensity categories and each category has sample anchor activities to help participants correctly identify their exercise habits: strenuous (e.g., running, soccer), moderate (e.g., fast walking, moderate weightlifting), and mild (e.g., easy walking, golf). The responses are then combined through a formula that weights the heavier activities stronger to get a total exercise score: (9 x strenuous) + (5 x moderate) + (3 x mild). For the hypotheses in this study, the total exercise and strenuous exercise metrics were used.

Body Mass Index. Participants were asked to provide their height (in feet and inches) and their weight (in pounds), and BMI was calculated based on the standard equation (World Health Organization, 1995). To do this, the person's weight in pounds is divided by the person's height in inches squared. That number is then multiplied by 703 to compensate for using English measurements. This value can be compared to the requisite charts to classify individuals into underweight, healthy, overweight, and obese as established by the Centers for Disease Control and Prevention. A BMI of less than 18

means the individual is underweight, between 18 and 24.9 is normal weight, between 25 and 29.9 is overweight, and 30 or greater means obese. In this study, raw BMI scores were used to avoid losing variance by categorizing participants. It is generally accepted that there is meaningful differences within body weight categories, particularly between different levels of obese individuals (e.g., Riva et al., 2006). Participants were, however, broken into weight classes in the exploratory moderator analyses.

Physical Symptoms. Physical symptoms were measured using the Physical Symptoms Inventory (PSI), developed by Spector and Jex (1998). This is a commonly used self-report measure of physical strains (e.g., Cvetanovski & Jex, 1994; Hall & Spector, 1991) and was recently reduced to its 13 most common symptoms. These 13 items represent several health problems, such as upset stomach, headache, trouble sleeping, and fatigue. Respondents are asked to indicate how often the symptoms occurred during the past six months.

Job Satisfaction. Job satisfaction was measured using the 3-item scale developed by Cammann, Fichman, Jenkins, and Klesh (1983), which was meant to tap global satisfaction with one's job. The three items (“All in all, I am satisfied with my job.”, “In general, I don't like my job.”, and “In general, I like working here.”) are answered on a 7-point Likert scale from 1 (Strongly Disagree) to 7 (Strongly Agree). Alpha values from previous studies range from .67 to .95 (Fields, 2002).

Depression. Self-reported depression was measured using the respective subscale from the shortened version of the Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995). The subscale has 7-items and is answered on a scale from 0 (Did not apply to me at all) to 3 (Applied to me very much, or most of the time). Evidence for

construct validity for the full version of the DASS has been reported by Crawford and Henry (2003), who showed that it have solid psychometric properties in a large general adult population. Specifically, they found strong support for its construct validity, where the depression scale was highly correlated with other established scales of depression and had high internal consistency (α =.95).

Attitudes Toward Health Behaviors. The 4 items about health attitudes were developed for this study. They are answered on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). They specifically assessed beliefs, motivation, knowledge, and advocacy of nutrition and exercise.

Other Measures. Also included was a single item measure of absenteeism, "How many days of work have you missed due to illness in the last 3 months?" The following demographic variables were collected as well: age, ethnicity, gender, company name, and tenure.

Procedure

Each participant, either recruited via a university online participation pool or recruitment email, followed a link to an online survey containing the above measures. As part of the survey, participants were asked to provide two email addresses of co-workers, who were then be emailed a link to another shorter survey. The co-workers were sent an email about the survey that contained a link to the online co-worker survey (See Appendices A & B) containing only basic demographics, the WNECS, and the health subscale of the Worksite Health and Safety Climate Scale (Basen-Engquist et al., 1998). This survey was administered online, and co-workers were be given a participant number to enter into the survey to connect their data to the participants. Participants (both main

participants and co-workers) were asked for their email address or phone number to contact them if they won a pedometer, but this information was kept separate from the survey data and was not used to identify them in any way. The data was converted from the online website to Excel for easy upload to SPSS.

Data Analysis

A reliability analysis was used to determine poor items that could be deleted from the WNECS and establish its internal consistency. Item-total correlations were be used to determine if an item should be deleted. An exploratory factor analysis was also used to explore the factor structure of the scale, as well as to compare the WNEC and health climate items simultaneously.

To look at interrater agreement on the perception of WNEC, as well as health climate, by the workers within the organization, two statistics were examined. First, a simple Pearson correlation was examined between the individual participant-level climate and the co-worker level climate. Second, an ICC(1) was calculated, which can be interpreted as an effect size, showing how much of individual ratings of climate are attributable to group membership (LeBreton & Senter, 2008).

Pearson correlations determined the relationship between the climate measures, health benefits and attitudes, health behaviors, and physical and mental health outcomes. These correlations were used to establish convergent and discriminant validity for the WNECS and to test Hypotheses 1-7. Whenever two correlations are compared for a significant difference between their strength within the same sample, a Hotelling's *t*-test was used. Whenever two correlations were compared in two separate samples (i.e., comparing correlations for males versus females), a Fisher's Z-test was utilized.

To determine the mediation effects of healthy behaviors on the WNEC-health indicators relationships (Hypotheses 8a-8e), these three steps were completed as suggested by Baron and Kenny (1986). First, WNEC needed to be shown to related to the various outcome variables by running regression with WNEC as the predictor and the health indicators as the outcome. Second, WNEC needs relate to health behaviors by regressing the mediator variables on it, here eating and exercise behaviors. Finally, both WNEC and health behaviors need to be regressed onto the outcome variables to determine the mediation effect of the behaviors. The Sobel significance test was to be utilized for any regression that passed these steps (Sobel, 1982). These regressions were run for the participant- and co-worker-level WNECS scores on the employee outcomes.

Finally, an exploratory moderation analysis was conducted for gender and BMI weight class. To accomplish this, separate correlations were calculated by group membership. For those correlations that showed the largest and significant differences, moderated regressions were then conducted.

Results

Final Scale Development and Reliability

The reliability analysis (N = 156) for the 23-items of the WNECS is presented in Table 1. The initial scale, where all 23 items were tested, had an internal consistency of α = .95. However, items number 19 and 20 were deleted because they had lower item-total correlations (below .51) than the remaining items, and item 1 was deleted as one of the remaining exercise-related items with a lower item-total correlation to even the scale at 20 total items and 10 each for nutrition and exercise. The items were also reordered so that odd items contained wording relevant to nutrition climate and even items were relevant to exercise climate. Even after deleting those three items, the internal consistency of the final scale was still α = .95. This new, final version of the scale is presented in Table 1, along with the item-total correlations from both reliability analyses. The final scale has a mixture of nutrition and exercise items that ask about a variety of elements of the work environment, management/organizational support, and social aspects of an organization. While some items with lower item-total correlations are still present, they are important because they cover the whole breadth of the construct, and the scale still maintains a high internal consistency.

Table 1

Reliability Analysis of the Workplace Nutrition and Exercise Climate Scale (WNECS)

Final Item Number	Scale Item	Initial Item-Total Correlation	Final Item-Total Correlation
1	This organization is concerned with whether I eat healthy.	.636	.621
2	The organization has sufficient programs that promote proper exercise habits.	.702	.700
3	Employees in this organization place a high value on eating properly.	.767	.765
4	Employees in this organization support the exercise habits of others.	.662	.645
5	The majority of employees in this organization eat a healthy diet.	.566	.574
6	If I wanted/needed to improve my fitness level through exercise, it would be easy to do in my work environment	.713	.708
7	The organization has sufficient programs that promote proper nutrition.	.650	.647
8	My work environment allows sufficient time for me to exercise.	.593	.603
9	Coworkers bring healthy meals to work to eat for lunch/snacks.	.607	.604
10	Supervisors make it known that they participate in physical activities outside of work.	.641	.642
11	People here are supported for eating healthy.	.772	.774
12	Employees in this organization place a high value on exercising.	.812	.812
13	My supervisor shows concern that employees eat properly.	.715	.721
14	The majority of employees in this organization exercise regularly.	.628	.632
15	If I wanted/needed to improve my fitness level through proper nutrition, it would be easy to do in my work environment.	.712	.710
16	Employees in this organization are active in sporting activities.	.637	.627
17	Supervisors make it know that they eat a healthy diet.	.709	.712
18	I have the opportunity to discuss and receive guidance regarding exercise while at work.	.718	.695

19	My work environment allows sufficient time for me to eat properly.	.516	.526
20	My supervisor shows concern that employees get regular exercise.	.716	.724
X	This organization is concerned with whether I exercise.	.596	n/a
X	My coworkers openly discuss if they engage in some type of exercise during non-work hours.	.481	n/a
X	My coworkers openly discuss if they eat a healthy diet.	.466	n/a

Note: "X" indicates that the items were deleted after the initial reliability test and are not part of the final 20-item scale.

The mean for the 20-item scale was 57.97 (*SD* = 16.15). To further test and support the reliability of this scale, the internal consistency for the scale was also calculated independently for the co-worker data (*N* = 70), which had not been used in the other two reliability analyses performed. This reliability analysis resulted in a Cronbach's alpha of .92. Additionally, within the co-worker sample, all of the item-total correlations were above .42.

To investigate interrater reliability/agreement, the participant-level WNECS scores were correlated to the co-worker average on the WNECS. As they were significantly related ($r = .45$, $p < .01$, $N = 42$), this provides some initial evidence for interrater reliability. This correlation between participant and co-worker scores is higher than it was for Basen-Engquist and colleagues' health climate measure in the current sample, which was not significant. ($r = .24$, *n.s.*, $N = 43$). Additionally, an intraclass correlation was calculated for WNECS. The ICC(1) was .49, where typically anything greater than .25 is considered a "strong" effect (LeBreton & Senter, 2008). The ICC(1) for the (Basen-Engquiest et al.) health climate measure was .33. These findings support the aggregation of WNEC to the group- and/or organizational-level.

One Construct Versus Separate Facets

An exploratory factor analysis without a rotation was conducted on the WNECS, as well as ones utilizing Varimax and Quartermax rotations. The eigenvalues from this analysis suggest only one factor is present (See Table 2 & Figure 2). All of the items loaded on the first factor when no rotation was used, and no reasonable factor structure could be interpreted from the factor loadings with either of the rotations (See Table 3). Additionally, the two subscales (nutrition climate and exercise climate) were highly correlated to one another ($r = .91$, $p < .001$). Therefore, there is sufficient evidence to believe that workplace nutrition climate and workplace exercise climate are highly intertwined constructs, and that the WNECS can be utilized as a scale of a single construct.

Table 2

Eigenvalues from the Exploratory Factor Analysis of the WNECS Items

Component	Initial Eigenvalues	% of variance
1	10.16	50.80
2	1.61	8.05
3	1.25	6.27
4	1.04	5.20
5	.79	3.94
6	.77	3.83
7	.67	3.34
8	.57	2.86
9	.49	2.44
10	.46	2.32
11	.41	2.05
12	.34	1.69
13	.31	1.55
14	.29	1.42
15	.23	1.15
16	.21	1.05
17	.13	.65
18	.12	.62

19	.10	.51
20	.05	.27

Figure 2

Scree Plot of Eigenvalues for WNECS Items

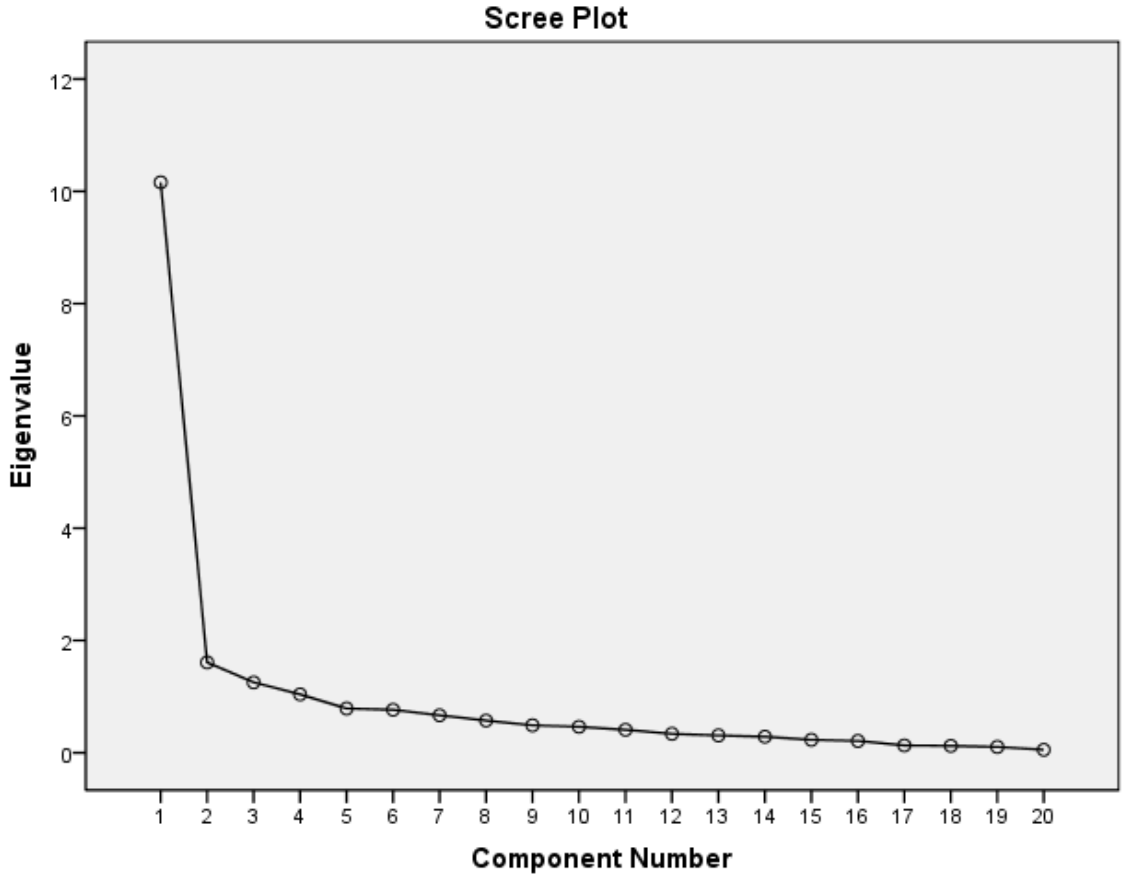


Table 3

Factor Loadings of WNECS Items With a Varimax and a Quartermax Rotation

Item	Varimax		Quartermax	
	Factor 1	Factor 2	Factor 1	Factor 2
1. This organization is concerned with whether I eat healthy.		.77	.61	.50
2. The organization has sufficient programs that promote proper exercise habits.		.86	.67	.56
3. Employees in this organization place a high value on eating properly.	.53	.60	.79	

4. Employees in this organization support the exercise habits of others.	.55	.42	.69	
5. The majority of employees in this organization eat a healthy diet.	.69		.66	
6. If I wanted/needed to improve my fitness level through exercise, it would be easy to do in my work environment	.36	.70	.70	.34
7. The organization has sufficient programs that promote proper nutrition.		.83	.62	.58
8. My work environment allows sufficient time for me to exercise.	.36	.54	.61	
9. Coworkers bring healthy meals to work to eat for lunch/snacks.	.65		.67	
10. Supervisors make it known that they participate in physical activities outside of work.	.69		.71	
11. People here are supported for eating healthy.	.61	.53	.81	
12. Employees in this organization place a high value on exercising.	.56	.63	.83	
13. My supervisor shows concern that employees eat properly.	.73	.34	.79	
14. The majority of employees in this organization exercise regularly.	.71		.71	
15. If I wanted/needed to improve my fitness level through proper nutrition, it would be easy to do in my work environment.	.36	.70	.71	.35
16. Employees in this organization are active in sporting activities.	.68		.70	
17. Supervisors make it know that they eat a healthy diet.	.81		.79	
18. I have the opportunity to discuss and receive guidance regarding exercise while at work.	.51	.53	.72	
19. My work environment allows sufficient time for me to eat properly.		.50	.54	
20. My supervisor shows concern that employees get regular exercise.	.73	.34	.79	

Note: Only factor loadings higher than .3 are presented in this table.

The nutrition and exercise subscales were correlated with the other variables in the study. and despite the evidence that the two constructs are highly correlated, some significant differences were found (See Table 4). Exercise climate was more strongly related to the number of health benefits available and utilized. The correlation between

self-reported healthy diet and nutrition climate was significantly higher than its correlation to exercise climate, but this difference was not significant for fat intake. Also, while exercise climate had a higher correlation with total exercise than nutrition climate, this difference was not significant. Furthermore, nutrition climate had a slightly higher correlation with depression and exercise climate had a slightly higher correlation with health attitudes, but neither difference was significant. These findings suggest that although the WNECS subscales are highly correlated, there is some distinctions between them in terms of relationships to constructs within their own domain—exercise or nutrition.

Table 4

Correlations between Workplace Nutrition and Exercise Climate Subscales and Study Variables with Comparison Test

	Workplace Nutrition Climate-Participant (N = 156)	Workplace Exercise Climate-Participant (N = 156)	Hotelling's t-test
Health Benefits – Available	.35**	.43**	$t(146) = -2.58$, $p < .05$
Health Benefits – Utilized	.44**	.51**	$t(146) = -2.45$, $p < .05$
Self-Reported Healthy Diet	.35**	.28**	$t(153) = 2.32$, $p < .05$
Fat Intake	-.13	-.11	*n.s.*
Total Exercise	.13	.16	*n.s.*
Strenuous Exercise	.17*	.17*	*n.s.*
Body Mass Index	-.06	-.09	*n.s.*
Physical Symptoms	-.03	-.04	*n.s.*
Days Lost to Illness	-.06	-.05	*n.s.*
Job Satisfaction	.46**	.45**	*n.s.*
Depression	-.18*	-.13	*n.s.*
Health Attitudes	.22**	.26**	*n.s.*

* $p < .05$, ** $p < .01$

Characteristics of Study Variables

For each scale, the number of items, number of main participants who completed the scale, range, means, standard deviations, skewness statistic and internal consistencies (where applicable) are presented in Table 5.

Table 5

Number of Items, Number of Participants, Range, Means, Standard Deviations, and Internal Consistencies of All Study Measures

Scale	# of items	*N*	Range	*M*	*SD*	Skew	*α*
WNECS - Participant	20	156	22-96	57.97	16.15	-.20	.95
WNECS – Co-worker	20	42	32-81	58.48	12.64	-.17	-
Health Climate - Participant	5	148	5-23	12.78	3.96	.13	.78
Health Climate – Co-worker	5	43	7-19	13.19	3.00	-.02	-
Health Benefits – Available	9	149	0-9	3.74	2.65	.67	-
Health Benefits – Utilized	9	149	0-7	1.77	1.61	.94	-
Self-Reported Healthy Diet	1	156	1-5	3.55	.97	-.82	-
Fat Intake	10	149	11-33	22.83	4.58	-.04	.68
Total Exercise	3	140	0-334	37.94	37.63	4.12	-
Strenuous Exercise	1	145	0-10	1.72	1.79	1.12	-
Body Mass Index	n/a	152	18.6-46.6	25.83	5.46	1.38	-
Physical Symptoms	12	145	13-49	22.82	6.73	1.15	-
Days Lost to Illness	1	156	0-10	.88	1.65	3.20	-
Job Satisfaction	3	156	5-17	14.13	2.63	-1.28	.92
Depression	7	136	7-19	7.94	1.84	2.81	.81
Health Attitudes	4	148	4-20	16.17	3.00	-1.36	.83

Note: Internal consistency could not be calculated for scales that had only 1 item (i.e. healthy diet perception), utilize a formula to calculate the scale totals (i.e. exercise total), or were a collection independent events (i.e. physical symptoms and health benefits).

All the variables have ranges that run through all or almost all of the possible scores, except for depression (which is expected since this is a non-clinical sample), so

significant range restriction in the analyses was unlikely. Skewness statistics were also calculated for each of the variables. All variables were within the acceptable range (between +2 and -2), except for total exercise, days lost to illness, and depression, all of which were skewed positively. For these three variables, transformations were conducted by taking the square root of the values, which is commonly used in positively skewed samples because it pulls in high outlier values and is appropriate as long as all values are positive and at 1 or above, as was the case for these variables (Osborne, 2002). When the transformations were used in analyses, the relationships between the variables in question are reported for both the transformed and non-transformed skewed variables.

Hypotheses 1-7: Direct Relationships Between WNEC, Healthy Behaviors, and Health Outcomes

The correlations between the WNEC and other variables in the study are shown in Table 6. The correlations were also computed with the transformed data for total exercise, days lost to illness, and depression variables, but this did not change the significance of any of the relationships. Based on the results of the correlational analysis, Hypotheses 1a and 1b were partially supported. Self-perceived healthy diet was related to WNEC at the participant- and coworker-level, but the fat intake scale was not related at either level. Additionally, strenuous exercise frequency was significantly related to WNEC at only the participant-level. No other relationships between WNEC and healthy behaviors were significant.

The relationships between the two different WNEC levels (participant and co-worker) and the study variables were compared with Hotellling's *t*-tests using only the participants that had values for all three variables in question, and the results confirmed

that most of the correlations were similar for both levels. However, significant differences occurred between WNEC and health benefits utilized (participant-level higher, .43 to -.03, $t(39) = 3.66$, $p < .01$) and depression (co-worker-level higher, -.08 to -.52, $t(33) = 2.88$, $p < .05$).

Table 6

Pearson Correlations between WNEC at Participant- and Co-worker Levels and Key Study Variables

	WNEC - Participant *(N =156)*	WNEC - Co-worker *(N =42)*
Health Climate	.74**	.59**
Health Benefits - Available	.40**	.24
Health Benefits - Utilized	.48**	-.03
Self-Reported Healthy Diet	.32**	.44*
Fat Intake	-.12	-.15
Total Exercise	.15 (.15)	.22 (.22)
Strenuous Exercise	.17*	.19
BMI	-.08	-.28
Physical Symptoms	-.03	-.16
Days Lost to Illness	-.06 (-.12)	-.05 (-.04)
Job Satisfaction	.46**	.33*
Depression	-.16 (-.20)	-.52** (-.52**)
Health Attitudes	.25**	.32*

*$p < .05$, ** $p < .01$

Note: Each WNEC measure was correlated to its corresponding health climate (i.e., Participant-level WNEC was correlated with participant-level health climate). Correlations with the transformed variables are listed in parentheses.

Table 7: *Correlations Between Main Study Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. WNEC - Participant	-														
2. WNEC - Co-worker	.45**	-													
3. Health Climate - Participant	.74***	.51**	-												
4. Health Climate - Co-worker	.24	.59***	.42**	-											
5. Health Benefits – Available	.40***	.24	.29***	.08	-										
6. Health Benefits – Utilized	.48***	-.03	.43***	.06	.52***	-									
7. Self-Reported Healthy Diet	.32***	.44**	.29***	.34*	.19*	.26*	-								
8. Fat Intake	-.12	-.15	-.19*	.15	-.04	-.20*	-.29***	-							
9. Total Exercise	.15	.21	-.03	-.10	-.02	.05	.13	-.06	-						
10. Strenuous Exercise	.17	.19	.07	.01	.06	.09	.27**	-.10	.52***	-					
11. Body Mass Index	-.08	-.28	-.01	-.20	-.03	-.04	-.17*	-.05	-.06	-.15	-				
12. Physical Symptoms	-.03	-.16	-.02	.01	-.07	-.16	-.19*	.01	.02	.05	-.02	-			
13. Sick Days	-.06	-.05	-.16	-.34*	.02	-.02	-.03	-.07	.05	-.01	.06	.34***	-		
14, Job Satisfaction	.46***	.33*	.34***	.20	.16	.31***	.14	.02	.11	.11	-.24**	-.25**	-.30**	-	
15. Depression	-.16	-.52**	-.16	-.14	.06	-.04	-.15	.02	-.05	-.06	.11	.38***	.25**	-.35**	-
16. Health Attitudes	.25**	.33*	.21*	.25	.08	.22**	.22**	-.27**	.11	.24**	-.12	-.01	-.01	.06	-.21*

* $p < .05$, ** $p < .01$, *** $p < .001$

The correlations between all of the main variables utilized in this study are presented in Table 7. Of the hypotheses examining relationships between healthy behaviors and health outcomes (Hypotheses 2-6), only Hypotheses 2a (that healthy eating behaviors would be significantly correlated to body mass index) and 3a (that healthy eating behaviors would be significantly correlated with physical symptoms) were partially supported. In both of these hypotheses, self-reported healthy diet was correlated significantly to the outcomes of body mass index (r = -.17, p < .05) and physical symptoms (r = -.19, p < .05), respectively. Neither healthy eating behaviors variable (self-reported healthy diet or fat intake) was significantly related to days lost due to illness, depression, or job satisfaction, lending no support to Hypotheses 4a, 5a, and 6a. Despite numerous studies showing the link between exercise and body weight, physical health, and mental well-being, neither total or strenuous exercise were significantly related to any health outcome variables. Thus, Hypotheses 2b, 3b, 4b, 5b, and 6b were also not supported by the data.

In Hypothesis 7, it was expected that WNEC would be directly related to body mass index (7a), physical symptoms (7b), days lost to illness (7c), job satisfaction (7d), and depression (7e). Hypotheses 7a, 7b, and 7c were not supported, since WNEC was not significantly related to body mass index, physical symptoms, or days lost to illness at either level. However, Hypotheses 7d and 7e were partially supported as WNEC was significant related to job satisfaction at the participant-level (r = .46, p < .01) and depression at the co-worker-level (r = -.52, p < .01). While co-worker perceptions of the climate had moderate correlations to body mass index (r = -.28) and physical symptoms (r = -.16), neither of these correlations were significant.

Some additional notable correlations existed. While self-reported healthy diet was related to health benefits (both available and utilized), total exercise did not have any significant relationship to either variable, particularly unusual since many of the benefits were exercise-focused. Also, total exercise and self-perceived diet had only a small, non-significant correlation with one another (r = .13, *n.s.*), but strenuous exercise was significantly related to self-perceived healthy diet (r = .27, p < .01). Fat intake was only moderately correlated with healthy diet perceptions, r = .29, p < .001. Fat intake was not related to any measure of exercise. It is also interesting to note that WNEC had similar, and even slightly higher, relationships to the healthy behaviors and body mass index than either having or using more organizational health benefits. In terms of health attitudes, attitudes towards health were significantly related to WNEC at both levels and both healthy eating behaviors, but was only related to strenuous (not total) exercise. Health attitudes were not related to any of the health outcomes directly, except depression (r = -.21, p < .05).

The Workplace Nutrition and Exercise Climate Scale, Previous Health Climate Measure, and Health Benefits

There is evidence for convergent validity in that the WNECS relates to the previous measure of health climate (Basen-Engquist et al., 1998) and health benefits provided. However, as expected, these correlations were not so high as to suggest that the new scale was measuring the same construct as that scale. Specifically, the WNECS and the health climate measure are strongly but not perfect correlated to each other (r = .74, p < .001 in participants, r = .59, p < .001 in co-workers). Second, when all 25 items (20 from the WNECS, 5 from health climate measure) were placed in a factor analysis

together, the health climate items had some of the lowest loadings on the 1st factor, and 3 of the 5 health climate items begin to load on a 2nd factor (See Table 8). The one item that seems to load strongest with the WNECS is item 2 of the health climate ("Most employees here are very health conscious", Basen-Engquist et al., 1998), which falls particularly in line with the definition of WNEC, and in this question especially, the word "health" is especially likely to be interpreted as meaning eating and exercise behaviors by many participants.

Table 8

Factor Loadings of the WNECS and Health Climate Measure Items When Analyzed Simultaneously in an Exploratory Factor Analysis

Item	Factor 1	Factor 2
1. This organization is concerned with whether I eat healthy.	.65	
2. The organization has sufficient programs that promote proper exercise habits.	.73	
3. Employees in this organization place a high value on eating properly.	.78	
4. Employees in this organization support the exercise habits of others.	.68	
5. The majority of employees in this organization eat a healthy diet.	.62	
6. If I wanted/needed to improve my fitness level through exercise, it would be easy to do in my work environment	.72	
7. The organization has sufficient programs that promote proper nutrition.	.69	
8. My work environment allows sufficient time for me to exercise.	.62	
9. Coworkers bring healthy meals to work to eat for lunch/snacks.	.64	-.40
10. Supervisors make it known that they participate in physical activities outside of work.	.69	
11. People here are supported for eating healthy.	.81	
12. Employees in this organization place a high value on exercising.	.82	
13. My supervisor shows concern that employees eat properly.	.77	.31

14. The majority of employees in this organization exercise regularly.	.68	
15. If I wanted/needed to improve my fitness level through proper nutrition, it would be easy to do in my work environment.	.73	
16. Employees in this organization are active in sporting activities.	.67	
17. Supervisors make it know that they eat a healthy diet.	.76	
18. I have the opportunity to discuss and receive guidance regarding exercise while at work.	.74	
19. My work environment allows sufficient time for me to eat properly.	.54	-.42
20. My supervisor shows concern that employees get regular exercise.	.78	.31
Health Climate 1. At my workplace, sometimes we talk with each other about improving our health and preventing disease.	.55	
Health Climate 2: Most employees here are very health-conscious.	.74	
Health Climate 3: Around here they look at how well you take care of your health when they consider you for promotion.	.53	.50
Health Climate 4: My supervisor encourages me to make changes to improve my health.	.69	.50
Health Climate 5: Supervisors always enforce health-related rules (smoking policies, requirements about medical examinations, etc).	.51	.52

Note: Only factor loadings higher than .3 are presented in this table.

In terms of health benefits, WNEC scores had a higher correlation to several important variables than simply having more health benefits available. Specifically, the WNECS had stronger relationships than health benefits available to job satisfaction (.46 to .16, $t(146) = 3.76$, $p < .001$) and depression (-.16 to .06, $t(146) = -2.50$, $p < .05$) in the expected direction, and a third, total exercise, approached significance (.15 to -.02, $t(146) = 1.93$, $p < .10$).

When comparing the WNECS from the current study to the previous health climate scale (Basen-Engquist et al. 1998), there are several important differences

between the two scales and their relationships. The reliability is higher for the WNECS (.95 in this study for main participants) than the health climate scale (.78 in this study, .74 in validation study). Also, as previously mentioned, the WNECS demonstrates higher interrater reliability both through correlations between co-workers perceptions and ICC(1). While the relationships between climate and behaviors/outcomes were similar at the participant-level for both climate measures (See Table 7), WNECS was significantly related to strenuous exercise and the health climate scale was significantly related to fat intake. However, the idea that the WNECS has a stronger shared perception than the health climate scale is further supported by the co-worker climate to behaviors and outcomes relationships. Co-worker WNECS had significantly stronger Pearson correlations (in the predicted/expected direction) than co-worker health climate with fat intake (-.15 to .15, $t(39) = -2.18$, $p < .05$), total exercise (.22 to -.10, $t(35) = -2.18$, $p < .05$), and depression (.52 to -.14, $t(39) = -3.15$, $p < .01$). Additionally, other moderate differences existed that were not significant: physical symptoms (-.16 to .01) and job satisfaction (.33 to .21).

Each of the benefit, behavior, and outcome variables were regressed on WNEC and the health climate measure simultaneously (both at the participant-level), and the results of those regressions are presented in Table 9. When there was a significant relationship present, it was typically the WNECS that was the significant predictor, specifically for health benefits (available and utilized), healthy diet, total and strenuous exercise in the predicted direction, and job satisfaction. The notable exception was for days lost to illness, which was better predicted by health climate.

Table 9

Regression of Benefits, Behaviors, and Outcomes on WNECS and the Health Climate Measure

	Climate Measure	Standardized Beta Weights at Participant-level
Health Benefits – Have	WNEC	.39**
	Health Climate	.00
Health Benefits – Use	WNEC	.35*
	Health Climate	.17
Self-Reported Healthy Diet	WNEC	.25*
	Health Climate	.11
Fat Intake	WNEC	.04
	Health Climate	-.22
Total Exercise	WNEC	.37*(.31*)
	Health Climate	-.30*(-.21)
Strenuous Exercise	WNEC	.27*
	Health Climate	-.15
Body Mass Index	WNEC	-.15
	Health Climate	-.10
Physical Symptoms	WNEC	-.02
	Health Climate	-.01
Days Lost to Illness	WNEC	.15(.07)
	Health Climate	-.27* (-.26)
Job Satisfaction	WNEC	.49***
	Health Climate	-.02
Depression	WNEC	-.09(-.10)
	Health Climate	-.09 (-.08)
Health Attitudes	WNEC	.19
	Health Climate	.06

Note: Beta weights from analyses with the transformed variables are listed in parentheses.
* $p < .05$, ** $p < .01$, *** $p < .001$

Mediated Regression Results

The results of the mediated regression steps for participant-level WNEC can be found in Table 10 and the co-worker-level WNEC results are in Table 11. Hypotheses 8a-e were not supported using the traditional test of mediation (Baron & Kenny, 1986) at either the participant- or co-worker-level. All of these relationships failed one of the first two steps of the mediation analysis: either the independent variable (WNEC) or the mediator (healthy diet or strenuous exercise) were not significantly related to the outcomes (i.e., physical symptoms, job satisfaction), or the mediator was not related to the outcome when WNEC was included in the regression model. Since none of the regressions passed all of the steps of the Baron and Kenny (1986) model, no Sobel (1982) tests were necessary to compute.

Table 10

Standardized Beta Weights from Mediated Regression Analyses at the Participant-level

Outcomes	WNEC to Outcome	WNEC to Self-Reported Healthy Diet	Self-Reported Healthy Diet Effect on Outcome
Body Mass Index	-.08	.31**	-.16
Physical Symptoms	-.03	"	-.19
Days Lost to Illness	-.06	"	-.01
Job Satisfaction	.46**	"	-.01
Depression	-.16	"	-.10
	WNEC to Outcome	WNEC to Fat Intake	Fat Intake Effect on Outcome
Body Mass Index	-.08	-.12	-.06
Physical Symptoms	-.03	"	.01
Days Lost to Illness	-.06	"	-.08
Job Satisfaction	.46**	"	.08
Depression	-.16	"	.01

	WNEC to Outcome	WNEC to Total Exercise	Total Exercise Effect on Outcome
Body Mass Index	-.08	.15	-.05
Physical Symptoms	-.03	"	.03
Days Lost to Illness	-.06	"	.05
Job Satisfaction	.46**	"	.04
Depression	-.16	"	-.03
	WNEC to Outcome	WNEC to Strenuous Exercise	Strenuous Exercise Effect on Outcome
Body Mass Index	-.08	.17*	-.15
Physical Symptoms	-.03	"	.05
Days Lost to Illness	-.06	"	.02
Job Satisfaction	.46**	"	.03
Depression	-.16	"	-.03

Note: The beta weight for the effect of the healthy behavior on the outcome has WNEC included in the model.
* $p < .05$, ** $p < .01$

Table 11

Standardized Beta Weights from Mediated Regression Analyses at the Co-worker-level

	WNEC to Outcome	WNEC to Self-Reported Healthy Diet	Self-Reported Healthy Diet Effect on Outcome
Body Mass Index	-.28	.44**	.26
Physical Symptoms	-.16	"	-.09
Days Lost to Illness	-.05	"	-.03
Job Satisfaction	.33*	"	-.18
Depression	-.52**	"	-.05
	WNEC to Outcome	WNEC to Fat Intake	Fat Intake Effect on Outcome
Body Mass Index	-.28	-.14	.01
Physical Symptoms	-.16	"	.11
Days Lost to Illness	-.05	"	.04
Job Satisfaction	.33*	"	-.19
Depression	-.52**	"	.08
	WNEC to Outcome	WNEC to Total Exercise	Total Exercise Effect on Outcome
Body Mass Index	-.28	.22	-.31
Physical Symptoms	-.16	"	-.01
Days Lost to Illness	-.05	"	.20
Job Satisfaction	.33*	"	.08
Depression	-.52**	"	.09

	WNEC to Outcome	WNEC to Strenuous Exercise	Strenuous Exercise Effect on Outcome
Body Mass Index	-.28	.19	-.26
Physical Symptoms	-.16	"	-.04
Days Lost to Illness	-.05	"	.14
Job Satisfaction	.33*	"	.18
Depression	-.52**	"	-.02

Note: The beta weight for the effect of the healthy behavior on the outcome has WNEC included in the model.
* $p < .05$, ** $p < .01$

Gender & Body Mass Index as Moderators Between WNEC and Outcomes

It is quite possible that different relationships exist between these variables based on gender and weight group membership, since these demographics have a profound effect on health behaviors, attitudes, and outcomes. Therefore, to investigate the moderating effect of these two variables, exploratory moderation analyses were conducted. First, separate correlations were calculated for male vs. female and normal vs. overweight/obese participants. These were only calculated at the participant-level because of there were not enough participants with co-worker connections to meaningfully examine moderation. The Pearson correlations based on these separations can be found Tables 12 & 13.

Table 12

Correlations between WNEC and Study Variables by Gender

	Males	Females
	WNEC – Participant (N = 48)	WNEC – Participant (N = 101)
Health Benefits - Have	.25	.48**
Healthy Diet	.27	.31**
Fat Intake Scale	.08	-.22*
Total Exercise	.37*	.04
BMI	-.19	-.05
Physical Symptoms	.02	-.02

Days Lost to Illness	-.20	-.01
Job Satisfaction	.33*	.49**
Depression	-.08	-.22*
Health Attitudes	.23	.26**

*$p < .05$, ** $p < .01$

Table 13

Correlations between WNEC and Study Variables by Body Mass Index Category

	Normal	Overweight/Obese
	WNEC – Participant (N = 77)	WNEC – Participant (N = 66)
Health Benefits - Have	.40**	.43**
Healthy Diet	.28*	.35**
Fat Intake Scale	-.15	-.05
Total Exercise	.13	.16
BMI	n/a	n/a
Physical Symptoms	.02	-.11
Days Lost to Illness	.10	-.25*
Job Satisfaction	.43*	.50**
Depression	-.24*	-.05
Health Attitudes	.30**	.28*

*$p < .05$, ** $p < .01$

Note: The relationship between BMI and climate was not calculated because of the range restriction caused by placing participants into homogenous weight groups.

Several noteworthy differences existed between males and females on the relationships between WNEC and the various study variables. For example, the relationship between WNEC and total exercise was significant for men, but not for women (in fact, it was near zero), and the difference between those correlations was near significant in a two-tailed test ($z = 1.94$, $p < .10$). The WNEC and healthy diet correlations were significant for women, but not men, although the correlations themselves were not significantly different ($z = .24$, *n.s.*). The WNEC to fat intake relationship was stronger, which also neared significant, for women as men actually had a positive relationship between these variables ($z = 1.69$, $p < .10$). Finally, the relationship

between WNEC and depression for females was significant at participant-level (not the case in the entire sample), while this was not the case for males (z = .80, *n.s.*).

When the correlations were calculated separately by weight class, two of the major differences occurred in the physical symptoms and days lost to illness relationships. Obese/overweight individuals had higher relationships between WNEC and physical symptoms (although this difference was not significant, z = .76, *n.s.*) and days lost to illness (z = 2.08, p < .05). Additionally, the correlation between WNEC and depression was significant for normal weight individuals, but not for those who were overweight (although this difference also was not significant, z = 1.14, *n.s.*).

Based on the correlations that had significant difference between males versus females and normal versus overweight/obese participants, three moderated regression analyses were run for the participant-level of WNEC: the moderation effect of gender on the WNEC to total exercise and WNEC to fat intake relationships and the moderation effect of BMI on the WNEC to days lost to illness relationship. The results of these analyses can be found in Table 15. Two of the interaction terms were significant, and the graphs of those relationships can be found in Figures 3 & 4.

Table 14

Moderated Regression Analyses for Gender and BMI

	β	*R Change*
	Total Exercise	
Main Effects		
WNEC - Participant	.02*	
Gender	-.91*	.06*
Interaction		
WNEC x Gender	-1.15**	.06**

	Fat Intake	
Main Effects		
WNEC - Participant	-.19*	
Gender	-.38	.03
Interaction		
WNEC x Gender	.53	.01
	Days Lost to Illness	
Main Effects		
WNEC - Participant	.10	
Body Mass Index	.60	.00
Interaction		
WNEC x BMI	-.68*	.03*

* $p < .05$, ** $p < .01$

Figure 3

The Moderation Effect of Gender on the WNEC to Total Exercise Relationship

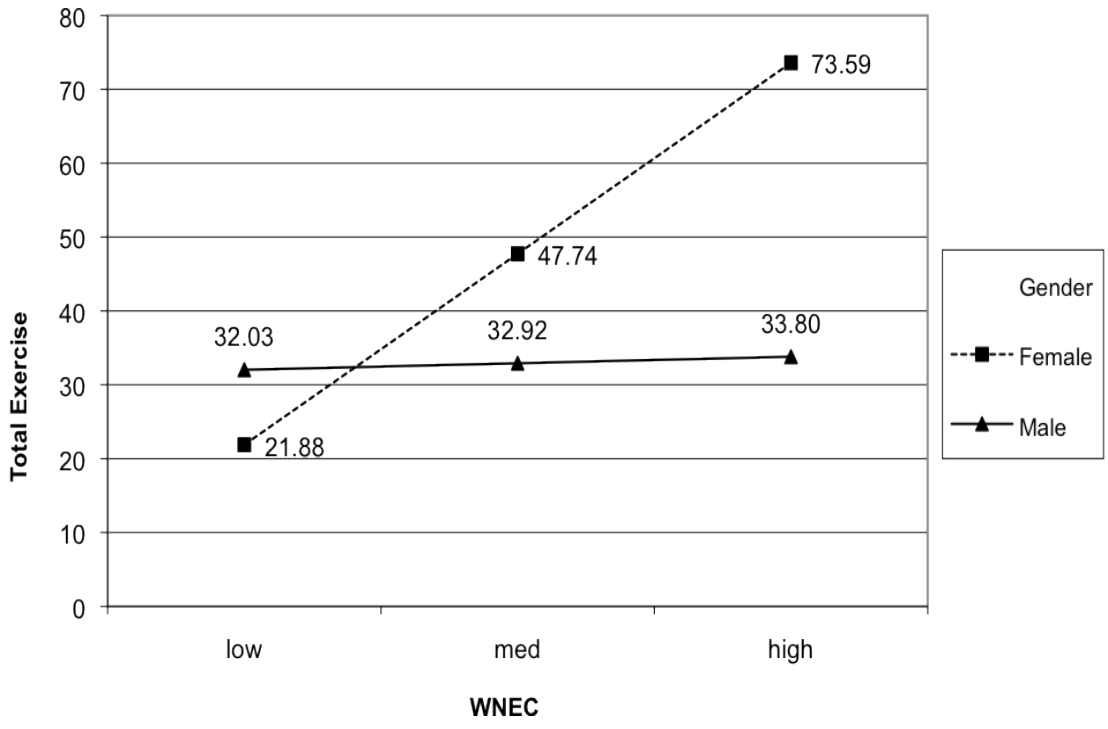
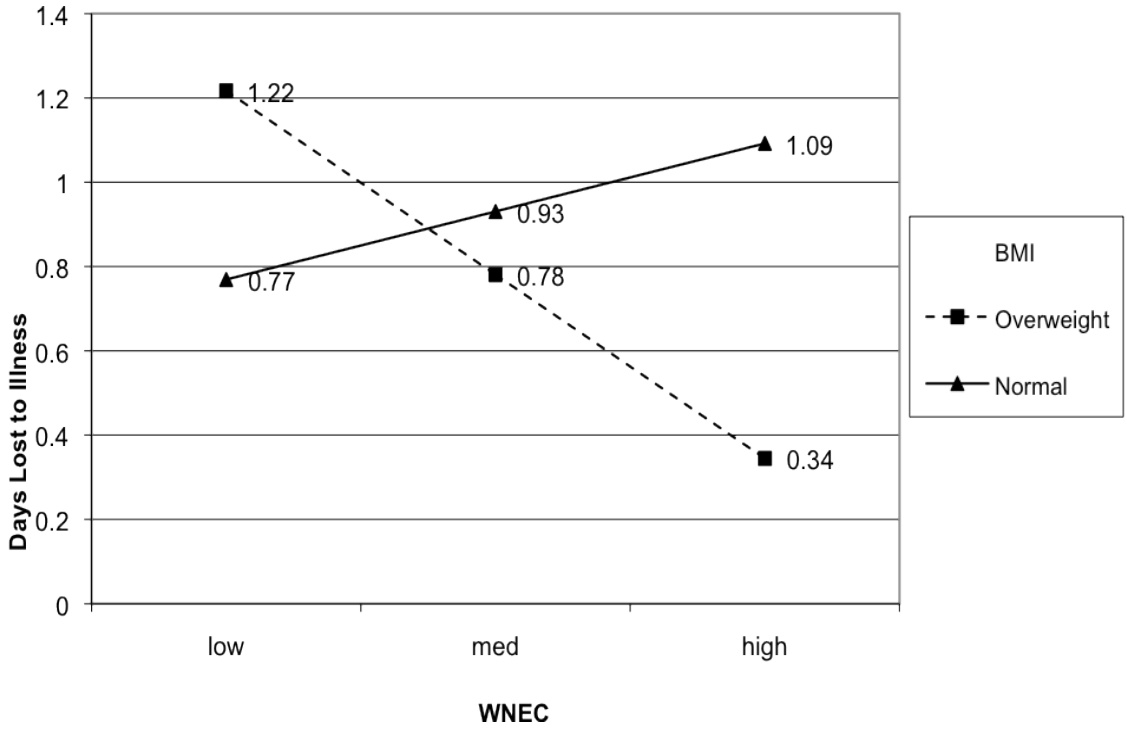


Figure 4

The Moderation Effect of BMI on the WNEC to Days Lost to Illness Relationship



Discussion

The main goals of this study were accomplished. A final version of the WNECS was developed and tested, and there appears to be at least some evidence for its reliability and validity. Specifically, it showed strong interrater reliability and a high internal consistency. The factor analysis results indicated that the concepts of nutrition and exercise climate were highly intertwined within the organizational setting and should be considered part of one overall construct. Despite this fact, the structure of the scale and wording of the items does allow for researchers to measure only nutrition or exercise climate scale if desired, as some differences did exist in how these subscales related to the study variables. Specifically, exercise climate was more strongly related to health benefits, which may be due to the fact that many of those benefits are often more exercise-focused. Also, nutrition climate was more strongly related to self-reported healthiness of one's diet (as might be expected), but this finding did not extend to fat intake or to the relationship between exercise climate and either exercise measure. Furthermore, both the strong correlation between the participant and co-worker perceptions of WNEC and intraclass correlation for the scale suggest the possibility of aggregation, which could be done in future studies with a sufficient number of organizations and participants per organization.

Furthermore, the results show the new scale to be an improvement over the previous health climate measure for a variety of reasons. In addition to largely removing

the ambiguous term “health” from the items and concentrating specifically on the nutrition and exercise climate, the WNECS had a higher internal consistency. At the participant-level, WNEC was a stronger of predictor of several important variables when they were regressed on both climate measures, specifically self-reported healthy diet and job satisfaction, as well as both having and using health benefits. Additionally, at the co-worker level, it had stronger relationships to fat intake, total exercise, and depression than health climate. This may suggest that the shared perception has a strong effect on health behaviors, but further investigation of the WNEC at the organizational-level is needed before being able to confirm this phenomenon.

WNEC is directly related to some measures of healthy eating and exercise behaviors, specifically self-perceived healthiness of one’s diet and strenuous exercise frequency, the former being significantly related to BMI. WNEC was directly related to both job satisfaction and attitudes about health at both levels investigated, had a strong, negative correlation to depression at the co-worker level, and had a moderate (albeit nonsignificant) correlation to BMI at the co-worker level. Also, WNEC had a stronger relationship to job satisfaction and depression, and total exercise to a lesser extent, than having more health available health benefits. Additionally, while health benefits had moderate relationships with healthy eating behaviors, they had very low relationships to the exercise variables. This seems to confirm the idea that it is not enough to put health initiatives in place, but a climate should be created supporting their use and encouraging the health of all employees. Based on the direct links between WNEC and self-reported healthy diet and strenuous exercise frequency, a healthy WNEC has the ability to promote the healthy behaviors that have been consistently linked to lowered body fat and

improved health (e.g., Wang, Patterson, & Hills, 2003; Donnelly et al., 2004). If a casual link for this relationship can be established, creating a healthy climate may ultimately prove to result in healthier employees.

It was interesting to note which variables had differing relationship with WNEC at the two different levels. Participant-level WNEC had a much stronger relationship to utilizing health benefits, which seems to further validate past research that suggests that health initiatives and interventions are more frequently utilized when individuals believe these initiatives are supported by the organization (e.g., Pelletier, 2001). Second, depression was more strongly related to the co-workers' rating of the WNEC than the participants' ratings. This is particularly surprising, consider that outside observers' perception of the climate had such a strong relationship to someone's personal mental health. Similarly, co-worker WNEC had a higher relationship (although not significantly so) to BMI than participant WNEC. In conjunction, these findings suggest that the objective or shared climate, and not just the individual perceptions, may also have important relationships to health outcomes. Due to the small sample size for the matching co-workers and the nature of this data, very little can be said at this time about to what variables such a shared climate would relate. However, these correlations and the support for the aggregation of WNEC discussed previously should lead future researchers to look into these variables at the organizational-level. If eventually proven that such a shared climate is important, it could mean that creating such a climate may help improve health, regardless of how the individuals perceives the climate.

Very few of the original hypotheses were supported. WNEC was related to all of the healthy behaviors in the expected direction, but only self-reported healthiness of

one's diet and strenuous exercise had significant relationships to the measure. Only self-reported diet was related to any of the health outcomes (specifically body mass index and physical symptoms), and WNEC was only related to job satisfaction and depression significantly, although all relationships were once again in the expected direction. The mediation effect of the health behaviors was not supported for any of the outcomes at either level of climate.

In this study, self-reported healthy diet was only related to body mass index and physical symptoms in terms of health indicators. The link between eating right and weight control/physical health symptoms was expected, and is consistent with previous research (e.g., Van Duyn & Pivonka, 2000; Allen & Armstrong, 2006). It was surprising, however, that total exercise was not related to any of the health indicators, given previous research showing both its physical and mental benefits (e.g., Ledwidge 1980; Grosch et al., 1997). It is possible that extensive exercise training may cause more muscle aches, back pain, fatigue, and other minor illnesses, causing an increase in reported physical symptoms. Thus, while these individuals are healthier overall and may experience fewer serious symptoms, they nonetheless report a fair number of symptoms, reducing the observed relationship between exercise and symptoms. It is unclear why this long established link between exercise and BMI was not present in the current data, but it could be related to the nature of self-report BMI calculations, which is discussed more thoroughly in the limitations section. Nonetheless, despite the lack of significant relationship here, previous research has provided ample evidence that exercise does in fact improve physical health and lower body weight.

Additionally, as self-perceived diet had a stronger relationship to the climate measures than fat intake (as well as the physical health indicators, see Table 7), the fat intake scale may not have worked as a measure of healthy eating behaviors since eating certain types of fats in small to moderate doses is often recommended as a part of a healthy diet (Dietary Guidelines Advisory Committee, 2005). The self-report healthiness of one's diet measure may have had better relationships to health indicators, in part, because fat intake (the main focus of the Fat Intake Scale) is not necessarily a bad dietary choice depending on the type and quantity of the fat, especially for active men.

While nutrition and exercise climate were highly intertwined with one another, the actual eating and exercise behaviors had only a small non-significant relationship to each other. So while health climate may contain a broad range of aspects that encompass many or all factors that show support for health behaviors, whether people partake in certain healthy behaviors may be more individualized. For example, it could be that people who exercise regularly may feel their activity level is sufficient enough to keep them healthy, and that they therefore do not need to eat as healthy, or vice versa. Also, it is possible that people who exercise have a higher expectation of their eating habits, and they rate their diet as low to moderately healthy, when in fact it might be quite healthy. Further investigation should be done into how people perceive their own health and healthy behaviors, and how this might affect their responses to self-report measures.

Coupled with the correlational results, mediated regression results showed the original preliminary model of for WNEC to be inadequate. While health behaviors were mildly related to WNEC, both WNEC and the health behaviors were largely unrelated to the health outcomes (physical and mental). Based on the these null findings, moderator

analyses were conducted on the relationships between participant-level WNEC and the study variables for two important demographics: gender and body mass index categorization. Several important differences were found that could help to guide future researchers looking at how these variables interact with each other. For gender, the relationships between WNEC and fat intake and WNEC and total exercise were different for males and females, the latter of which was further confirmed by moderated regression. As shown in the graph, men have a strong, positive relationship between WNEC and total exercise; the healthier they perceive the nutrition and exercise climate, the more frequently they exercise. On the other hand, the perception of the climate has almost no effect on women's exercise habits. These gender findings in regards to fat intake may also provide insight into why the fat intake measure did not have many significant relationships in the overall sample. It is possible that active, healthy women try hard to avoid fat, and a health climate helps them to accomplish this feat. However, active, healthy men may still consume a fair amount of fat because they feel they need the calories to support their activity levels. This hypothesis is further supported by both the stronger positive relationship between WNEC and total exercise and slightly positive (instead of negative, as with female participants) between WNEC and fat intake.

For BMI, the relationship between WNEC and days lost to illness was significantly different for normal vs. overweight/obese individuals, and this finding was also confirmed with moderated regression. This is an interesting finding, as it appears that normal weight individuals miss more days if the WNEC is higher. This could be due to normal individuals working out more based on such a climate, and thus, getting injured or even sick from overtraining/running in poor conditions. Overweight or obese

individuals have less sick days when the climate is healthy, so it is might be that such healthy climates allow these individuals to be just healthy enough to avoid getting sick more often. These are two possible theories on why this relationship existed in this data, but future research should look to not only confirm these moderation effects but also directly test why they are present. These moderators could also only be tested at the participant-level, and additional research is needed to see if they continue at the organizational-level.

Limitations and Future Research

As with all cross-sectional studies, the current study has difficulty interpreting any temporal causal relationships. Therefore, the causality of WNEC on healthier eating and exercise behaviors cannot yet be determined. However, the causality between behaviors and BMI (and the other health outcomes where relationships were present) can be inferred based on the previous literature (e.g., Proper et al., 2003; Donnelly et al., 2004). The use of the co-worker surveys to begin to look at the aggregation of health (or here specifically nutrition and exercise) climate perceptions is an important addition (from past health climate studies) and should be considered a strength in this and future studies of climate. Also, participants from a wide variety of ages, educational backgrounds, tenures, types of jobs, weight classes, and geographic location were part of this study, which should enhance the external validity of the findings presented.

The sample was healthier on average than the overall U.S. population, which could have affected some relationships. The exploratory moderation analyses did suggest that these relationships might be different for overweight and obese individuals compared to those with normal weight, particularly for the number of sick days and, to a lesser

extent, depression. Therefore, the effect of climate for individuals with differing health and/or motivation levels could be the focus of an interesting future study. Similarly, there were some gender differences, particularly with fat intake and total exercise, and it could be interesting to further investigate how males and females perceive and react to the health climate differently.

There also may have been issues concerning the measures of eating and exercise behaviors utilized in this study. Better measures of healthy behaviors, specifically nutrition and exercise, are required to investigate the relationship between the climate and behaviors and between behaviors and health indicators. Searches for such research showed a dearth of available measures for these constructs (especially for nutrition), and it is possible that such measures will need to be developed. Such efforts might benefit from interdisciplinary collaboration with medical and/or health professionals who have in depth knowledge of the link between health and nutrition. At this time, there is almost nothing short of a full daily eating diary to accurately gauge individual eating habits, something that has rarely, if ever, been done in psychological research. Future researchers should work to find a way to make such diaries more feasible, possibly by paying participants to provide this type of intricate information. Furthermore, when such diary information is gathered, researchers could utilize a large number of healthy diet indicators, including, but not limited to: fat intake, total calories, percentage of calories from fat, vitamin intake, and fruit and vegetable consumption.

Additionally, the main measures of personal health levels were body mass index, calculated from self-reported height and weight, physical symptoms from a simple symptom checklist, and self-reported absences due to sickness (a measure with a low

base rate). Body mass index from this formula can be problematic for two reasons. First, it assumes that participants know their height and weight and report it accurately. While participants would have little to no incentive to lie on an online, anonymous survey, some research suggests that participants may have difficulty accurately reporting their height and weight for BMI, especially women (Jacobson & DeBock, 2001). Second, body mass index, when calculated this way, is an imperfect measure of health levels because it does not account for muscle content, which is why most professional athletes and highly fit individuals are classified as overweight on the WHO (1995) system of BMI because of their large concentration of muscle, which makes BMI through height and weight an ineffective way to measure body type, as these very fit individuals often are considered "overweight" by the measure. This could also help to explain the lack of a relationship between exercise and BMI.

BMI is still a valuable resource for self-report studies, and is used extensively in health research (e.g., Daviglus et al., 2003; Ogden et al., 2006). It is repeatedly shown to relate to wide variety of important health variables in research, including coronary heart disease, diabetes, and low self-esteem (Stroebe, 2008). Nonetheless, future researchers should seek to get different, more objective measures of individual health to confirm these findings. For example, participants could be brought into a lab where tests for blood pressure, treadmill fitness, time to return to resting HR, and VO2 max could be performed. In terms of health through disease and physical symptoms, a more thorough medical evaluation could be done either through self-reported history or physician examination on a variety of topics, such as cardiovascular health risk and history, diabetes risk and history, and/or current life expectancy. While physician evaluations, be

they archival or given at the time of the study, would be difficult and costly for researchers to obtain, they could give a wealth of knowledge about true personal physical health.

The lack of more objective measures of the study variables could have been problematic in other areas as well. The relationship between WNEC and job satisfaction is an important finding, and it may indicate the importance of workplace health climate in an employee's perception of how the organization feels about them, and consequently in how satisfied they are with their job and organization. Alternatively, it could also be that those who are satisfied with their jobs are more likely to endorse positive items about the climate in that job/organization. While it is difficult to utilize anything other than self-report in measuring job satisfaction, this is one area where more objective measures of climate could be key in uncovering the true nature of this relationship.

Thus, in addition to the future research avenues mentioned above, more information is needed regarding organizational-level and/or objective climate. In this study, co-worker data from one or two individuals was used to begin to establish the validity of aggregating workplace nutrition and exercise climate. While this method is useful in the current context, and the possibility for aggregation was initially supported, it is only a first step. The sample of participants that could be connected to co-workers was rather low, and this may have affected the power to detect significant effects. While this study was an initial test of the climate, focused mainly on the participant-level climate, future researchers should try recruiting a higher number of organizations and getting more participants from each organization. Additionally, observational research or evaluations of the organization's policies, procedures, initiatives, and mission could be

done to try and establish a measure of objective nutrition and exercise climate. These various methods could then be compared (individual/perception vs. organizational/shared vs. objective) to determine if they are similar and if their relationships to behavior, attitudes, and health differ.

Workplace nutrition and exercise climate (WNEC) could be an important concept in an organization's attempt to recruit, maintain, and create healthy employees. The construct was related to job satisfaction, supporting the idea that promoting such a climate demonstrates to employees that their employer cares about their personal well-being, and not just the bottom line. Nonetheless, numerous studies have found that health promotion and healthy employees can have financial benefits for organizations as well (e.g., Bertera, 1990; Anderson et al., 2000), and results in the current study showed that WNEC had more influence on some healthy behaviors and mental well-being outcomes than simply offering health benefits/promotion. Therefore, organizations have plenty of reasons to promote a healthy nutrition and exercise climate. Also, an organizational climate that is supportive of employee health and healthy behaviors shows an organization’s concern for their employees, which would further enhance employees’ job satisfaction and organizational commitment.

This study has shown the possibility that the construct of WNEC does relate to healthier behaviors and people. Future researchers should continue to test these relationships, and if these finding continue to be supported, research should move towards if such a healthy climate can be created within an organization and/or work group, and how managers would go about creating it. Previous research suggest that health climate is fluid and changeable (Abrams et al., 1994), and researchers should

determine what policies, activities, interventions, initiatives, and other factors help to create healthy nutrition and exercise climates, as well as if companies with unhealthy climates can institute them to improve their climate and subsequent employee health. The scale developed here should be valuable to researchers and practitioners who want to know how well the environmental and social climate within the organization supports healthy behaviors and employees. Additionally, organizations that implement initiatives to increase employee health through proper diet and exercise can use the measure to monitor this climate as a result of those initiatives. The ultimate goals for health researchers and practitioners should be to motivate individuals to be healthy in their main daily activities and behaviors, and as a result, all individuals who have the motivation to get or stay healthy should have both the resources and environment to do so.

References

Abrams, D. B., Boutwell, W. B., Grizzle, J., Heimendinger, J., Sorensen, G., & Varnes, J. (1994). Cancer control at the workplace: the Working Well Trial. *Preventive Medicine, 23,* 1-13.

Agho, A. O., Mueller, C. W., & Price, J. L. (1993). Determinants of employee job satisfaction: An empirical test of a causal model. *Human Relations, 46*(8), 1007-1027.

Akande A., van Wyk, C. de. W., & Osagie, J. E. (2000). Importance of exercise and nutrition in the prevention of illness and the enhancement of health. *Education, 120*(4), 758-772.

Allen, T. D. & Armstrong, J. (2006). Further examination of the link between work-family conflict and physical health. *American Behavioral Scientist, 49*(9), 1204-1221.

Anderson, D. R., Whitmer, R. W., Goetzel, R. Z., Ozminkowski, R. J., Wasserman, J., & Serxner, S. (2000). The relationship between modifiable health risks and group-level health care expenditures. *American Journal of Health Promotion, 15*(1). 45-52.

Baron, R. M. & Kenny, D. A. (1986). The mediator-moderator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51, 1173-1182.*

Basen-Engquist K., Hudmon, S.K., Tripp, M., & Chamberlain, R. (1998). Worksite health and safety climate: scale development and effects of a health promotion intervention. *Preventive Medicine, 27(1),* 111-119.

Bertera, R. L. (1990). The effects of workplace health promotion on absenteeism and employment costs in a large industrial population. *American Journal of Public Health, 80*(9), 1101-1105.

Blair, S. N. (1985). Physical activity leads to fitness and pays off. *Physician Sport Medicine, 13,* 145-150.

Blair, S. N., Kohl, H. W., Paffenbarger, R. S., Clark, D. G., Cooper, K. H., & Gibbons, L. W. (1989). Physical fitness and all-cause mortality: A prospective study of healthy men and women. *Journal of the American Medical Association, 273,* 1093-1098.

Bungum, T., Satterwhite, M., Jackson, A.W., & Morrow, J. R. (2003). The relationship of body mass index medical costs, and job absenteeism. *American Journal of Health Behaviors, 27*(4), 456-462.

Cammann, C., Fichman, M., Jenkins, D., & Klesh, J. (1983). Assessing the attitudes and perceptions of organizational members. In S. Seashore, E. Lawler, P. Mirvis, & C. Cammann (Eds.) *Assessing organizational change: A guide to methods, measures and practices.* New York: John Wiley.

Carlson, J. (1982). The multimodal effect of physical exercise. *Elementary School Guidance, 16,* 304-309.

Cason, K. L., & Wenrich, T. R. (2002). Health and nutrition beliefs, attitudes, and practices of undergraduate college students: A needs assessment. *Topics in Clinical Nutrition, 17*(3), 52-70.

Clarke, S. (2006). The relationship between safety climate and safety performance: a meta-analytic review. *Journal of Occupational Health Psychology, 11*(4), 315-327.

Cox, M. H., Shepard, R. J., & Corey, P. (1981). Influence of an employee fitness programme upon fitness, productivity, and absenteeism. *Ergonomics, 24*, 795-806.

Crawford, J. R. & Henry, J. D. (2003). The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology, 42*(2), 111-131.

Cusack, L. (2000). Perceptions of body image: implications for the workplace. *Employee Assistance Quarterly, 15*(3), *23-39.*

Cvetanovski, J., & Jex, S. M. (1994). Locus of control of unemployed people and its relationship to psychological and physical well-being. *Work & Stress, 8*, 60-67.

Daviglus, M. L., Liu, K., Yan, L. L., Pirzada, A., Garside, D. B., Schiffer,L., Dyer, A. R., Greenland, P., & Stamler, J. (2003). Body mass index in middle age and health-related quality of life in older age. *Archives of Internal Medicine, 163*(10*)*, 2448-2455.

DeJoy, D. M., Schaffer, B. S., Wilson, M. G., Vandenburg, R. J., & Butts, M. M. (2004). Creating safer workplaces: Assessing the determinants and role of safety climate. *Journal of Safety Research, 35*(1), 81-90.

Dietary Guidelines Advisory Committee. (2005). *Dietary guidelines for Americans*. U.S. Government Printing Office: Washington, DC.

Donnelly, J. E., Smith, B., Jacobsen, D. J., Kirk, D., DuBose, K., Hyder, M., Bailey, B., & Washburn, R. (2004). The role of exercise for weight loss and maintenance. *Best Practice & Research Clinical Gastroenterology*, *18*(6), 1009-1029.

Ensel, W. M., & Lin, N. (2004). Physical fitness and the stress process. *Journal of Community Psychology*, *32*(1), 81-101.

Falkenberg, L. E. (1987). Employee fitness programs: Their impact on the employee and the organization. *Academy of Management Review*, *12*(3), 511-522.

Field, R.H.G. & Abelson, M.A. (1982). Climate: A reconceptualization and proposed model. *Human Relations, 35*(3), 181-201.

Fields, D. L. (2002). *Taking the measure of work: A guide to validated scales for organizational research and diagnoses.* Thousand Oaks, Sage Publications, Inc.

Fogelman, Y., Vinker, S., Lachtner, J., Biderman, A., Itzhak, B., & Kitai, E. (2002). Managing obesity: a survey of attitudes and practices among Israeli primary care physicians. *International Journal of Obesity*, *26*, 1393-1397.

Gallup, November 11-14, 2007. Poll results retrieved Aug. 15, 2008 from Gallup.com.

Gallup, July 10-13, 2008. Poll results retrieved Aug. 15 from Gallup.com.

Godin, G. & Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences, 10,* 141-146.

Golaszewski, R., Allen, J., & Edington, D. (2008). Working together to create supportive environmens in worksite health promotion. *American Journal of Health Promotion, 22*(4), 1-10.

Grosch, J. W., Alterman, T., Peterson, M. R., & Murphy, L. R. (1998). Worksite health promotion programs in the U.S.: Factors associated with availability and participation. *American Journal of Health Promotion, 13(1),* 36-45.

Hall, J. K., & Spector, P. E. (1991). Relationships of work stress measures for employees with the same job. *Work & Stress, 5,* 29-35.

Harris, D.M. & Guten, S. (1979). Health-protective behavior: an exploratory study. *Journal of Health and Social Behavior, 20*(1), 17-29.

Hays, K. F. (1999). *Working it out: Using exercise in psychotherapy.* Toronto, ON, Canada: The Performing Edge.

Heaney, C. A., & Goetzel, R. Z. (1997). A review of health-related outcomes of multi-component worksite health promotion programs. *American Journal of Health Promotion, 11*(4), 290-308.

Jacobson, B. H., & DeBock, D. H. (2001). Comparison of body mass index by self-reported versus measured height and weight. *Perceptual and Motor Skills, 92*(1), 128-132.

Jeffrey, R. W., French, S. A., Raether, C., Baxter, J. E. (1994). An environmental intervention to increase fruit and salad purchases in a cafeteria. *Preventive Medicine, 23,* 788-792.

Jex, S. M., & Beehr, T. A. (1991). Emerging theoretical and methodological issues in the study of work-related stress. *Research in Personnel and Human Resources Management, 9,* 311-365.

Judge, T. A., Thoresen, C. J., Bono, J. E., & Patton, G. K. (2001). The job satisfaction-job performance relationship: a qualitative and quantitative review. *Psychological*

Bulletin, 127(3), 376-407.

Judge, T. A. & Watanabe, S. (1993). Another look at the job satisfaction-life satisfaction relationship. *Journal of Applied Psychology, 78*(6), 939-948.

Kerr, J. H. & Vos, M. C. (1993). Employee fitness programmes, absenteeism, and general well-being. *Work & Stress, 7*(2), 179-190. Special issue: Exercise, stress and health.

Kerr, N. A., Yore, M. M., Ham, S. A., & Dietz, W. H. (2004). Increasing stair use in a worksite through environmental changes. *American Journal of Health Promotion, 18*(4), 312-315.

Krauss, D. M., Winston, M., Fletcher, B. J., & Grundy, S. M. (1998). Obesity: Impact on cardiovascular disease. *Circulation, 98,* 1472-1476.

LeBreton, J. M., & Senter, J. L. (2008). Answers to 20 questions about interrater reliability and interrater agreement. *Organizational Research Methods, 11*(4), 815-85.

Ledwidge, B. (1980). Run for your mind: Aerobic exercise as a means of alleviating anxiety and depression. *Canadian Journal of Behavioural Science, 12*(2), 126-139.

Levy, A. S., & Heaton, A. W. (1993). Weight control practices of U.S. adults trying to lose weight. *Annals of Internal Medicine, 119*(7), 661-666.

Lovibond, S.H. & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scale. (2nd Ed.).* Sydney, Australia: Psychology Foundation.

Marcus, B. H., Bock, B. C., Pinto, B. M., Napolitano, M. A., & Clark, M. M. (1996). Exercise initiation, adoption, and maintenance. In. Van Raalte, J. L. & Brewer, B.

W. (Eds.), *Exploring Sport and Exercise Psychology.* Washington, DC: American Psychological Association.

Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., & Marks, J. S. (2003). Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *Journal of the American Medical Association, 289*(1), 76-79.

Moran, E. T. & Volkwein, J. F. (1992). The cultural approach to the formation of organizational climate. *Human Relations, 45*(1), 19-45.

National Center for Health Statistics. (2008). *Deaths: Final data for 2005.* (National Vital Statistics Report, 56(10)). Hyattville, MD: U.S.

Nixon, A. E., Mazzola, J. J., Bauer, J., Spector, P. E., & Krueger, J. (in press). Are all symptoms created equally? A meta-analytic investigation of occupational stressors and physical symptoms inventories. *Work & Stress.*

Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *Journal of the American Medical Association, 295,* 1549-1555.

Osborne, J. (2002). Notes on the use of data transformations. *Practical Assessment, Research, & Evaluation, 8*(6). Retrieved May 19, 2010 from http://PAREonline.net/getvn.asp?v=8&n=6.

Pauly, M. V., Nicholson, S., Xu, J., Polsky, D., Danzon, P. M., Murray, J. F., & Berger, M. L. (2002). A general model of the impact of absenteeism on employers and employees. *Health Economics, 11,* 221-231.

Pauly, J., Palmer, J. Wright, C.C., & Pfeifer, G. J. (1982). The effect of a 14-week employee fitness program on selected physiological and psychological

parameters. *Journal of Occupational Medicine, 24,* 457-463.

Pelletier, K. R. (2001). A review and analysis of the clinical-and cost-effectiveness studies of comprehensive health promotion and disease management programs at the worksite: 1998-2000 update. *American Journal of Health Promotion, 16*(2), 107-116.

Proper, K. I., Hildebrandt, V. H., Van Der Beek, A. J., Twisk, J. W. R., & Van Mechlen, W. (2003). Effect of individual counseling on physical activity fitness and health: a randomized controlled trial in a workplace setting. *American Journal of Preventive Medicine, 24*(3), 218-226.

Raglin, J. S & Morgan, W. P. (1987). Influence of exercise and quiet rest on state anxiety and blood pressure. *Medicine and Science in Sports and Exercise, 19*(5), 456-463.

Reichers, A. E., & Schneider, B. (1990). Climate and culture: An evolution of construct. In Schneider, B. (Ed.) *Organizational Climate and Culture,* San Francisco: Jossey Bass.

Retzlaff, B. M., Dowdy, A. A., Walden, C. E., Bovbjerg, V. E., & Knopp, R. H. (1997). The Northwest Lipid Research Clinic Fat Intake Scale: Validation and utility. *American Journal of Public Health, 87*(2), 181-185.

Ribisl, K., & Reischl, T. (1993). Measuring the climate for health at organizations: development of the worksite health climate scales. *Journal of Occupational Medicine, 35,* 812-824.

Riva, G., Bacchetta, M., Cesa, G., Conti, S., Castelnuovo, G., Mantovani, F., & Molinari, E. (2006). Is severe obesity a form of addiction?: Rationale, clinical approach, and

controlled clinical trial. *Cyberpsychology & Behavior, 9*(4), 458-479.

Schneider, B. (1975). Organizational climates: An essay. *Personnel Psychology, 28,* 447-479.

Sinyor, D., Schwartz, S. G., Peronnet, F., Brisson, G., & Seraganian, P. (1983). Aerobic fitness level and reactivity to psychosocial stress: physiological, biochemical, and subjective measures. *Psychosomatic Medicine, 45*(3), 205-217.

Snow, J. T., & Harris, M. B. (1985). Maintenance of weight loss: Demographic, behavioral and attitudinal correlates. *Journal of Obesity & Weight Regulation, 4*(4), 234-257.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equipment models. In S. Leinhardt (Ed.), *Sociological Methodology 1982* (pp. 290-312). Washington, DC: American Sociological Association.

Sorensen, G., Linnan, L., & Hunt, M. K. (2004). Worksite-based research and initiatives to increase fruit and vegetable consumption. *Preventive Medicine, 39*(S2), S94-S100.

Spector, P. E., & Jex, S. M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal Conflict at Work Scale, Organizational Constraints Scale, Quantitative Workload Inventory, and Physical Symptoms Inventory. *Journal of Occupational Health Psychology, 3,* 356-367.

Steptoe, A. Edwards, S., Moses, J., & Mathews, A. (1989). The effects of exercise training on mood and perceived coping ability in anxious adults from the general population. *Journal of Psychosomatic Research, 33*(5), 537-547.

Stroebe, W. (2008). *Dieting, Overweight, and Obesity: Self-regulation in a food-rich*

environment. Washington, DC: American Psychological Association.

Tavares, L. S., & Plotnikoff, R. C. (2008). Not enough time? Individual and environmental implications for workplace physical activity programming among women with and without young children. *Health Care for Women International, 29*, 244-281.

Thogersen-Ntoumani, C., Fox, K. R., & Ntoumanis, N. (2004). Relationships between exercise and three components of mental well-being in corporate employees. *Psychology of Sport and Exercise, 6*(6), 609-627.

Van Duyn, M. A. S. & Pivonka, E. (2000). Overview of the health benefits of fruit and vegetable consumption for the dietetics professional: Selected literature. *Journal of the American Dietetic Association, 100*(12), 1511-1521.

Wang, Z., Patterson, C. M., & Hills, A. P. (2003). The relationship between BMI and energy and fat intake in Australian youth: A secondary analysis of the National Nutrition Survey. *Nutrition & Dietetics, 60*(1), 23-29.

Watson, W. & Gauthier, J. (2003). The viability of organizational wellness programs: An examination of promotion and results. *Journal of Applied Social Psychology, 33*(6), 1297-1312.

World Health Organization. (1995). *Physical Status: the use and interpretation of anthropometry.* (WHO Technical Report Series 854). Geneva: World Health Organization.

Wynd, C. A. & Ryan-Wegner, N. A. (2004). Factors predicting health behaviors among army reserve, active duty army, and civilian hospital employees. *Military Medicine*, 169, 942-947.

Yancey, A. K., Fielding, J. E., Flores, G. R., Sallis, J. F. McCarthy, W. J., & Breslow, L. (2007). Creating a robust public health infrastructure for physical activity promotion. *American Journal of Preventive Medicine, 32(1),* 68-78.

Young, R. J. & Ismail, A. H. (1976). Personality differences of adult men before and after a physical fitness program. *Research Quarterly, 47(3),* 513-519.

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology, 65,* 96-102.

Appendices

Appendix A: Recruitment Emails

Main Participant Recruitment Email

I would like to invite you to participate in a short survey about your work perceptions and daily routines. This survey is being completed as part of a doctoral dissertation and takes approximately 15 minutes. For your time, you will be placed in a drawing for (TBD). To complete the survey, you will need the email addresses of two fellow employees at your work, who will be emailed another shorter survey (less than 5 minutes to complete). They will not be told who provided their email address, unless you choose to tell them yourself. For their time, they will be placed in a drawing for (TBD). Thank you very much for your participation. If you have any questions or concerns, please feel free to contact me at jmazzola@mail.usf.edu.

Sincerely,
Joe Mazzola

Co-worker Participant Recruitment Email

Hello! I am working on a research project for my doctoral dissertation, and one of your co-workers filled out a survey as part of this project. However, I need to get a larger picture of their work environment, so I need a little information from you. If you take the time to fill out this brief survey (less than 5 minutes), you will be placed in a drawing for (TBD). To complete the survey, just click on the link below, and on the first page of the survey, enter the 3 digit participant number you see below. I greatly appreciate your participation in this study, and if you have any questions, please feel free to contact me at jmazzola.mail.usf.edu.

Sincerely,
Joe Mazzola

Participant ID number: XXX

http://www.surveymonkey.com/s.aspx?sm=TGuVObSKYvkbHAwamfpAuw_3d_3d

Appendix B: Main Participant & Co-worker Surveys

Below you will find several questions that ask you about yourself and your work experiences. Please select the answer that best describes you and your experiences. Your responses will be kept completely anonymous and no individual person's responses will be shared with anyone. You have the right to withdraw from this survey at any point without penalty. If you have any questions, feel free to contact me at jmazzola@mail.usf.edu.

Gender (Circle One): **Male** **Female** Age: _____

Ethnicity (Circle One): **White/Caucasian**
African-American/Black
Asian
Hispanic
Pacific Islander
Other: _____

I would consider my job to be (Circle One): **Part-time** **Full-time**

Height: _____ Weight: _____

What company do you work for? _____

How long have you worked in your organization (in years and months)? _____

How many days of work have you missed due to illness in the last 3 months? _____

I have a healthy diet: 1 2 3 4 5
Strongly Disagree Strongly Agree

The following items should be answered with this scale (Circle one for each line):
1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

1	This organization is concerned with whether I exercise.	1	2	3	4	5
2	This organization is concerned with whether I eat healthy.	1	2	3	4	5
3	The organization has sufficient programs that promote proper nutrition.	1	2	3	4	5
4.	The organization has sufficient programs that promote proper exercise habits.	1	2	3	4	5
5	Employees in this organization place a high value on eating properly.	1	2	3	4	5
6	Employees in this organization place a high value on exercising.	1	2	3	4	5
7	Employees in this organization support the exercise habits of others.	1	2	3	4	5
8	The majority of employees in this organization eat a healthy diet.	1	2	3	4	5
9	People here are supported for eating healthy.	1	2	3	4	5
10	Employees in this organization are active in sporting activities.	1	2	3	4	5
11	The majority of employees in this organization exercise regularly.	1	2	3	4	5
12	If I wanted/needed to improve my fitness level through proper nutrition, it would be easy to do in my work environment.	1	2	3	4	5
13	If I wanted/needed to improve my fitness level through exercise, it would be easy to do in my work environment	1	2	3	4	5

The following items should be answered with this scale (Circle one for each line):
1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

14	Coworkers bring healthy meals to work to eat for lunch/snacks.	1	2	3	4	5
15	My work environment allows sufficient time for me to exercise.	1	2	3	4	5
16	My work environment allows sufficient time for me to eat properly.	1	2	3	4	5
17	Supervisors make it known that they participate in physical activities outside of work.	1	2	3	4	5
18	Supervisors make it know that they eat a healthy diet.	1	2	3	4	5
19	My coworkers openly discuss if they engage in some type of exercise during non-work hours.	1	2	3	4	5
20	My coworkers openly discuss if they eat a healthy diet.	1	2	3	4	5
21	I have the opportunity to discuss and receive guidance regarding exercise while at work.	1	2	3	4	5
22	My supervisor shows concern that employees eat properly.	1	2	3	4	5
23	My supervisor shows concern that employees get regular exercise.	1	2	3	4	5

The following items should be answered with this scale (Circle one for each line):

	Strongly Disagree						Strongly Agree
All in all, I am satisfied with my job.	1	2	3	4	5	6	7
In general, I don't like my job.	1	2	3	4	5	6	7
In general, I like working here.	1	2	3	4	5	6	7

Please check the appropriate answer to these questions to the best of your knowledge:

Over the past 6 months, how often have you experienced each of the following symptoms?	Less than once per month or never	Once or twice per month	Once or twice per week	Once or twice per day	Several times per day
1. An upset stomach or nausea					
2. A backache					
3. Trouble sleeping					
4. Headache					
5. Acid indigestion or heartburn					
6. Eye strain					
7. Diarrhea					
8. Stomach cramps (Not menstrual)					
9. Constipation					
10. Ringing in the ears					
11. Loss of appetite					
12. Dizziness					
13. Tiredness or fatigue					

The following items should be answered with this scale (Circle one for each line):
1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

1	At my workplace, sometimes we talk with each other about improving our health and preventing disease.	1	2	3	4	5
2	Most employees here are very health-conscious.	1	2	3	4	5
3	Around here they look at how well you take care of your health when they consider you for promotion.	1	2	3	4	5
4	My supervisor encourages me to make changes to improve my health.	1	2	3	4	5
5	Supervisors always enforce health-related rules (smoking policies, requirements about medical examinations, etc).	1	2	3	4	5

For each type of health/fitness benefit, place a checkmark in the first box if you have the benefit available to you from your organization. Place a checkmark in the second box if you use the benefit.

Benefit	Have it?	Use it?
1. Health Insurance		
2. Health screening (i.e. blood pressure, cholesterol, body composition, etc)		
3. On-site medical professionals (i.e. nurses, doctors)		
4. On-site workout facility		
5. Exercise or fitness challenge programs (i.e. rewards for reaching certain exercise or weight loss goals)		
6. Free or reduced gym membership to outside workout facility (i.e. recreational center, Bally's, etc.)		
7. Nutrition, exercise, and/or lifestyle counseling		
8. Personal trainers and/or aerobic classes provided by the organization		
9. Flexible hours to help exercise better fit into daily schedule		

Please answer each of the following questions as honestly and accurate as possible.

1. **How much cheese do you eat per week?**
   ___ 1. I do not eat cheese.
   ___ 2. I eat whole milk cheese less than once a week and/or use only low fat cheese such as diet cheese, low fat cottage cheese, or ricotta.
   ___ 3. I eat whole milk cheese once or twice per week (such as cheddar, swiss, monterey jack).
   ___ I eat whole milk cheese three or more times per week.

2. **What type of milk do you use?**
   ___ 1. I use only skim or 1% milk, or don't use milk.
   ___ 2. I usually use skim milk or 1% milk, but use others occasionally.
   ___ 3. I usually use 2% or whole milk.

3. **How often do you eat these meats: regular hamburger, bologna, salami, hot dogs, corned beef, spareribs, sausage, bacon, braunsweiger, or liver? Do not count others.**
   ___ 1. I do not eat any of these meats.
   ___ 2. I eat them about once per week or less.
   ___ 3. I eat them about 2 to 4 times per week.
   ___ 4. I eat more than 4 servings per week.

4. **How many commercial baked goods and how much regular ice cream do you usually eat? (Examples: cake, cookies, coffee cake, sweet rolls, donuts, etc. Do not count low fat versions.)**
   ___ 1. I do not eat commercial baked goods and ice cream.
   ___ 2. I eat commercial baked goods or ice cream once per week or less.
   ___ 3. I eat commercial baked goods or ice cream 2 to 4 times per week.
   ___ 4. I eat commercial baked goods or ice cream more than 4 times per week.

5. **What is the main type of fat you cook with?**
   ___ 1. I use nonstick spray or I do not use fat in cooking.
   ___ 2. I use a liquid oil (Examples: safflower, sunflower, corn, soybean, and olive oil.)
   ___ 3. I use margarine.
   ___ 4. I use butter, shortening, bacon drippings, or lard.

6. **How often do you eat snack foods such as chips, fries or party crackers?**
   ___ 1. I do not eat these snack foods.
   ___ 2. I eat one serving of these snacks per week.
   ___ 3. I eat these snacks 2 to 4 times per week.
   ___ 4. I eat these snack foods more than four times per week.

7. **What spread do you usually use on bread, vegetables, etc?**
   ___ 1. I do not use any spread.
   ___ 2. I use diet or light margarine.
   ___ 3. I use margarine.
   ___ 4. I use butter.

8. **How often do you eat as a snack candy bars, chocolate, or nuts?**
   ___ 1. Less than once per week.
   ___ 2. One to 3 times per week.
   ___ 3. More than 3 times per week.

9. **When you use recipes or convenience foods, how often are they low fat?**
   ___ 1. Almost always.
   ___ 2. Usually.
   ___ 3. Sometimes.
   ___ 4. Seldom or never.

10. **When you eat away from home, how often do you choose low fat foods?**
   ___ 1. Almost always.
   ___ 2. Usually.
   ___ 3. Sometimes.
   ___ 4. Seldom or never.

1. During a typical **7-Day period** (a week), how many times on average do you do the following kinds of exercise for **more than 15 minutes** during your free time (write on each line the appropriate number).

Times Per Week

a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY) _____
(e.g., running, jogging, football, soccer, squash, basketball, vigorous weightlifting, roller skating, vigorous swimming, vigorous long distance bicycling)

b) MODERATE EXERCISE (NOT EXHAUSTING) _____
(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, moderate weightlifting, popular and folk dancing)

c) MILD EXERCISE (MINIMAL EFFORT) _____
(e.g., yoga, archery, fishing, bowling, horseshoes, golf, easy walking)

The following items should be answered with this scale (Circle one for each line):
1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

1	I believe it is important to exercise and eat healthy.	1	2	3	4	5
2	I try to exercise and eat healthy whenever possible.	1	2	3	4	5
3	I am knowledgeable about proper nutrition and exercise.	1	2	3	4	5
4.	I encourage others to exercise and eat healthy.	1	2	3	4	5

Depression
Answered with:
0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of the time
3 Applied to me very much, or most of the time

1. I couldn't seem to experience any positive feeling at all.
2. I found it difficult to work up the initiative to do things.
3. I felt that I had nothing to look forward to.
4. I felt down-hearted and blue.
5. I was unable to become enthusiastic about anything.
6. I felt I wasn't worth much as a person.
7. I felt that life was meaningless.

Co-Worker Survey

Below you will find several questions that ask you about yourself and your work experiences. Please select the answer that best describes you and your experiences. Your responses will be kept completely anonymous and no individual person's responses will be shared with anyone. You have the right to withdraw from this survey at any point without penalty. If you have any questions, feel free to contact me at jmazzola@mail.usf.edu.

Gender (Circle One): **Male** **Female** Age: _____

Ethnicity (Circle One): **White/Caucasian**
African-American/Black
Asian
Hispanic
Pacific Islander
Other: _____

I would consider my job to be (Circle One): **Part-time** **Full-time**

What company do you work for? _____

How long have you worked in your organization (in years and months)? _____

The following items should be answered with this scale:
1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

1	At my workplace, sometimes we talk with each other about improving our health and preventing disease.	1	2	3	4	5
2	Most employees here are very health-conscious.	1	2	3	4	5
3	Around here they look at how well you take care of your health when they consider you for promotion.	1	2	3	4	5
4	My supervisor encourages me to make changes to improve my health.	1	2	3	4	5
5	Supervisors always enforce health-related rules (smoking policies, requirements about medical examinations, etc).	1	2	3	4	5

The following items should be answered with this scale:
1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

1	This organization is concerned with whether I exercise.	1	2	3	4	5
2	This organization is concerned with whether I eat healthy.	1	2	3	4	5
3	The organization has sufficient programs that promote proper nutrition.	1	2	3	4	5
4.	The organization has sufficient programs that promote proper exercise habits.	1	2	3	4	5
5	Employees in this organization place a high value on eating properly.	1	2	3	4	5
6	Employees in this organization place a high value on exercising.	1	2	3	4	5
7	Employees in this organization support the exercise habits of others.	1	2	3	4	5
8	The majority of employees in this organization are physically fit.	1	2	3	4	5
9	People here are supported for eating healthy.	1	2	3	4	5
10	Employees in this organization are active in sporting activities.	1	2	3	4	5
11	The majority of employees in this organization exercise regularly.	1	2	3	4	5
12	If I wanted/needed to improve my fitness level through proper nutrition, it would be easy to do in my work environment.	1	2	3	4	5
13	If I wanted/needed to improve my fitness level through exercise, it would be easy to do in my work environment	1	2	3	4	5
14	Coworkers bring healthy meals to work to eat for lunch/snacks.	1	2	3	4	5
15	My work environment allows sufficient time for me to exercise.	1	2	3	4	5

The following items should be answered with this scale:
1 = Strongly Disagree
2 = Disagree
3 = Neither Agree nor Disagree
4 = Agree
5 = Strongly Agree

16	My work environment allows sufficient time for me to eat properly.	1	2	3	4	5
17	Supervisors make it known that they participate in physical activities outside of work.	1	2	3	4	5
18	Supervisors make it know that they eat a healthy diet.	1	2	3	4	5
19	My coworkers openly discuss if they engage in some type of exercise during non-work hours.	1	2	3	4	5
20	My coworkers openly discuss if they eat a healthy diet.	1	2	3	4	5
21	I have the opportunity to discuss and receive guidance regarding exercise while at work.	1	2	3	4	5
22	My supervisor shows concern that employees eat properly.	1	2	3	4	5
23	My supervisor shows concern that employees get regular exercise.	1	2	3	4	5

About the Author

Joseph J. Mazzola received a Bachelor's Degree in Psychology from Bowling Green State University in 2004. He received his M.A. in Industrial/Organizational Psychology from the University of South Florida in the Fall of 2006 and started teaching psychology courses that same semester. While in the doctoral program in Industrial/Organizational Psychology at the University of South Florida, he earned a concentration in Occupational Health Psychology and was a member of the training grant bestowed by the National Institute for Occupational Safety and Health. Mr. Mazzola was also actively involved in the Society for Occupational Health Psychology, acting as their Graduate Issues Committee Chair for two years. Finally, during his time at the University of South Florida, he presented several poster and paper presentations at the Society of Industrial/Organizational Psychology and Work, Stress, and Health conferences, as well as worked on several papers that are currently in press or under review for publication.