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HOW EMPLOYEES VIEW THE CLIMATE FOR HEALTH AT WORK:
DEVELOPMENT OF THE WORKSITE HEALTH CLIMATE SCALES

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HOW EMPLOYEES VIEW THE CLIMATE FOR HEALTH AT WORK: DEVELOPMENT OF THE WORKSITE HEALTH CLIMATE SCALES

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ABSTRACT

HOW EMPLOYEES VIEW THE CLIMATE FOR HEALTH AT WORK: DEVELOPMENT OF THE WORKSITE HEALTH CLIMATE SCALES

By

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Researchers interested in empirically studying the influence of the work environment upon employee health have been handicapped by the scarcity of psychometrically sound measures for assessing work environment perceptions. The present studies utilized an ecological framework to study employee's perceptions of the climate for health at their organization using the Worksite Health Climate Scales (WHCS). The WHCS were administered in survey form to a sample of 241 employees at a newspaper company in Study One to evaluate and improve the psychometric properties of the scales. A total of 203 employees at seven organizations were surveyed in Study Two. The results showed that the scales demonstrated high reliability and that the scales also have preliminary evidence for their validity. Additionally, since the health climate ratings differed across organizations, this research provides support for the concept of a climate for health at the worksite.

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CHAPTER I

Introduction

Worksite health promotion activities have recently become a remarkably popular offering within American corporations (Glasgow & Terborg, 1988). The National Survey of Worksite Health Promotion Activities (Office of Disease Prevention and Health Promotion (ODPHP), 1987; Fielding & Piserchia, 1989) found that of worksites with more than 50 employees, 66% of their sample had at least one health promotion activity and greater than 50% of the activities had been in place for fewer than five years. Part of the popularity of worksite health promotion programs can be attributed to the concern of businesses about their rapidly rising health care costs (Everly & Feldman, 1985), but other benefits have been demonstrated, such as reduced turnover (Tsai, Baun, & Bernacki, 1987), improved physical fitness of participants (King, Carl, Birkel, & Haskell, 1988), and improved morale (Brownell, Cohen, Stunkard, Felix, & Cooley, 1984). Employers are also concerned about improving employee health (ODPHP, 1987), improving productivity, and enhancing the image of the organization (O'Donnell, 1984). While many of these concerns have been addressed through empirical research on individual employees, there is a pressing need to explore how work environments impact employee health (Pender,

1989). Worksite health promotion has evolved so that the interventions, research, and the philosophy undergirding this movement have neglected the important influence of the work environment upon employee health.

Recent History of Work and Health

House and Cottington (1986) assert that there have been two major scientific and social movements since World War II that have focused upon health at the workplace. The occupational safety and health movement began to lose momentum in the late 1970's and early 1980's while the worksite health promotion movement gained strength.

The emphasis of the occupational safety and health movement was threefold: (a) those aspects of health that were directly work-related, (b) how the work environment contributed to occupational health problems and how it could be modified to improve occupational health, and (c) how physical, chemical, and biological factors were major influences upon occupational health (House & Cottington, 1986). The worksite health promotion movement was inspired by a different set of assumptions about health and ways of improving it.

The focus of the worksite health promotion movement was broader - it focused upon general health and disease. There was less emphasis on the contributions of the workplace to health and choosing it as the target of health improvement efforts (House & Cottington, 1986).

An important implication of this historical change was that the locus of responsibility for health promotion was shifted from the worksite environment to the individual. This trend has also been noted by Levenstein (1989) in a recent editorial

where he asserts that industry has resisted regulation of business activity; one manifestation of this resistance has been in the redefinition of "health issues as problems of individual behavior rather than environmental hazard" (p.11). House and Cottington (1986) argued for a broader conceptualization of the factors that impinge upon employee health at the worksite. Both individual and environmental factors continue to be important, but they suggested that the psychosocial environment should play a more significant role in guiding comprehensive efforts to improve workplace health promotion. Sloan (1987) made a similar appeal in a theoretical paper on the paradigm which has been guiding worksite health promotion research.

A Paradigm for Worksite Health Promotion Research

Sloan (1987) noted that an explicit and articulated paradigm has not yet emerged for worksite health promotion due to the newness of the field, but after reviewing multiple studies from the literature, he proposed that an underlying paradigm does appear to exist. This paradigm "calls for activities, both large- and small-scale, which are designed to induce health-related behavior change in individuals rather than examining and changing the system of work in which these behaviors may be embedded" (p.186). Winett, King, and Altman (1989, chap. 9) remarked that most worksite health promotion interventions seek to encourage healthy behaviors or discourage unhealthy behaviors, but do not seek to reform policies, regulations, or environments that facilitate unhealthy behaviors or create impediments to the practice of healthy behaviors. Castillo-Salgado (1984) confirmed these sentiments by stating that two premises have formed the basis of the occupational

health movement: (a) the focus is upon changing the health behaviors of individual workers, and (b) the burden of responsibility for health is placed upon the worker.

Sloan divided reports from the worksite health promotion literature into two broad categories: single health-habit interventions and comprehensive interventions. Examples of some single health-habit interventions at the worksite include: hypertension control (Drazen, Nevid, Pace, & O'Brien, 1982), nutrition and obesity (Abrams & Follick, 1983; Loper & Barrows, 1985), physical fitness (King, Carl, Birkel, & Haskell, 1988), smoking cessation (Glasgow, Klesges, Godding, Vasey, & O'Neill, 1984; Rosen & Lichtenstein, 1977), and stress management (Peters, Benson, & Porter, 1977; Carrington, Collings, Benson, Robinson, Wood, Lehrer, Woodfolk, & Cole, 1980). These single interventions achieve their objective through individual behavior modification.

The comprehensive approaches to health promotion typically are composed of several single health-habit interventions within an integrated program (Sloan, 1987); thus, they still may not address the factors within the worksite environment that may need modification. Brief descriptions of four large-scale comprehensive worksite health promotion programs can be found in Fielding (1984b). These include programs by Johnson & Johnson ("Live for Life"), Control Data Corporation ("Staywell"), Kimberly Clark, and Mattel ("Health Enhancement Program"). While comprehensive programs are much broader in scope, they still have relied basically upon individual behavior change as opposed to organization-wide changes (Sloan, 1987). Given the decline of the occupational safety and health movement and the

underlying paradigm guiding worksite health promotion efforts, recent attention has been diverted from the worksite environment as a factor affecting employee health.

Definitions of Health Promotion

Recent definitions given for health promotion also highlight the themes of individual factors versus organizational and environmental factors as determinants of health and health behavior. One group of definitions focuses upon the role of the individual as the primary agent for improving health. Other definitions have stressed the importance of creating an atmosphere or environment that "promotes" personal health. A sample of these various approaches to defining health promotion is provided to illustrate their differences.

The American Hospital Association (AHA) defined health promotion as "the process of fostering awareness, influencing attitudes, and identifying alternatives so that individuals can make informed choices and change their behavior in order to achieve an optimum level of physical and mental health and improve their physical and social environment" (cited in Bader, Jones, & Yenney, 1982). This definition stressed the role of the individual for making a behavior change and influencing the physical and social milieu.

In contrast, Opatz (1985) defined health promotion as "the systematic efforts by an organization to enhance the wellness of its members through education, behavior change, and cultural support" (p.7). Goodstadt, Simpson, and Loranger (1987) proposed a similar definition in their appeal for a conceptual integration for health promotion: "the maintenance and enhancement of existing levels of health, through the implementation of effective programs, services, and policies" (p.61).

These two definitions rely more upon the role of the organization in improving employee health.

The American Journal of Health Promotion (O'Donnell, 1989) covered both of these perspectives in their expanded definition of health promotion:

> Health promotion is the science and art of helping people change their lifestyle to move toward a state of optimal health. Optimal health is defined as a balance of physical, emotional, social, spiritual and intellectual health. Lifestyle change can be facilitated through a combination of efforts to enhance awareness, change behavior, and create environments that support good health practices. Of the three, supportive environments will probably have the greatest impact in producing lasting changes.

Thus, it is apparent that each of these definitions has somewhat different connotations. Note that the definition by the AHA placed all of the responsibility for health change upon the individual, while the organization's role was to provide information which might precipitate the change in health habits. Also, they posited that individual factors can play a role in improving the worksite environment. Goodstadt et al. (1987) took a different stance and considered the role of the organization to be central because it can control policies and the nature of the programs that can affect employee health. Finally, the definition provided by the American Journal of Health Promotion synthesized the above two as it focused upon the role of improving individual health practices as a goal of health promotion, but it realized that a supportive environment is a critical factor in shaping health behaviors.

One important implication of these different definitions of health promotion is

their impact upon the design of health interventions. Differing orientations on the locus of responsibility for employe health lead to very different intervention strategies.

The individual approach, the most pervasive of the two, would seek to affect change in individual employees' health behaviors in order to help improve their health. The environmental approach has the same objective, but would seek to make modifications in the worksite climate or work design which lead to better health outcomes in employees (Sloan, 1987). An example of this second approach is given by McLeroy, Bibeau, Steckler, and Glanz (1988) who commented that organizations can alter their "corporate culture" in order "to include concerns about health outcomes in both tactical and strategic organizational decision making, and to include health related norms and values as part of the corporate ideology" (p. 361).

The most effective approach to understanding employee health practices and health status will likely incorporate both the influence of individual factors and the influence of the work environment. The occupational health and safety movement emphasized the worksite environment, but the worksite health promotion movement has focused upon the individual. Levenstein and Moret (1985) noted the need for an integrated approach to worker health that recognizes the influences of both personal behavior and the hazards that exist within the worksite environment. This imbalance in focus and strategies is not limited to worksite health research and action, but is a trend in the broader health promotion movement. Green (1984) regretted that most of the literature on health interventions has been produced by psychologists who have tended to emphasize the individual when changes might be directed toward

organizational, institutional, environmental, and economic conditions shaping behavior. Therefore, since most of the research on worksite health promotion has already overemphasized individual explanations of health behavior and health status, additional research needs to address the social-environmental factors at the worksite that affect personal health behaviors and health.

The purpose of this report is to demonstrate the need for systematic research on the contributions of the worksite environment to employee's health habits and health status. Two studies are described after a review of past research on this topic.

Overview of Literature Review

The introduction provided a brief historical perspective on worksite health programs, discussed the paradigm which has guided previous research, and provided several definitions of health promotion and discussed the implications of each. The common ground for these three areas is an understanding that the role of environmental influences upon employee health and health behavior has not served as a focal point for worksite health promotion efforts.

The next section of this paper will address factors within the worksite environment that affect employee health. These environmental factors will be explored through a review of research studies using a multi-level framework for the worksite that is similar to the approach taken by environmental psychologists (Conyne & Clack, 1981). Specifically, literature related to three aspects of the worksite environment will be reviewed: institutional aspects, physical aspects, and interpersonal aspects.

Overview of the Multiple-Level Framework

To identify the important environmental domains pertinent to health promotion, this review will utilize theoretical developments from environmental and ecological psychology. Based upon the approach to environmental classification by Conyne and Clack (1981), environments can be divided into three primary components: institutional, physical, and social. The institutional component reflects "all policies and procedures that implicitly or explicitly govern human behavior" in the environment, the physical component encompasses "both natural and built features", and the social component subsumes both "the demographic and personal characteristics of people and their behavior."

The literature review on the worksite environment will be organized into three general categories which are derived from this framework presented by Conyne and Clack (1981). These three areas that are relevant to the study of employee health are: the institutional environment of work, the physical environment of work, and the interpersonal environment of work.

An outline of these three levels of the worksite environment is provided in Table 1. The first component of the worksite environment is the institutional environment for health. This component is broken down into three smaller areas. The first area concerns organizational policies that are related to health risks such as a restrictive smoking policy (Biener, Abrams, Follick, & Dean, 1989) or a ban on smoking (Borland, Chapman, Owen, & Hill, 1990). The second component is related to employee benefits, such as child-care or flexitime, which contribute to parents' well-being (Greenberger, Goldberg, Hamill, O'Neill, & Payne, 1989) and are

potentially health-enhancing. The final aspect relates to job characteristics and the design of job tasks. Previous research has examined the impact of work load, work pressure, and decision latitude upon employee well-being (Johnson & Hall, 1988; Karasek et al., 1988).

The physical aspects of work are the second general component influencing employee health. This subsumes two areas: physical features of the work setting and structural aspects related to the practice of healthy behaviors. The physical features of work that are related to employee health are composed of common workplace stressors (e.g. temperature, noise, light) (Quick & Quick, 1984) and ergonomics (Westgaard & Aaras, 1985). Structural aspects related to health habits are structures present at the workplace that can facilitate health-promoting behaviors, such as the provision of bicycle racks, healthy vending machine food (Wilbur, Zifferblat, Pinsky, & Zifferblat, 1981), and nutritional information displays (Schmitz & Fielding, 1986).

The third general component, the interpersonal aspects of work, is broken down into two smaller areas, one related to encouraging the practice of healthy behaviors and the other related to the provision of social support. Health behavior is influenced by the supportiveness for healthy behaviors (Robbins & Slavin, 1988) and by the worksite norms regarding health behavior (Allen & Kraft, 1982, 1984). Worksite health norms have the potential to influence individual health behaviors through the provision of other employees who serve as role models for healthy behavior and also because certain health behaviors are reinforced at that worksite. Social support at the workplace is composed of co-worker support and supervisor support. Social support has been researched most frequently for its involvement in

Table 1

Conceptualization of the Worksite Environment

I. Institutional work environment

- A. Policies concerning health risks
  - 1. Smoking and alcohol policy
  - 2. Safety-belt policy for company vehicles
- B. Employee benefits as health promotion
- C. Job characteristics related to health

II. Physical work environment

- A. Physical environment of work
  - 1. Stressors
  - 2. Ergonomics
- B. Physical features related to the practice of healthy behaviors

III. Interpersonal work environment

- A. Social support at work
  - 1. Coworker social support
  - 2. Supervisor social support
- B. Support for healthy behavior
- C. Norms promoting healthy behavior

negating the deleterious effects of stress at the worksite (House & Cotton, 1986). This multi-level framework for viewing the worksite environment and its relation to health promotion will serve as the underpinning for the review of the literature.

Institutional Work Environment

Policies of organizations can be structured to enhance employee health and serve as a useful adjunct to existing health promotion programs. Three major areas where research has demonstrated that organizational policies have an impact upon employee health are identified and the empirical basis for each area is discussed.

Policies concerning health risks. Several organizations have enacted policies aimed at regulating or modifying employee smoking, alcohol and drug use, and nutrition habits (Kizer, 1987; Sloan, Gruman, & Allegrante, 1987). Most of the research that has been conducted concerning organizational health policies has been conducted on the impact of initiating restrictive smoking policies or bans on smoking at the workplace.

Biener, Abrams, Follick, and Dean (1989) evaluated the impact of a restrictive smoking policy upon the behavior and attitudes of smokers and non-smokers at a hospital. The researchers compared the responses of random cross-sectional samples of employees at the target hospital with employees from a control hospital. The majority of non-smokers (over 90%) and the majority of smokers (67%) at the target hospital approved of the policy. One year after the policy had been implemented, 5% of the non-smokers in the smoking policy hospital reported being bothered by smoke at their work stations compared to 25% of non-smokers at the control hospital.

Additionally, smokers reported lower smoking rates at work. However, there were not significant differences in the reported rates of smoking at home nor were the quit rates of smokers for the target and control hospitals different. The policy implemented in this intervention placed restrictions upon smoking; however, some organizations have initiated a total ban on smoking at the workplace.

A smoking ban was associated with reduced rates of smoking by smokers working in the Australian Public Service (Borland, Chapman, Owen, & Hill, 1990). Complete information was obtained for a total of 2,113 employees (391 of whom were smokers) who were surveyed two to four weeks before the ban on smoking and again five to six months later. The reduction in the amount of reported smoking associated with the bans was found to be over 25% among moderate and heavier smokers and compensatory smoking outside of work was minimal. Although the number of smokers declined slightly, the decrease was not any more than would be expected based on community trends.

Both of these studies relied upon self-reported information regarding smoking behavior. Neither of these two studies confirmed abstinence from smoking through biochemical tests; however, neither study claimed increased abstinence rates as a major finding. Additionally, the benefits of reduced smoking at work could have been lessened since the smokers could have compensated their reduced smoking rates by increasing puff frequency or depth of inhalation. However, since research has been implicating the hazardous effects of passive smoking or sidestream smoking upon non-smokers (Hole, Gillis, Chopra, & Hawthorne, 1989), a policy restricting or

banning smoking at the worksite is one way that an organizational policy can support health promotion for smokers as well as non-smokers.

Although the majority of respondents in the Biener et. al study favored the restrictions on smoking and 82% of the members in a national union favored restrictions on worksite smoking (Brown et. al, 1988), worksite personnel need to be sensitive in finding a balance for the rights of smokers and non-smokers when initiating any health-related policy. A seat-belt program in company cars (Ware, Sleet, & Bigelow, 1986) is also another way employers can structure their policies to encourage desirable health habits by employees.

Employee benefits as health promotion. Employee benefits, such as maternity/paternity leave and extended child care for parents, can also support the goals of health promotion (Kizer, 1987; Rosow, Zager, & Hanft, 1985; Sloan, Gruman, & Allegrante, 1987). For many parents, conflict and stress can be the result of balancing the demands from work with the demands of family life (Zedeck & Mosier, 1990).

The contributions of formal, family-responsive benefits and policies and informal social support to the well-being and orientation to work of 80 married men, 169 married women, and 72 single women with a young child was assessed by Greenberger, Goldberg, Hamill, O'Neill, and Payne (1989). The family responsive benefits were maternity/paternity leave, child care options, and flexitime. A work environment supportive of the needs of parents was an important feature for women; measures of informal and formal support accounted for nearly 48% of the variance in married women's organizational commitment. While informal social support was a

more important predictor than formal support by the organization for women, formal support still uniquely contributed to level of organizational commitment among both married and single women, job satisfaction on the part of married women, and well-being among married women. Also, the number of formal benefits used was associated with fewer symptoms of poor health for single women. For the men, when the formal features of the work environment were regressed on the dependent measures (e.g. job satisfaction, commitment, role strain, health symptoms) none significantly explained their variance. These data where obtained from a cross-sectional sample and based upon self-report measures; however, the pattern of results were compelling and supported the notion that a supportive work environment is related to the physical and mental well-being of employees.

Job characteristics related to health. Another important aspect of the institutional environment for health is the way that work tasks are structured. Most of the literature on stress management is directed at coping responses and appraisal of stressors, which are individual factors, as opposed to modifying aspects of the way that work is structured, which are organizational factors (Ivancevich, Matteson, Freedman, & Phillips, 1990; Winett, King, & Altman, 1989, chap. 9). Stress is a complex phenomenon, and many factors at work can contribute to employees feeling the impact of stress. Factors related to employee stress include: threat of demotions, unclear job descriptions and responsibility, poor communication, and perceived lack of importance (Donatelle & Hawkins, 1989; Fielding, 1984a). Donatelle and Hawkins (1989) have advocated stress reduction efforts which address personal, environmental, and organizational sources of stress. These authors chided stress

reduction programs based upon exercise and relaxation techniques because they only deal with the problem temporarily and "they offer little alternative for the person who may be hassled by the boss and isn't able to go jogging or meditate immediately" (p. 24).

While industrial/organizational psychologists have long been concerned about the way that jobs are designed (Ilgen, 1990), health professionals are becoming increasingly aware of the relationship of job design and employee health. Johnson and Hall (1988) investigated the relationship between aspects of the psychosocial work environment and the prevalence of cardiovascular disease (CVD) in a randomly selected sample of 13,779 Swedish workers. Based on self-reports, individuals in environments that had high demands, low control, and low social support had nearly double the prevalence of age-adjusted CVD than workers in environments with low demand, high control, and high social support. The effects of age and 11 other potentially confounding factors were controlled. Since the nature of the design was cross-sectional, causal inferences cannot be made, but the study involved an impressive number of participants (including men and women) based upon a representative, random sample. Although relying totally upon self-report measures, the measure of self-reported CVD showed good validity since it was prospectively related to cardiovascular-related mortality based upon a national disease registry.

An investigation of secondary data from the Health Examination Survey (HES) 1960-61 and the Health and Nutrition Examination Survey (HANES) 1971-75 by Karasek et al. (1988) related psychosocial job characteristics to the prevalence of myocardial infarction for employed males. After controlling for age, race, education,

systolic blood pressure, serum cholesterol, smoking (HANES only), and physical exertion, the employed males in jobs which were both low in decision latitude and high in psychological work load had a higher prevalence of myocardial infarction in both data bases. Decision latitude and work load were assessed by a "job characteristic estimation system" developed by the authors which estimated the job characteristics of 221 occupations. This method had the advantage of reducing self-report response bias, but the authors noted that it also probably suppressed the magnitude of the associations between myocardial infarction and job characteristics. In sum, the reviewed research suggests that psychosocial factors related to aspects of the job design are also related to employee health outcome measures.

Physical Aspects of Work

The physical environment of work. Physical features of the worksite environment are just one of the potential sources of stress in organizations (Quick & Quick, 1984). Physical features may create physical demands upon employees leading to the perception of stress. Several aspects include temperature, illumination and other rays, sound waves and vibrations, ventilation, and chemicals (Quick & Quick, 1984; Lehmann & Kalmar, 1979). Many of these stressors have been traditional areas of interest for the occupational safety and health movement. In addition to these environmental factors, ergonomic features are also related to health outcomes.

Ergonomics is the study of the interface between humans and physical aspects of their work environment with an emphasis on improving the "fit" between machines

and workers. Allen (1986) described the role that an occupational therapist can play in altering the work environment in order to help enhance work performance and reduce potential injuries. Interventions that are described include adjusting office furniture to enable correct posture, preventing eyestrain by repositioning computer screens to reduce glare, and checking that documents are positioned at the same level as the screen to avoid muscle strain.

An intervention in a small Norwegian factory that sought to reduce the impact of musculo-skeletal illnesses utilized an ergonomics approach to improve the physical work environment (Westgaard & Aaras, 1985). The modifications in the environment led to reduced muscle strain in muscles of the shoulders and neck region (as measured by EMG activity), a significant reduction in sick leave, and a significant reduction in labor turnover. When the new work situations were compared with the old ones, the mean muscle load in some instances was reduced by nearly 50%. A 40% reduction in long-term sick leave at one of the sites was demonstrated and this reduction was caused primarily by reduced musculo-skeletal sick leave.

In sum, a variety of factors in the physical environment influence employee wellness. Comprehensive analyses of the various physical aspects of the work environment are not very common, as researchers have tended to focus upon one or two stressors or to remain within their disciplinary boundaries (e.g. ergonomic or occupational safety issues).

Physical features related to the practice of healthy behaviors. The second component of the physical work environment includes features of the environment that are related to the practice of healthy behaviors. Particular health behaviors, such as

smoking or eating healthy foods, may be facilitated or discouraged by some of the structural aspects of the physical work environment.

Changing the dietary habits of workers might be achieved by altering aspects of the workplace such as the cafeteria. Noting that many employees will eat one meal and/or several snacks at the workplace, Schmitz and Fielding (1986) designed cards with nutritional labeling (e.g. number of calories, grams of fat, milligrams of sodium) to highlight healthy food choices in a workplace cafeteria. Their findings showed a decrease in the mean levels of sodium per tray and a trend for decreased fat per tray after the cards were displayed. Since the study did not use a control group (i.e. comparison using baseline measures was used), some caution in interpreting the findings is warranted.

Ries and Schoon (1986) evaluated an 8-week cafeteria education program for college students that utilized nutritional pamphlets placed on tables in cafeteria lines in two cafeterias. A nonequivalent control group, another campus cafeteria, was used for comparison and the results showed that nutritional knowledge increased (albeit slightly) in the two treatment cafeterias as opposed to the control cafeteria. These findings should be viewed with extreme caution since the follow-up sample was self-selected and only represented approximately 10% of the original sample and only attitudes and knowledge were measured, not actual dietary behavior.

There is some evidence that the nutrition and buying habits of consumers at the worksite can be altered by modifying aspects of vending machines. The effect of nutrition information displays and increased availability of lower-calorie items in vending machines was related to sales in one study which used a multiple time series

design (Wilbur, Zifferblatt, Pinsky, & Zifferblatt, 1981). Lower-calorie items were defined as snacks (e.g. raisins, nut combinations, and pretzels) with 40% fewer calories than the average number of calories for an item in the machines during the baseline period. In the treatment conditions, the availability of lower-calorie items was increased so that lower-calorie items constituted one-half of the possible 18 choices.

Lower-calorie items were 40% of total sales when their availability was increased and 45% of total sales when nutritional labels were added and availability increased. Interestingly, the total sales rose 59% over baseline when availability increased and 76% over baseline when availability increased and labels were added. However, in the control condition, sales actually declined 19% from baseline.

The investigators concluded that when lower-calorie items were available, they assumed a large proportion of sales and that by adding the nutrition information, sales of lower-calorie items were enhanced. Since the setting for this investigation was an administrative complex at the National Institute of Health, it is unknown whether these findings may generalize to worksites which place less of an emphasis upon health.

Another investigation which examined factors affecting employee's dietary practices at the worksite was conducted by Ostwald (1989), who looked at the impact of three treatment regimens upon dietary and exercise practices in a small Midwestern company. A nearby company served as a control and total of 90 employees in the treatment company were randomly assigned in equal numbers to three varying levels (from mild to intensive) of a health promotion intervention. While all of the

participants had access to a fitness facility, the participants in the mild intervention attended an educational seminar, received a monthly newsletter, were given a sample of free healthy food available at the cafeteria, and received blood chemistry tests with a written report of the results. Participants in the moderate intervention received the interventions above, further elaboration on their laboratory results, a physical examination, and a maximal treadmill exercise test. The individuals in the intensive group received all of the interventions previously mentioned, further explanation of their laboratory results, an individual exercise prescription, participation in an aerobics class, a free daily low-fat meal from the company cafeteria, and additional information on low-fat foods.

One of the most interesting findings of Ostwald's investigation was the number of healthful changes made by the participants in the mild intervention group. They received only educational strategies and information about healthy food at the worksite, yet they reported a significant decrease in the number of kilograms they were overweight. This group started out with the highest mean values of blood lipids and glucose, and lowest cholesterol/HDL ratio and total HDL (i.e. each of these are considered undesirable blood chemistries), but they showed significant healthful changes in glucose and triglyceride mean values and favorable changes in their cholesterol/HDL ratio. In fact, 36% of the employees in this group were classified as high risk for coronary heart disease before the intervention and only 14% were afterwards - this was the largest reduction in all of the three groups.

These findings suggest that environmental and educational supports can have beneficial effects upon dietary and exercise practices, and that the interventions might

not need to be very intensive. Some caution in interpreting these findings is warranted, because the potent effects observed in the mild intervention group might have precluded statistically significant changes in health variables for the intensive interventions due to the limited sample size. Ostwald also noted that a Hawthorne effect or a John Henry effect (i.e. employees in the mild intervention group being more competitive than the others) might have contributed to these findings. Lastly, some of the significant differences might have arisen by chance since univariate t-tests were used to detect pre/post changes in several variables that are correlated to each other, such as changes in total cholesterol, HDL-cholesterol (a subcomponent of total cholesterol), and the total cholesterol/HDL ratio. A multivariate approach might have clarified some of these concerns.

In addition to providing supports conducive to healthy eating habits, a worksite may choose to target smoking behavior by removing cigarette vending machines from the lobby or break rooms, and Kizer (1987) suggests that this might be one part of an overall strategy to help employees stop smoking. In summary, there is evidence that modifications made in certain aspects of the worksite can lead to better health and well-being outcomes for employees. The final aspect of the work environment that is considered in this review is the interpersonal work environment.

Interpersonal Work Environment

Social support at work. Social support is defined as "the comfort, assistance, and/or information one receives through formal or informal contacts with individuals or groups" (Wallston, Alagna, DeVellis, & DeVellis, 1983, p. 369). Research in the

past decade has looked at the role of social support as a potential mechanism that may concurrently improve health, reduce stress, and act as a buffer for the impact of stress upon health (House & Cottington, 1986).

One of difficulties encountered in reviewing the relationship between social support and stress and health has been due to a lack of consensus guiding research paradigms. Variability in the conceptualization and operationalization of "social support" and methodological shortcomings have been typical problems with the research relating social support to stress and health (Beehr, 1985; Wallston et al., 1983). Since the focus of this review concerns the effects of various aspects of the worksite upon employee health, the relationship of work stress and workplace social support is of primary concern.

In an article on the psychological and social factors related to stress and its effects upon health, Caplan (1985) cited research that subjective perceptions of the worksite environment can lead to reactions that are emotional, physiological, cognitive, and health-related in nature. Emotional reactions might include anxiety or depression; physiological reactions can be related to risk factors in cardiovascular disease and immune system responses; cognitive reactions might be related to effects upon problem-solving; and health-related reactions might have an effect on the use of alcohol or tobacco. While there is a potential for many of these to have harmful effects upon health, having social support at the workplace in the form of supportive supervisors and co-workers may allow employees to react with less emotional and physiological upset under heavy workloads (Caplan, 1985) and has been associated

with less perceived work stress and better self-reported physical and mental health (House & Cottington, 1986).

Revicki and May (1985) developed a structural model that was tested on a sample of 210 family physicians to study the effects of occupational stress upon the development of depressive symptoms. The results indicated that there was a direct effect of occupational stress on depressive symptoms, but the relationship was moderated directly by family social and emotional support and indirectly by the locus of control on family social support. The authors interpreted their findings to suggest that individuals with a more internal locus of control may be able to better organize their support systems in the face of stressful work situations.

Another study involving social support, personality characteristics, and perceived health used a structural equation model to test the direct and indirect relationships between these constructs (Connell & D'Augelli, 1990). The proposed model was evaluated on 182 respondents who were evenly divided into two groups, one as an exploratory sample and the other as a confirmatory sample. A relationship between perceived available support and perceived physical health was demonstrated in the confirmatory sample, but not in the exploratory group. The authors concluded that the study provided limited support for a link between social support and perceived physical health since the amount of perceived support was positively related to their perceived physical health. The authors suggested caution in interpreting these findings since cross-sectional data were used and reciprocal causation could not be ruled out between social support and health.

LaRocco, House, and French (1980) used a randomly stratified sample of 636 men from a pool of 2,010 subjects within 23 different occupational groups in a number of different organizations to investigate the relationship of social support, occupational stress, and health. The investigation was primarily concerned with testing the hypothesis that social support buffers the impact of job stress upon job-related strain and health. A review of past research in this area and the findings from this investigation (which reanalyzed data used in previous studies) supported the hypothesis that social support buffers the impact of occupational stress upon mental and physical health variables (e.g. anxiety, depression, irritation, somatic symptoms). In agreement with the reviewed research, the hypothesis that social support buffers the effect of job stress upon job-related strain (e.g. job dissatisfaction, boredom, dissatisfaction with work load) was not supported, but job-related social support appeared to have a direct effect upon job-related stress and strain (LaRocco, House, & French, 1980).

The reviewed evidence suggests that interpersonal aspects of the worksite are related to employee health in two ways - one is related to health-related behaviors and the second is through the provision of social support. Co-workers and supervisors may potentially provide a supportive context that encourages healthy behaviors at the worksite, as well as social support for employees. The relation of social support at work and perceptions of stressors and health outcomes has been examined. Evidence was given that demonstrated both "main effects" and "buffering effects" for social support. The social support construct used in the studies above was general social

support. There are also more specific facets of social support. One of these specific facets, the role of social support for healthy behaviors, will be discussed next.

Support for healthy behavior. Robbins and Slavin (1988) have developed a measure of support for health-related behavior change called the Health Support Index (HSI). This specific measure of support by social network members has two subscales: A direct component where others actively help the individual change their health-related behaviors, and a modeling component where others work to improve their own health and fitness. To test the predictive validity of this instrument, it was administered to 220 teachers who were participating in a health promotion workshop and were interested in losing weight. A discriminant analysis procedure was employed using six pretest subject variables, three of which were significant (i.e. Pre-Exercise Level, HSI Support, Life Stress Events) and this function predicted 73% of the individuals who lost two or more pounds of weight and 44% who were not successful in losing that same amount of weight. The authors concluded that the supportiveness scale was useful in predicting short-term behavior changes and the modeling scale may be more relevant to success in long-term behavior change.

Members of health and smoking classes at the worksite also can provide support for each other. In a description of worksite smoking cessation programs that utilized monetary incentives and group meetings, Stachnik and Stoffelmayr (1983) noted that "perhaps the most important function of the group meetings over the entire seven months is that they are the occasion for an exchange of social support [italics added] among the participants" (p. 1395). While the direct impact of support for quitting smoking was not tested, the effectiveness of the interventions was

remarkable. At the three sites, the reported percentage of smokers abstinent (which was verified by friends and spouses) at six months ranged from 80 to 91% and participation rates ranged from 47 to 70%.

A study of spouse-training for 68 overweight women demonstrated that the greatest long-term weight loss occurred when spouses were taught to provide modeling, monitoring, and reinforcement (Pearce, LeBow, & Orchard, 1981). The superiority of couples training was also demonstrated earlier by Brownell, Heckerman, Westlake, Hayes, and Monti (1981) where the effectiveness of co-operative spouse couples training exceeded the two other treatment regimens and resulted in a nearly 30 lb. average weight loss for participants in that group. Although these studies were not conducted at the work setting, the findings of these studies suggest that support may be manipulated to help achieve health promotion objectives and consequently measures of health supportiveness at work are needed to further knowledge in this area.

The relationship of social support along with other psychosocial variables to initial cessation and long-term abstinence for 402 smokers participating in a worksite smoking cessation program was studied by Curry, Thompson, Sexton, and Omenn (1989). Two types of social support were assessed. The first type of support, an index of social-reinforcement for smoking, was based on the total number of smokers in the respondent's home and place of work, and among friends and one's significant other. The other support measure, support expected for quitting, was based on the degree of support for quitting that the respondent expected to receive from their significant other, friends, and coworkers. Neither of the social support measures

were related to the first outcome, initial cessation. However, the number of smokers in the participant's environment was related to smoking abstinence at 6- and 12-month follow-up. Although the expected support for quitting was not related to either outcome, this construct was assessed as an expectation of support and not actual support received. Perhaps, these authors might have found that actual received support for quitting was related to quitting smoking. However, given the discrepancy between these two types of support for behavior change, they should be investigated independently and not grouped together to represent overall support for making healthy behavior changes.

Norms promoting healthy behavior. The final component of the interpersonal work environment that is related to employee health and well-being is the role of worksite norms for health behaviors. Robert Allen and colleagues are perhaps the most well-known individuals who have focused upon the impact health-related norms (Allen & Allen, 1986; Allen & Kraft, 1980, 1982, 1984; Allen & Linde, 1981). Norms are defined as "all behavior that is expected, accepted, or supported by the group, whether or not the standards are written down, expressed orally, or acknowledged" (Allen & Kraft, 1980, p. 13). The norms related to health at the worksite both influence and are influenced by individual health behaviors. O'Donnell (1984) stated that a worksite environment supportive of a healthy lifestyle is partly determined by respected members of the organization who provide healthy role models and peer support figures. A supportive environment at work is just one component of a "behavior change support system," which O'Donnell (1984) claimed is the most effective of four possible levels of intervention programs for worksite

health promotion. The four levels, in order of impact, are: educational programs, evaluation screening programs, prescription programs, and a behavior change support system.

Winett (1985) mentioned similar social influences when explaining differences in the exercise habits of individuals. He argued that certain "activities that are not practiced, modeled, and valued by peer groups are not likely to be emulated" (Winett, 1985, p. 162). This sentiment is echoed by Glasgow and Terborg (1988) who note that "When a small group of workers changes habits in atypical ways (e.g., exercising instead of eating lunch), they may be viewed as eccentric. When, however, a critical mass of influential people engage in such behaviors, other employees may be more receptive [to change]" (p. 369).

Given the relationship between interpersonal influences and health-related behaviors, most of the health promotion interventions utilizing this approach unfortunately have relied upon changing individuals, as opposed to altering the norms or social groups themselves (McLeroy, Bibeau, Steckler, & Glanz, 1988). However, Allen and Allen (1986) have presented an innovative strategy for promoting cultural change within groups by altering their normative systems. One the goals of past interventions has been to encourage healthy norms, since the "culture" of many groups has strong norms for health risk behavior (e.g. drinking or smoking) and not health-enhancing behavior. Many of these claims of the importance of health norms are anecdotal, but there are a few examples of empirical work in this area.

In one worksite smoking cessation intervention that examined the psychosocial factors related to quitting smoking, the authors found that the reported number of

smokers in an individual's environment was negatively associated with long-term abstinence (Curry, Thompson, Sexton, & Omenn, 1989). Long-term abstainers were those not smoking at 6 and 12 months and each were asked to submit a saliva sample for chemical verification of their smoking status. The sample was composed of 402 smokers from a Department of Energy installation in the Pacific Northwest. This report suggests that the behavior of certain individuals in the workplace may be related to the health behaviors of other employees.

Should there be strong norms at the worksite for certain beneficial health practices, one could argue that there exists either a climate or a culture promoting health at that worksite. This concept of organizational climate in an organization should be differentiated from the related, but distinct concept of culture. Organizational climate is defined as "individual descriptions of the social setting or context of which the person is a part" (Rousseau, 1988, p. 140). Climate refers to individual perceptions and descriptions; culture is a group or social-unit phenomenon and is largely normative (Rousseau, 1988). Rousseau noted that all organizations have climates, but many organizations have no culture or set of shared beliefs.

Although early research examined general organizational climate as undifferentiated summary perceptions, more recent research has focused upon different facets of climate (Rousseau, 1988). In fact, Zohar (1980) proposed that there is a climate for safety in industrial organizations and Schmitt, Colligan, and Fitzgerald (1980) present evidence based on unexplained physical symptoms at eight worksites that support the concept of a "sick organization." The idea of a climate for health has been mentioned in the literature with some empirical support, but further

research in this area is suggested (Ilgen, 1990). Thus, the question remains as to whether a climate surrounding health actually exists at the worksite and whether this climate has an impact upon employee well-being.

Implications

The reviewed studies strongly suggest that there are multiple influences upon the health and health habits of individuals at work. Research on employee health has been reviewed which indicates the influences of (a) policies regarding health risks, (b) supportive benefits, (c) psychosocial factors of job design, (d) ergonomically efficient work environments, (e) a physical environment supporting sound health practices, (f) co-worker and supervisor social support, (g) support for making healthy behavior changes, and (h) positive health norms.

Since there has been a strong emphasis placed on the role of individual factors in worksite health promotion efforts, there is a pressing need to understand the context within which these behaviors occur. This means that research should focus upon the role of the worksite environment and how it contributes to the health of the employee. This shortcoming in the literature has been noted by Pender (1989) as one of the three major areas where future research in worksite health promotion is suggested: "Research is needed to identify environmental parameters that can be modified to strengthen health and increase the frequency of health-enhancing behaviors in work settings" (p. 40).

Also, the types of people who participate in worksite health promotion activities are generally the healthier employees. Since the people who need these

programs the most might not be attending programs, making an alteration in the work environment may help reach employees with poorer health and less desirable health habits. Some of the evidence that these programs are reaching a selective audience is presented next.

Conrad (1987) surveyed participants in a corporate wellness program and a random sample of nonparticipants and found that participants were less likely to be smokers, rated their health better, were more interested in health, and spent more time exercising. Findings from another study (Shephard, Corey, Renzland, & Cox, 1982) found that nonparticipants in test companies had greater initial hospital usage and higher initial medical costs than employees who chose to participate in a fitness program. An investigation by Eakin, Gotay, Rademaker, and Cowell (1988) of the factors related to enrollment in a worksite fitness program found that joiners were more likely to consider fitness a priority, were more likely to engage in health-oriented behaviors, and were more likely to have engaged in prior fitness activity. The joiners appeared to have a more positive attitude toward health promotion, although there were no differences in the health status of the groups. In sum, it appears that the healthier employees, the ones who need the health programs the least, are the ones who are most likely to volunteer for health promotion activities.

The advantage of making changes in the worksite environment as a supplement to individual behavior change is that worksite health promotion will reach those people who choose not to participate in health promotion activities (Sloan, Gruman, & Allegrante, 1987). This is an important issue; Fielding (1990) asserted that one of the greatest challenges for the worksite health promotion movement is in maximizing

participation. Finally, Fielding noted that environmental approaches to worksite health promotion reach all employees and that "the majority of [behavior] changes may come through changes in the environment for health rather than participation in specific risk reduction formal offerings" (Fielding, 1990, p.81).

To promote understanding in the topic of how the workplace environment is related to employee health, a reliable and valid instrument that assesses the workplace environment needs to be created. Most of the cited studies looked at many of the disparate influences upon worker health, but few have utilized an integrated approach to study how the psychosocial environment at work related to employee health. While a fairly comprehensive questionnaire has been developed to measure a "wellness oriented work environment" (Chapman, 1987), it has not been evaluated for any of its psychometric properties and it's utility for research purposes is limited because of the restricted variance in most of the response formats.

The Present Research

Creating an instrument that reliably and validly assesses the climate for health at organizations was the task of the present investigation. This study combined multiple aspects of the work environment from the framework suggested by the literature review and related these to several health outcome measures. Areas that needed more research were explored in greater detail and areas where there is already an adequate empirical base were not investigated in depth. Two studies were conducted to achieve the research goals. The first study was conducted to assess several of the psychometric properties of the newly developed WHCS and to revise

this measure for use in a second study that would reassess the reliability of the revised measure and provide evidence for the validity of the measures.

CHAPTER II

STUDY ONE

The current research describes the development of a multi-scale instrument that assesses an array of factors within the work environment that are related to employee health habits and health outcomes. These measures of employee perceptions of the work climate for health are called the Worksite Health Climate Scales (WHCS). The purpose of Study One was to promote the development of internally consistent scales composed of items that demonstrate adequate discrimination. The results of Study One guided the revision of the WHCS.

Method

Sampling Procedures

Four worksites in the Mid-Michigan area were contacted regarding possible participation in Study One. All of these worksites had received a small grant for worksite wellness activities from the Michigan Health Initiative, an innovative program that is sponsored by the Michigan Department of Public Health aimed at increasing the availability of worksite wellness activities to smaller companies. Three of the sites declined participation because they had surveyed employees recently and

felt that it was too soon to survey them again or because they felt that they did not have enough time for the project. A medium-sized newspaper company agreed to participate and served as the setting for Study One.

Employees at the newspaper were initially notified of the study through a brief article placed in the company's biweekly employee newsletter. The following week, all current employees (N = 380) received a cover letter and survey in their mailbox. The design of the survey, the content of the cover letter, and the procedures were guided by the recommendations of Dillman (1978). To enhance participation and employee motivation, a lottery for participants was held. The lottery was briefly mentioned in the newsletter and described in detail in the cover letter and in the survey instructions. The prizes for the lottery included shorts, sweatshirts, and 3-month memberships to local health clubs. A lottery ticket was attached to the back of every survey booklet. Employees were instructed to place their completed survey in a centrally located box and to place their signed lottery ticket in a different box beside the first box. Using two boxes facilitated the selection of lottery winners and enabled the experimenter to identify nonrespondents, but still guaranteed the anonymity of participants. Skeptical observers might note that an individual could enter the drawing without completing a survey just by placing their name on a ticket and placing it in the box; however, there were 243 tickets returned along with 241 surveys. Presumably, only two people entered the drawing without completing the survey.

One week after the surveys were distributed, a brief postcard, which was the same for all participants, was sent to each employee which thanked those who had

completed their survey and encouraged nonrespondents to complete and hand in their survey. Finally, two weeks later, a follow-up letter and extra survey were sent to all nonrespondents (i.e. those not entering the lottery) which encouraged them to participate.

The overall response rate was 63% of current employees (241/380). The response rate among part-time employees (i.e. defined by the company as individuals who work less than 30 hours a week) was substantially lower than for full-time employees. Part-time employees had a response rate of 45% (80/179) and the response rate among full-time employees was 80% (161/201).

Sample Characteristics

The mean age of the sample was 36.1 years (SD = 12.3 years). The sample included 52% females and the majority of participants were white (92%) with 6% African American, 1% Native American, and 1% Hispanic. The obtained sample represented the ethnicity of the company's employees fairly well, although the females tended to be overrepresented in the sample. Data from personnel records provided by the company showed that 40% of employees were female and that 88% of employees were white, 8% African American, 1% Native American, and 2% Hispanic. The marital status of the participants was: 55% married, 2% widowed, 10% divorced or separated, and 33% never married. The education level was: 1% attended some high school, 16% graduated from high school, 4% attended a technical/trade school, 13% earned an associate degree, 33% attended some college, 24% had a college degree, and 6% had a master's degree. The average number of hours worked was 35.8 hours

(SD = 10.5) and the mean number of years that the individual had worked at the company was 8.4 years (SD = 10.7).

Measures

The WHCS from Study One can be divided into three general categories: the organizational support scales, the interpersonal support scales, and the health norms scales. The three organizational support scales assessed health-related constructs that can be influenced by organizational policies and practices, such as the amount of health information distributed to employees or a policy regarding exercising during work hours. The four interpersonal support scales were concerned with different types of social support at the worksite. The four health norms scales asked respondents to rate the worksite norms in four different health areas (i.e. exercise, smoking, nutrition, and stress). The scales that composed the WHCS will be described in detail beginning with the organizational support scales.

Organizational Support Scales

Company health orientation (5 items). This scale attempted to measure the extent to which employees feel that their employer is concerned about and committed to employee health issues. Participants were asked to respond to several statements such as whether they feel that their company is concerned about employee health and well-being, and if they feel that their company values having healthy workers. This scale was essentially an attitude measure and the five response choices ranged from "Strongly Agree" to "Strongly Disagree."

Job flexibility to exercise (3 items). This scale measured the extent to which employees felt that their job affords the flexibility to allow them to exercise at work. For example, one item asked respondents if they can make time to exercise at some point during the day. The same response format of "Strongly Agree" to "Strongly Disagree" was employed for this scale.

Company provision of health information (6 items). This scale asked the frequency with which health information is distributed or disseminated to employees through memos, bulletin boards, presentations, etc. The conceptual approach of this scale is similar to what Flora, Maibach, and Maccoby (1989) termed the "information environment" of the organization. These authors suggest that the organization's information environment is "an important indicator of organizational healthfulness" (p. 193). This scale used 5-point frequency ratings ranging from "Almost Never" to "Almost Always."

Interpersonal Support Scales

Since most of the theorizing and empirical research on occupational stress has looked at supervisor social support or co-worker social support or both together (Beehr, 1985), separate scales were developed for these two sources of support. However, the scales were exactly parallel since the same content was represented in both scales.

Supervisor social support (12 items). This scale asked employees to rate the frequency of received support from their supervisor. The wording of some of the items and the conceptual approach were adapted from Barrera, Sandler, and Ramsay's (1981) research on social support for college students and House and Well's (1981)

research on social support at work. Also, one item was adapted from a study of stressors for white-collar workers in Sweden (Frankenhaeuser et al., 1989). Items were written to represent four commonly accepted social support domains: emotional support, appraisal support, informational support, and instrumental support (House, 1981). Most of the items described supportive behaviors of one's supervisor (e.g. giving praise, listening to work-related problems) and employees were asked to rate the frequency that they experienced them. Other items asked how often the individual is supported by their supervisor in less specific although important ways (e.g. that they can trust their supervisor, that their supervisor cares about them as a person). The 5-point response options ranged from "Almost Never" to "Almost Always."

Co-worker social support (12 items). This scale asked employees to rate the frequency of received support from their co-workers. The items and conceptual approach were identical to the Supervisor Social Support scale except that the word "co-workers" was substituted for the word "supervisor."

Health support (10 items). This scale assessed the degree to which healthy behaviors are supported by other employees at work. The idea for this scale came from a research report describing the Health Support Index by Robbins and Slavin (1988) who employed a social network approach to measuring this construct. Robbins and Slavin asked respondents to consider three groups of individuals (i.e. relatives, co-workers, friends) and list three network members for each group. A 5-point response scale was provided and respondents were asked the question "How much do these people support you in your efforts to improve or maintain your health?" In the present study, a social network approach was not employed since this study focused

only upon work-related aspects of health. Also, having employees list network members may have created a little anxiety about revealing one's identity and the confidentiality of their work companions. Although this was not expected to be a major concern in this study, when smaller sites would be used in the second study, it was anticipated that this could discourage individuals from answering this question. Therefore, the item that Robbins and Slavin used to generate responses was rewritten so that only work-related support for health was mentioned and nine additional items were written. The Support for Healthy Behavior scale assessed the extent to which co-workers support healthy eating, exercise, and anti-smoking practices. By creating a new scale, more specific questions could be asked about the types of support received since the established scale measured only general support and not support for specific health behaviors. These items, in keeping with the supervisor and co-worker social support constructs, were written to reflect the provision of the four domains of social support.

Healthy role models (6 items). Robbins and Slavin's (1988) Health Support Index also contained another item that asked participants to rate the extent to which network members were "personally active in efforts to enhance their own health and fitness" (p. 36). Since, the social network approach was not used in this study, the original item from the Health Support Index was rewritten to reflect the modeling of healthy behaviors at work. The other five items assessed the extent to which other employees model healthy eating, exercise, and non-smoking behaviors.

Health Norms Scales

The Health Norms subscales asked participants to rate the norms for healthy behavior at their worksite. The inspiration for looking at health norms comes from the work of Allen & Allen (1986b) who have described the importance of culture and social norms as determinants of health behavior. Some of the items in the WHCS are similar in content to some of the items in their Cultural Norm Indicator. However, the WHCS items explicitly refer to the environment at work. The norms for four health areas were assessed: nutrition/eating habits, exercise, smoking, and stress. Two response formats were used in this section; one format asked for the number of employees engaging in a particular activity and the other asked for the frequency with which certain behaviors occur. Both formats had five responses choices. The first response format ranged from "Almost No Employees" to "Almost All Employees" and the response format for frequency ratings ranged from "Almost Never" to "Almost Always." Each scale was composed of items using both response formats.

Healthy nutrition norms (9 items). This scale asked participants about the norms at their worksite regarding eating habits and nutrition. Like many of the other health norms scales, items were written to reflect positive as well as negative health norms in order to avoid response tendencies. For instance, one item asked about the number of employees that "Make an effort to include vegetables, salads, or fruit into their meals at work." Another item asked "How frequently do people at the worksite choose high fat foods for lunch (e.g. fried foods, ice cream, doughnuts)."

Exercise norms (9 items). This scale asked respondents to rate the extent to which their co-workers were physically active and held attitudes supportive of

exercising. For example, items asked about the number of co-workers who belong to health or fitness clubs, the number of co-workers who find time to exercise before or after work, and whether people at the worksite feel that exercise is not very important.

Smoking norms (5 items). The Smoking Norms scale asked about the norms regarding smoking at the worksite. For example, items asked participants how frequently they saw individuals smoking at work and whether smoking was considered an acceptable social activity at that worksite.

Tension norms (6 items). This scale asked respondents how common it is to see their co-workers burdened by job stress. For example, items asked about the number of people who rarely seem to have enough time to complete their work tasks and how often employees at the worksite are under a lot of pressure.

Results

Data Analysis Strategy

A combination of rational and empirical approaches were employed to revise the scales. Traditional test-construction techniques, such as those recommended by Jackson (1970) and DeVellis (1991), guided most of the modifications of the original scales.

Initially, the internal consistency reliability for all of the scales was computed, scale intercorrelations were calculated, and each item was correlated with all of the scales. Additionally, the scale intercorrelations were "corrected" for the unreliability of measurement. The formula for this correction takes into account the observed

correlation between any two scales and the internal consistency reliability of each scale to generate an estimate of the correlation between the two scales that is not attenuated by the unreliability of measurement. Based upon this information, several modifications were made to the original scales. In a few instances, however, when modifications suggested by empirical criteria did not make conceptual sense, these modifications were not undertaken and these exceptions are mentioned.

Based on the initial data analysis, 6 of the 11 scales demonstrated satisfactory internal consistency (alpha's in the .80's or .90's) and 5 scales showed low to moderate internal consistency (alpha's in the .50's and .60's). When a scale had low internal consistency, this suggested that the items were not measuring a unidimensional construct. In order to increase the internal consistency of these scales, items which depressed the reliability of their intended scale were dropped.

Highly intercorrelated scales presented a different problem. The high correlations among scales suggested that there was substantial overlap in the content domain of these scales. The correlations between scales that were corrected for the unreliability of measurement were examined to detect which scales showed problematic overlap. The corrected correlation between two scales is higher than the observed correlation because it assumes perfect measurement and gives an estimate of the "true" correlation between the constructs. When the absolute value for the corrected correlation between the scales exceeds the alpha level of either scale, many researchers choose to combine these scales because of their overlap. There were five instances where the corrected correlation for a pair of scales exceeded the reliability of one or both scales. The range of the corrected correlations between these

particular scales ranged from $r = .54$ to $r = .92$. Particular attention was directed toward ensuring that the revised versions of these scales would not have this high degree of overlap. Based on these initial analyses, several of the scales were modified to improve the psychometric properties of the instrument.

Initial Modifications to Scales

Minor revisions were made to the composition of most of the scales. Items which substantially depressed the reliability of their intended scale were removed from their particular scale. Additionally, items that were correlated to other scales more highly than to their intended scale were generally dropped. These minor changes to the scales are not discussed; however, more substantive changes to the composition of the scales is provided next.

There were no major changes to any of the three organizational support scales and only minor changes were made to the interpersonal support scales. The two 12-item Supervisor and Co-worker Social Support scales had very high reliabilities (alpha = .96 and .96, respectively). Since the reliability of these scales was quite high, these scales could be shortened without substantially affecting the reliability of each scale. The four items with the lowest item-total correlations on each scale were dropped to shorten these scales; however, in one instance the Instrumental Support domain would not be represented, thus that item was retained and the next appropriate item was discarded.

The internal consistency of the Healthy Role Models scale was fairly low (alpha = .61) for a six-item scale. Additionally, the Healthy Role Models scale was moderately correlated to the Nutrition Norms ($r = .56$) and Exercise Norms ($r =$

.38) scales. When the correlation between these two scales was corrected for the unreliability of measurement, the correlation between Healthy Role Models and Nutrition Norms was very high (r = .92) and also quite high for the correlation of Healthy Role Models with Exercise Norms (r = .68). Thus, it appeared that the Role Models scale was not assessing a unidimensional construct given its substantial overlap with these other scales. Therefore, items from the Role Models scale that were more highly correlated to the Nutrition Norms (2 items) scale and the Exercise Norms (3 items) scales were moved to these scales.

The Smoking Norms scale had fairly low internal consistency (alpha = .58) suggesting perhaps that the scale was not assessing a unidimensional construct. To explore the possible multidimensionality of the scale, an exploratory factor analysis was conducted. Based upon Kaiser's criterion, the scree test, and interpretability, the ideal factor solution was composed of two factors. This two-factor solution with a varimax rotation split the items into attitude items and behaviorally-oriented items. The first factor was a frequency of behavior factor, which included questions about how many smokers there were at the worksite and how frequently people smoked at the worksite as a social activity. The third item in this first factor asked about whether smokers had more rights than non-smokers. This item was dropped since its content did not reflect the behavioral dimension of smoking. The second factor, composed of the attitudinal items, was composed of two items where employees were asked to rate whether they felt smoking was acceptable at that particular worksite and were asked to rate the number of employees that feel smoking is a bad habit.

The internal consistency was fairly low for the Exercise Norms scale (alpha = .51) and an exploratory factor analysis was also conducted on this scale; however, the results of this factor analysis for this scale were less clear. When three factors were extracted, the default based on Kaiser's criterion, the factors were not interpretable. When two factors were extracted, the first factor was composed of behaviorally-oriented items and the second factor was composed of the two attitudinal items along with a third item relating to how often employees ride their bike or walk to work. The two factor solution was adopted since this approach would parallel the division of the Exercise Norms scale and the three factor solution was not very interpretable. The first factor was a frequency of behavior factor, which included questions about the frequency that people exercised either at the worksite or before or after work. The second factor was composed of two items where employees were asked to rate the importance of exercise to other employees and to rate what people thought of those individuals at the worksite who are exercisers. The third item that was not conceptually related to the two attitudinal items was dropped. Thus, two new scales, Pro-Exercise Attitudes and Exercise Behavior Norms, were created from the original Exercise Norms scale.

The original pool of 83 items was reduced to 65 items by this point. Provided next are the psychometric properties of the resulting revised scales.

Reliability of Revised Scales

The revised scale name, the number of items in the scale, the range of corrected item-total correlations, and the internal consistency (alpha) of the scale are featured in Table 2. The alpha coefficients of the 12 resulting scales vary widely

Table 2

Item-total Correlations and Coefficient Alphas of Revised Worksite Health Climate Scales in Study One

Revised Scale Name	Number of items	n[a]	Range of item-total correlations	Coefficient alpha
Organizational support				
Organizational support of health	4	232	.55 - .82	.88
Job flexibility to exercise	3	234	.41 - .43	.61
Health information	6	227	.27 - .56	.84
Interpersonal support				
Supervisor social support	8	227	.77 - .85	.95
Coworker social support	8	227	.79 - .82	.94
Support for healthy behavior	8	221	.59 - .78	.88
Health norms				
Nutrition norms	7	183	.28 - .48	.69
Exercise norms	9	194	.35 - .60	.79
Pro-exercise attitudes	2	220	.45	.62
Smoking norms	2	228	.60	.75
Anti-smoking attitudes	2	228	.51	.66
Job tension norms	5	223	.58 - .84	.88

[a] The number of cases varied for each scale due to missing data.

with a range of .60 to .95. Three scales had alphas in the .60's, three in the .70's, four in the .80's, and two in the .90's. Shortening the supervisor and co-workersocial support scales only marginally affected their reliability. The resulting reliabilities of the revised 8-item social support scales were alpha = .94 for the Supervisor scale and alpha = .95 for Co-worker scales. Both of the original 12-item scales had internal consistency coefficients of alpha = .96.

The item-total correlations for each item was $r = .35$ or higher with the exception of one item correlating $r = .27$ to the Health Information scale. Thus, each of the items was at least moderately correlated with its intended scale. The item-total correlation values presented in Table 2 are corrected. This correlation represents the correlation of an item to all other items in its scale. Therefore, this correlation will be lower than the correlation of an item to the full scale which is inflated by the correlation of an item with itself (DeVellis, 1991).

Item Discrimination Among Revised Scales

In order to demonstrate that items showed discrimination between the scales, every item was correlated to all of the revised scales in the survey. If a given item has a high correlation with its intended scale and has a low correlation with other scales, then the item is showing proper discrimination. In fact, when each of the 65 items was correlated to the other 11 scales (a total of 715 correlations), there were only two instances where an item correlated more highly to a scale other than its intended scale.

The first item that correlated more highly to another scale was "How many people here eat snacks such as carrot sticks, low-fat yogurt, or apples?" which was

correlated r = .38 with the Nutrition Norms scale, its intended scale, and r = .40 with the Exercise Norms scale. From a conceptual standpoint, this item should remain on the Nutrition Norms scale and not the Exercise Norms scale, thus it was left on its intended scale. Also, the magnitude of the difference between these correlations was quite small; there should be few reservations for keeping this item on its intended scale. The other item, "How many employees here are good role models for how to live a healthy life?" had been moved from the Healthy Role Models scale to the Nutrition Norms scale because it correlated r = .39 with that scale and this item increased the reliability of the Nutrition Norms scale. However, this item was also correlated r = .49 with the Support for Healthy Behavior scale. This item was kept on the Nutrition Norms scale since that scale needed items. To avoid future overlap with the health support scale this item was rewritten so that it specifically referred to nutrition.

Correlations among the Revised Scales

The 12 worksite health scales used in the pilot study were intercorrelated. The correlation matrix for these scales is featured in Table 3. Generally, the correlations among the scales were either low or moderate and none of the correlations were greater than r = .50. Approximately three-fourths (49/66) of the intercorrelations were less than r = .30. Thirteen correlation coefficients were in the .30's and only four correlation coefficients were in the .40's. In the cases where the intercorrelations were fairly high, these scales were conceptually similar albeit distinct constructs. For example, the correlations of the Support for Healthy Behavior scale with other scales in its domain suggested these scales are conceptually related.

Support for Healthy Behavior was correlated moderately with Supervisor Social Support (r = .32) and Co-worker Social Support (r = .46) which are conceptually related, but slightly different constructs. The amount of support for healthy behaviors was also correlated to the norms for nutrition (r = .46) and the norms for exercise (r = .46).

In conclusion, the patterns of correlations between many of the scales suggest that there is some overlap in the different health climate scales. However, since the intercorrelations among most of the scales were generally low, most of the scales seemed to be assessing relatively distinct constructs. Finally, when the intercorrelations among all of the revised scales were corrected for the unreliability of measurement, none of the pairs of these scales had corrected correlations higher than the internal consistency of either scale.

Table 3

Worksite Health Climate Scale Intercorrelations in Study One[a]

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1 Company health orientation	–											
2 Job flexibility to exercise	.32**	–										
3 Health information	.26**	.09	—									
4 Supervisor social support	.48**	.30**	.26**	—								
5 Coworker social support	.32**	.20**	.16*	.36**	—							
6 Support for healthy behavior	.31**	.15*	.17*	.30**	.44**	—						
7 Nutrition norms	.31**	.07	.25**	.23**	.31**	.42**	—					
8 Exercise norms	.28**	.21**	.39**	.28**	.24**	.36**	.34**	—				
9 Pro-exercise attitudes	.13	.13*	-.24**	.13	.07	.20**	.23**	-.11	—			
10 Smoking norms	-.18**	-.15*	.08	-.20**	-.08	.27**	-.33**	.06	-.34**	—		
11 Anti-smoking attitudes	.05	.07	.13	.00	.03	.15*	.15*	.20**	.03	-.30**	—	
12 Tension norms	-.29**	-.16*	.11	-.28**	-.20**	-.13*	-.18**	.16	-.19**	.10	.15*	—

[a] Due to rounding the correlation values to two significant digits, some values at a given correlation value may not be statistically significant although a correlation of that same magnitude is statistically significant. See row 9 for an example.

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Discussion

Data on the psychometric properties of the initial version of a health climate instrument for worksites have been provided. These data are from a study of a small company of 380 employees where 241 people returned a survey about the health climate at their worksite. A description of the content domains for the scales was given along with descriptions of the types of items composing each scale.

The initial item pool consisted of 83 items. Items were dropped from scales if the item did not show proper discrimination or if the item adversely affected the reliability of its intended scale. A total of 18 items were dropped based on these criteria leaving a total of 65 items. The Healthy Role Models scale was dropped because most of the items were more highly correlated to other scales. Two new scales, Pro-Exercise Attitudes and Anti-Smoking Attitudes, were formed since the original health norms scales did not seem to be measuring a unidimensional construct.

The approach employed for creating the two social support scales worked satisfactorily in Study One. Since the different domains of social support have been shown to be highly intercorrelated empirically, but much less correlated across sources (Beehr, 1985), scale scores in this study were derived by summing across all items (and the four domains) for each of the two sources. Although using a different social support measure (i.e. the Inventory of Socially Supportive Behaviors), Stokes and Wilson (1984) concluded from a principal components analysis that the social support measure could appropriately be used as a global measure of a unidimensional construct. The results of the principal components analysis suggested that there was

one general factor, even though four interpretable domains of social support were derived when four factors were extracted and subjected to oblique rotation.

The reliability analyses for the scales showed that 6 of the 12 scales have adequate reliabilities (alpha's in the .80's or .90's); however, several of the scales needed improvement. The wording of several existing items would need to be modified so that the items better reflect the underlying construct of the scale. Also, additional items would need to be added to many of the shorter scales in order to improve their reliability. For instance, when the Smoking Norms scale and the Exercise Norms scales were split into four separate scales, three of these scales were composed of only two items.

After several modifications were made to the original scales, the items seemed to discriminate well among the constructs and all but two items correlated most highly with their intended scale. The rationale for keeping these items was provided in a previous section. Several minor revisions in the wording of items would also need to be made in order for the scales to be more internally consistent.

Finally, the intercorrelations among the different scales generally were not very high which indicated that there was not too much overlap among the scales. However, when scales were more strongly correlated, these scales were generally from the same general grouping of scales. In conclusion, most of the revised scales demonstrated adequate psychometric properties; however, more items would need to be added to the shorter scales. Therefore some minor changes were made to these revised health climate scales and the new scales were administered to several different

organizations along with health and well-being measures in Study Two to assess the validity of the instrument.

CHAPTER III

STUDY TWO

Since the reliability of the health climate scales was established in Study One, a second study was conducted to reassess the reliability of the revised health climate scales and to establish the validity of the measures. The primary goals of this study were to evaluate whether the health climate measures showed significant variability across organizations and to evaluate whether the climate scales were related in predictable ways to a set of health and well-being health variables. Thus, the primary concerns of this study were to test the notion of a health climate and whether there is evidence for the validity of the measures. The specific hypotheses and method for this study are featured next.

Hypotheses

1. There will be differences across organizations in their climate for health. Since the organizations would be chosen with the goal of obtaining a diverse sample with diverse employees, there should be differences between the health climates of these organizations.
2. Demographic variables (e.g. sex, race, education, etc.) will not be consistently related to the health climate perceptions.

3. The 12 health climate subscales will be significantly correlated to a number of health and well-being variables, such as physical symptoms, medical utilization, health behaviors, job stress, and job satisfaction. The direction and magnitude of the correlations will vary depending upon the constructs being correlated. The hypothesized relationships are featured in Table 4. When a "+" is featured, a positive correlation is expected for these variables and when a "--" is featured a negative relationship is expected. Finally, if no significant relation is expected, the space is left blank.

In general, scores that indicate a better health climate will be negatively correlated to measures of poor health and be positively correlated to measures of positive health status and the practice of healthy behaviors. These relationships will be the strongest for health climate scales and health measures that are conceptually related. For instance, the ratings of the nutrition norms will be more highly correlated to nutrition habits than to job stress.

Since the health norms are expected to be interrelated, moderate correlations are expected with the health norms scales and the other health behavior variables. For example, since a generally positive health climate is expected to exist in some of the organizations, one would expect there to be significant relationships among a particular health norm and health practices such as eating healthfully, exercising, and not smoking.

Also, environments that have high support for healthy behaviors or are supportive of healthy eating/exercise habits, will have fewer employees who

are overweight. For more specific predictions about hypothesized relationships, the reader is encouraged to refer to Table 4.

4. The health climate scales should be able to make unique contributions to the variability in employee health and well-being measures after controlling for potentially confounding variables. Since demographic variables are often strongly correlated to health status and health behaviors, the influence of demographic variables will be controlled. Additionally, since physical characteristics of the worksites differed and some of these physical aspects have been shown to be empirically related to some of the health outcome variables, their influence will also be controlled.

Table 4

Hypothesized Relationships between Health Climate Variables and Health and Well-Being Variables

	Health and well-being variables							
	Health status			Health behaviors			Job qualities	
Worksite Health Climate Scales	Physical symptoms	Medical visits	Body mass index	Exercise habits	Healthy nutrition habits	Smoker Status[a]	Job stress	Job satisfaction
Organizational support								
Company health orientation							–	+
Job flexibility to exercise				+				+
Health information				+	+	–		
Interpersonal support								
Supervisor social support	–	–					–	+
Coworker social support	–	–					–	+
Support for healthy behavior			–	+	+	–		
Health norms								
Nutrition norms			–	+	+	-		
Exercise norms			–	+	+	-		
Pro-exercise attitudes				+	+	-		
Smoking norms				–	–	+		
Anti-smoking attitudes				+	+	–		
Job tension norms							++	

Method

Site Selection and Sampling Procedure

Twelve organizations that had either participated in the Michigan Health Initiative or had requested program information were approached for possible participation in this study. Sites were chosen from the master list of organizations with several criteria in mind. The companies needed to be located reasonably close to the research site, have fewer than 100 employees, and also represent the diversity of worksites in the area. Smaller sites were targeted because they were more likely to have their work location at one site. Having one location was important to the study since individuals would be asked to rate the psychosocial climate and physical characteristics of their particular work setting. If an organization had only one site, one could be reasonably certain that all of the employees were giving their perceptions of the same setting. Additionally, a diverse group of worksites was targeted in order to increase the generalizability of the results and to assess how the instrument worked with different types of employees in different types of jobs.

The investigator telephoned a contact person at each company for a brief introduction to the project and asked if the company wanted more information about the project. The inducement for participation on the part of the company was a profile of all their organization's survey results in aggregate form and a comparison to the other companies participating in the study. To be part of the study, however, the organization needed to agree to provide incentives for participants which would

facilitate higher response rates. All 12 of the organizations contacted requested more information about the study.

Three of these 12 organizations subsequently declined participation and one was dropped from consideration. A manufacturing company declined after looking at the questionnaire since they had recently surveyed employees with a similar instrument. A company providing medical services said it would participate, but would not pay for incentives. Another manufacturing company initially agreed to participate; however, it cited serious labor relations problems and a lack of management support as barriers to their participation. Finally, one other organization, a police department, failed to return correspondence and was therefore dropped from consideration.

Employees from eight organizations in the Mid-Michigan area served as data sources for this study. Each organization that participated in the study was an intact unit (i.e. one floor of a building or a single office). In most cases, all employees at a given organization were eligible to participate. However, participation was limited in order to keep the sample sizes similar across companies for the analyses and because resources were limited for printing the survey booklets. Participation was limited to 40 persons at each site and two organizations, the computer programming company and the social service site, exceeded this limit. Therefore, at the computer programming company, 40 employees were randomly selected from an employee roster which included mostly full-time employees. Only full-time employees were eligible in the social service agency's direct service site. The decision to survey only full-time employees at the service site was made since the response rates at the

organization in Study One were 80% for full-time employees, but only 45% for part-time employees. One might also argue that since full-time employees spend more time at the worksite that they might have a better sense of the climate of the organization. A final consideration was that there were exactly 40 full-time employees out of the 65 employees at that site.

Survey Procedures and Response Rates

The survey procedures were similar to those utilized in the pilot study. The investigator sent employees a personalized cover letter on Michigan State University letterhead describing the study and the incentives. The incentives were not offered at the fire department since the survey was completed during an educational session. The incentives provided by the other companies were diverse and were requested by the researcher to follow a health theme. The incentives at each site generally came from one or more of the following categories: gifts (e.g. coffee mugs, workout towels, t-shirts), services (e.g. cholesterol screening), money (e.g. four $50.00 gift certificates for any health-related purchase) or a paid one-day vacation from work. Included with the cover letter was a copy of the survey with two tickets attached to the last page. Employees were instructed to complete the survey anonymously and to fill out both tickets. One of the tickets was to be used for entering the drawing and the other served as a record for the employee. A slight difference in procedures was initiated in this study since about 30 individuals in Study One placed their tickets in the ticket box without writing their name on them. Thus, the experimenter was not be able to differentiate these individuals from nonrespondents. Unfortunately, this group of people who had faithfully completed their survey in Study One were sent the

nonrespondent letter. Therefore, in Study Two, the ticket numbers of each survey were recorded for each individual. Separate boxes for the surveys and tickets were placed together at the worksite in a convenient location.

One week after the surveys were distributed, a follow-up postcard was sent to all participants thanking them if they had completed their survey and asking them to complete it if they had not. The tickets were collected at the worksites and the names were checked against a roster for each company. Those individuals who had not entered the drawing, and presumably not completed a survey, were sent a follow-up letter one week after the postcard. In Study One, the postcard was sent after two weeks; however, few surveys came back in the interim between the first and second week and the experimenters felt that the follow-up time could be shortened. The follow-up letter described the importance of the individual's responses and gave them a final chance to participate.

For each of the participating organizations, the organization type, their number of employees, and the response rates for each can be found in Table 5. The response rates for the companies ranged from 75% to 100% of eligible employees. The response rate for the total sample was 87% (203/234). The response rate in this study was higher than the response rate in Study One because more effort was expended by the researchers to achieve greater participation. Extra efforts included ensuring that more incentives were offered, sending personalized letters to each employee, and providing a more attractive survey booklet. Additionally, several of the contact persons at the worksites were quite involved in promoting participation in the survey.

Table 5

Number of Employees and Response Rates by Company in Study Two

	Company Type	Number of Employees	Number Eligible	Number of Returned Surveys	Response Rate
1.	Computer Programming company	65	40	36	90%
2.	Social Service Agency - Administrative office	28	28	21	75%
3.	Social Service Agency - Direct service site	65	40	36	90%
4.	Fire Station A	31	31	25	81%
5.	Fire Station B	20	20	15	75%
6.	Credit Service for Farmers	20	20	20	100%
7.	College Health Department	35	35	33	94%
8.	Property Management Company	20	20	17	85%
	Overall		234	203	87%

Descriptive information about the sample at each site is featured in Table 6. The data in Table 6 show that the goal of obtaining diversity in the sample was attained; however, "blue collar" employees are not well-represented in this sample since neither of the manufacturing sites contacted were able to participate.

Description of the sites

A brief description of the different sites will be given in order to better describe how the sites differed. Impressions from visiting the companies and information featured in Table 6 were used to generate these descriptions.

The computer programming company was located on one floor of a very modern office building. Employees at this site were the youngest in the sample, their average age was 31.4 years (SD = 7.3). Also, employees at this site had the shortest average employee tenure, 3.6 years (SD = 2.7). Employees were generally well-educated, the gender breakdown was nearly even, and there were only six percent minority employees.

The social service administration site was located in several offices on one floor of an older building. Employees at this site worked fewer hours, 34.0 hours on average (SD = 10.6), than any of the other sites. There were slightly more female (57%) than male employees and this site had the largest minority representation of any of the sites. In fact, nearly one-fourth of employees were minorities. Most of the minorities were involved in an immigration outreach project that is coordinated through this organization.

Table 6

Selected Demographic Characteristics of the Eight Organizations in Study Two

		Demographic Variables											
		Age		Years of Education		No. hours worked per week		Employee Tenure (in Years)		Sex		Ethnicity	
Company	n	M	SD	M	SD	M	SD	M	SD	Male %	Female %	White %	Minority %
1. Computer Programming	36	31.42	7.32	14.83	1.21	46.17	8.03	3.61	2.72	55.6	44.4	94.4	5.6
2. Social Service Administration	21	38.24	11.65	15.52	1.78	33.95	10.57	4.00	4.88	42.9	57.1	76.2	23.8
3. Social Service Site	36	40.26	9.12	15.11	2.21	42.08	7.87	6.63	5.92	42.9	57.1	82.9	17.1
4. Fire Station A	25	36.91	8.66	13.91	.95	56.18	10.49	10.57	9.06	91.7	8.3	91.3	8.7
5. Fire Station B	15	33.73	6.82	14.13	.92	51.60	6.20	8.27	8.53	100.0	0.0	93.3	6.7
6. Credit Service	20	38.95	9.74	14.70	1.75	45.60	7.69	11.15	9.29	35.0	65.0	100	0
7. College Dept.	33	44.63	7.61	15.78	2.06	35.31	10.00	12.34	6.46	9.4	90.6	100	0
8. Property Management	17	36.53	7.18	13.88	1.11	47.12	8.15	7.29	5.50	35.3	64.7	100	0

The social service site was coordinated by the social service administration site described previously. This organization was a direct service site for youths experiencing various problems. The average employee age was one of the highest in the sample. The average employee was 40.2 years (SD = 9.1) old. There were slightly more females (57%) than males in the sample and minorities were well represented in the sample (17%).

The two fire stations were surveyed together at one of the stations. Considering the firefighters together as one group, these individuals were practically all middle-aged white males. Respondents were more than 90% male and non-minority in this sample. Employees of this organization reported the second least amount of formal education; however, the average employee had received approximately two years of education beyond high school. Employees at the fire stations reported working the longest hours of the sites which was due to their schedule of working every third day.

The credit service was located in several offices on one floor of a modern office building. The average employee was 39.0 years old (SD = 9.7) and had worked at the organization for 11.2 years (SD = 9.3). Two-thirds of respondents were female and there were no minority respondents. This site had a 100% response rate, thus the demographic characteristic of the sample should be identical to the actual employee population.

The college department was affiliated with health services and was located in a community college. The average employee age of 44.6 years (SD = 7.6) and the education level of employees, almost 16 years on average, at this location were the

highest reported from any of the sites. Employees also reported working for this organization for a longer period of time, 12.3 years on average (SD = 6.5), than any of the other sites. Respondents were overwhelmingly female (less than 10% of respondents were male) and no minorities were featured in the sample. This study was conducted during the summer months when many of the faculty were not present, therefore clerical workers and staff were overrepresented in the sample.

The property management company was located in a small one-story office building. The average employee age at this site was 36.5 years (SD = 7.2) and had reported receiving the least education compared to employees from other sites, even though the average employee reported nearly two years of education beyond high school. Nearly two-thirds of respondents were female and there were no minorities in the sample.

Sample Characteristics

The 203 respondents had the following demographic characteristics. All were between 20 and 67 years of age with a mean age of 37.8 years (SD = 9.4). The sample included 52% females and the majority of participants were white (92%) with 4% African American, 3% Asian, and 1% Hispanic. The marital status of the participants was 63% married, 2% widowed, 21% divorced or separated, and 14% never married. The sample was well-educated: 11% graduated from high school, 23% attended a technical/trade school, 25% earned an associate degree, 26% graduated from college, and 14% had earned either a masters or professional degree. The average number of hours worked per week was 43.9 hours (SD = 11.0) and the

mean number of years the individual had worked at the company was 7.9 years (SD = 7.2).

Measures

There were three broad categories of measures used in Study Two. There were 5 scales that assessed the physical work environment, there were the 12 revised health climate measures that were developed in Study One, and there were 8 health and well-being measures that were included to test the construct validity of the health climate measures. Detailed descriptions of the scales are featured along with psychometric information provided by the original report and from the current study.

Physical Environment Measures

The five scales describing the physical work environment were based upon the Building-in-Use Assessment for Environmental Quality developed by Vischer (1989). The original instrument was composed of seven scales based upon a factor analysis conducted by the author. These scales were regressed on a rating of "building-related symptoms of ill-health" derived from 14 questions. Since health status is a major focus of the current research, the three scales that were significant predictors of health (i.e. Air Quality, Thermal Comfort, and Lighting Comfort) were included in the study. Two additional scales, Spatial Comfort and Noise Control, were also included since they reflected common occupational health and safety concerns. The two scales that were not used in this study were Privacy (i.e. acoustic and visual privacy) and Building Noise Control (i.e. noise disturbances generated from building-related sources, such as buzzing coming from lights). The authors developed a shortened form for each of the scales which was composed of the three or four highest loading

items on each scale. This shortened form was used in the current study. A few minor changes were made in the wording of the response anchors for the original items to enhance clarity and increase the specificity of the respondents' ratings. Since information regarding the psychometric properties of these scales in the original report was scarce or not very compelling, the only psychometric data provided here is the internal consistency coefficients obtained in Study Two.

Thermal Comfort (4 items). This scale measured the employee's perceptions of coldness and temperature shifts. One of the items from the Thermal Comfort scale that had loaded higher on the Air Quality scale in Study One, was dropped and replaced with another item from the Thermal Comfort scale. This additional item was part of the original scale, but was not one of the items in the shortened version. A sample item asked for a rating of "Temperature" with five response choices and anchors of uncomfortable and comfortable. The reliability of this scale in Study Two was alpha = .74.

Air Quality (3 items). This scale measured the employee's perceptions of the ventilation and freshness of the office air. A sample item asked for a rating of the "Air Movement" with anchors of stuffy and circulating. The reliability of this scale was alpha = .92.

Noise Level Comfort (3 items). This scale measured the extent to which employees were aware of and distracted by noises in their work setting. The items reflected intrusions created by the noises generated by other people, as opposed to the noises emanating from building structures. A sample item asked for a rating of

"General Office Noise Levels" with five response choices ranging from too noisy to comfortable. The reliability of this scale in Study Two was alpha = .93.

Spatial Comfort (4 items). This scale assessed the quality and quantity of office furniture and storage space. The author mentioned that this scale most closely resembles the ergonomic comfort of the work area. A sample item asks for a rating of "Work Storage" with response anchors of adequate and insufficient. The reliability of this scale was alpha = .87.

Lighting Comfort (3 items). This scale asked participants to rate the extent to which the lighting is too bright or produces an uncomfortable glare. A sample item asked for a rating of the "Glare from Lights" with response choices anchored by either high glare or no glare. The reliability of this scale was alpha = .89.

Health Climate Measures

The health climate measures for the current study were developed in Study One. For a more detailed description of the scales and their content domains, the reader is referred to the preceding Measures section. There were several minor changes made in the final scales from Study One that were undertaken in Study Two to improve these scales and most of these revisions are documented in this section. In general, items were added to scales that needed more items to increase their reliability and the wording of some items was modified slightly. The response anchors for the health norms questions which used frequency ratings were altered in Study Two to enhance clarity. The original response anchors asked about the frequency of observing particular behaviors ranging from of Almost Never to Almost Always.

More specific anchors were used in Study Two and the ranged from Once a Month or Less to Daily.

The alpha coefficients and range of item-total correlations for each scale is featured in Table 7. All of the items in the scales correlated at least $r = .35$ to their intended scale and all 12 of the health climate subscales demonstrated adequate internal consistency (alpha > .70) and 9 scales demonstrated very good (alpha => .80) internal consistency. The final set of items from each health climate scale is featured in Table 8.

Company health orientation (4 items). This scale remained unchanged from Study One and the internal consistency of this scale was alpha = .87 in the present study.

Job flexibility to exercise (4 items). Another item was added to this scale and the alpha coefficient rose substantially from .61 in Study One to .79 in this study. The only other modification was that the original items asked about flexibility to exercise during the "work day" which was changed to "during normal work hours" since some individuals may work evenings or nights.

Health information (6 items). This scale remained unchanged and its internal consistency was alpha = .80 in the present study.

Supervisor social support (8 items). This scale remained unchanged and its internal

Co-worker social support (8 items). This scale also remained unchanged and its internal consistency was alpha = .94 in the present study.

Table 7

Item-total Correlations and Coefficient Alphas of WHCS in Study Two

Worksite Health Climate Scale	Number of items	n[a]	Range of item-total correlations	Coefficient alpha
Organizational Support				
Company health orientation	4	195	.61 - .78	.87
Job flexibility to exercise	4	195	.41 - .68	.79
Health information	6	189	.48 - .74	.80
Interpersonal Support				
Supervisor social support	8	185	.77 - .83	.94
Coworker social support	8	185	.71 - .86	.94
Support for healthy behavior	8	182	.52 - .78	.86
Health Norms				
Nutrition norms	7	195	.50 - .72	.84
Exercise norms	7	193	.35 - .69	.78
Pro-exercise attitudes	4	194	.67 - .73	.85
Smoking norms	4	187	.51 - .77	.81
Anti-smoking attitudes	4	195	.45 - .58	.73
Job tension norms	5	188	.58 - .72	.84

[a] The number of cases varied for each scale due to missing data.

Table 8

Revised Worksite Health Climate Scales in Study Two

Organizational Support

Company health orientation (alpha = .87)

This company values healthy workers. (r = .76)

This company is generally concerned about my health and well-being (r = .77)

It is easy to see that top management has a commitment to improving employee health (r = .78)

It is easy to see that middle management has a commitment to improving employee health (r = .61)

Job flexibility to exercise (alpha = .79)

With the job I have, I can make time to exercise at some point during my normal work hours (r = .63)

It would be acceptable for me to take time out during normal work hours to exercise (r = .67)

I am able to leave the job briefly to take a brisk walk when I want to (r = .41)

The hours that I need to be at work are flexible, so I can choose to exercise when I want to (r = .68)

Health information (alpha = .80)

How often are there pamphlets with health information distributed to employees (r = .74)

How often are there articles on health in the company newsletter (r = .55)

How often is there health-related information on a bulletin board at work (e.g. tips on healthy eating or quitting smoking) (r = .48)

How often are there presentations on a health topic at work (e.g. such as a lunch presentation (r = .63)

How often might you expect to see health information distributed with paychecks (r = .55)

How often are there memos to employees mentioning health-related information (r = .73)

Interpersonal support

Supervisor social support (alpha = .94)

My supervisor is supportive when problems come up at work (r = .82)

My supervisor is willing to listen to my work-related problems (r = .83)

My supervisor shows concern about the welfare of those under him/her (r = .83)

My supervisor is someone who I can truly trust (r = .83)

My supervisor gives clear and helpful feedback about my performance (r = .77)

My supervisor makes it clear what is expected of me (r = .76)

My supervisor is very good about giving advice when problems arise at work (r = .80)

My supervisor is very helpful to me in getting my job done (r = .80)

Table 8 (cont'd)

Coworker social support (alpha = .94)

My coworkers show concern about the welfare of other people at work (r = .71)

My coworkers are people who I can truly trust (r = .75)

My coworkers care about me as a person (r = .80)

My coworkers go out of their way to praise good work (r = .86)

My coworkers give clear and helpful feedback about my performance (r = .77)

My coworkers are very good about giving advice when problems arise at work (r = .77)

My coworkers do a good job of teaching useful skills (r = .77)

My coworkers are very helpful to me in getting my job done (r = .75)

Support for healthy behavior (alpha = .86)

Would be supportive of you if you were starting to exercise at work (r = .53)

Share health information with others (r = .61)

Would assist people who are trying to quit smoking at this worksite (r = .66)

Would cover for somebody else who wanted to take a quick walking break (r = .52)

Are interested in hearing about new health information or news (r = .68)

Would support you if you tried to adopt good health habits (e.g. eating right or exercising) (r = .78)

How often do people at work support you in your efforts to improve or maintain your health (r = .58)

If you were trying to lose weight here, how often would you receive encouragement from your coworkers (r = .53)

Health norms

Nutrition norms (alpha = .84)

Eat snacks such as carrot sticks, low-fat yogurt, or apples (r = .61)

Are good role models for making nutritious food choices? (r = .72)

Have unhealthy eating habits* (r = .67)

Make an effort to include vegetables, salads, or fruit into their meals at work (r = .54)

Are concerned about the amount of cholesterol in the foods they eat (r = .50)

Regularly choose high fat foods for lunch (e.g. fried foods, ice cream, doughnuts)* (r = .60)

Regularly eat potato chips or candy bars for snacks* (r = .59)

Exercise Norms (alpha = .78)

Belong to a health or fitness club (e.g. YMCA, YWCA, or health spa) (r = .35)

Find time to exercise before or after work (r = .69)

Are "health nuts" because they like to exercise (r = .55)

Table 8 (cont'd).

Are actively working to improve their physical fitness (r = .66)

Participate in sports as a way to keep physically active (r = .48)

Walk for exercise during lunch or other breaks (r = .39)

Exercise (other than walking) during normal work hours (r = .47)

Pro-exercise attitudes (alpha = .85)

Think that people who exercise are a bit "crazy"* (r = .68)

Feel that exercise is not very important* (r = .72)

Think exercise is a waste of time* (r = .73)

Think the benefits of exercise are overrated* (r = .67)

Smoking norms (alpha = .81)

Smoke cigarettes or cigars when they are working (r = .76)

Feel that smoking is a nice way to take a break from work (r = .77)

Like to smoke on their breaks (r = .76)

How often can people be seen smoking at this worksite (r = .51)

Anti-smoking attitudes (alpha = .73)

Think smoking is a bad habit (r = .58)

Are proud of being a non-smoker (r = .58)

Would like a lenient smoking policy, one that allows smoking anywhere at work* (r = .45)

Feel that it is not acceptable to smoke at this workplace (r = .49)

Job tension norms (alpha = .84)

Experience significant tension from their job (r = .66)

Rarely seem to have enough time to get all their work done (r = .58)

How often are your coworkers pushed to the limit by the amount of work they have (r = .71)

How often are employees here under a lot of pressure (r = .72)

How often do employees here worry because of their job (r = .58)

Note. Items which were reverse-scored have an "* before the item-total correlation coefficient. The internal consistency of the scale is featured beside the scale name.

* The corrected-item total correlation is provided in parenthesis after each item.

Support for healthy behavior (8 items). This scale remained unchanged and the internal consistency of this scale in the present study was alpha = .86.

Nutrition norms (7 items). The Nutrition Norms scale remained unchanged and the internal consistency of this measure was alpha = .84 in the present study.

Exercise norms (7 items). Two items that did not correlate $r = .35$ with this scale were dropped. The internal consistency of this scale was alpha = .78 in the current study.

Pro-exercise attitudes (4 items). Three items were added to the original 2-item Pro-Exercise Attitudes scale and one item was dropped since it did not load high enough on this scale. The reliability increased from alpha = .66 in Study One to .85 in the present study.

Smoking norms (4 items). One item was added to the original 3-item Smoking Norms scale and the reliability increased from .70 in Study One to .81 in the present study.

Anti-smoking attitudes (4 items). Two items were added to the original 2-item Anti-Smoking Attitudes and its reliability increased from alpha = .60 in Study One to alpha = .73 in the present study.

Job tension norms (5 items). This scale remained unchanged and its internal consistency was alpha = .84 in the present study.

Health and Well-Being Measures

A number of health and well-being measures were included in Study Two to assess the construct validity of the health climate scales. Health status was assessed

by measures of reported current health, reported physical symptoms, body mass index, and reported medical utilization. Health habits were assessed for smoking, exercise, and nutrition. Job-related measures were also used which included measures of personal job stress and job satisfaction.

Physical Symptoms (35 items). A modified version of the 39-item Cohen-Hoberman Index of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983) was used as a measure of physical health problems. Respondents were asked to rate the extent to which they have been bothered in the last 3 months by 35 common symptoms (e.g. headache, poor appetite, dizziness). Items were chosen by the authors to represent physical symptoms, but not psychological symptoms. Some of the items, according to the source publication, may be considered to be of a psychosomatic nature, such as a headache or weight loss. In two separate studies of college students, scores on the CHIPS were significantly correlated to student health service utilization in the 5-week period subsequent to completing the scale. A 4-point scale ranging from not at all to extremely often was used for all of the items. The alpha coefficients of the slightly modified CHIPS (the same one used in the present study), in an investigation of married men, married women, and single women, were .87, .90, and .91, respectively (Greenberger, Goldberg, Hamill, O'Neill, & Payne, 1989). The alpha coefficient was .90 in the present study.

Body Mass Index (2 items). The relationship of self-reported weight to height (W in Kg./H^2 in Meters) was assessed using the Quetelet Index. Body mass indices are commonly used to estimate body adiposity when more costly and time-consuming (although more accurate) laboratory techniques are not practical. The Quetelet Index

was correlated (r = .76) with body adiposity using skinfold calipers and (r = .71) with hydrostatic laboratory measures in an investigation of 447 males aged 20 to 70 years (Revicki & Israel, 1986). Individuals receiving scores greater than 28.0 are considered "overweight" by this index (Guthrie, 1986).

Medical Utilization (1 item). A medical utilization question was adapted from the National Survey of Personal Health Practices and Consequences (National Center for Health Statistics, 1986). The number of physician contacts was obtained by asking respondents the following question "During the past 12 months, how many times did you see or speak to a medical doctor about your own health? Please exclude any doctors you may have seen while you were a patient in a hospital?" Respondents could choose either "No physician contacts" or could write in the number of physician contacts.

Smoking Behavior (1 item). Two questions taken from Caplan, Cobb, French, Van Harrison, and Pinneau (1980) were used to measure the presence and extent of a smoking habit. Respondents' smoking behavior was assessed by asking the following question "Do you smoke?" There were three response choices: a) I have never smoked as a habit, b) I used to smoke but have stopped, and c) I smoke. For individuals who reported being smokers, questions were asked about the number of cigarettes, cigars, and pipes that they smoke per day on average.

Exercise Habits (5 items). Exercise behavior was assessed using the exercise scale of the Health Promoting Lifestyle Profile by Walker, Sechrist, and Pender (1987). Respondents were asked to rate how frequently they engage in specific health behaviors using a 4-point response format ranging from never to routinely. The

reliability for the 5-item Exercise Scale was alpha = .81 in the published report and alpha = .81 in the present study.

Nutrition Habits (6 items). Eating habits were assessed using the nutrition scale of the Health Promoting Lifestyle Profile (Walker, Sechrist, & Pender, 1987). The reliability of this scale was alpha = .76 for the published report and alpha = .78 in the present study.

Job Stress (7 items). The Job-Induced Tension Scale by House and Rizzo (1972) was used to assess personal job stress. The scale is one of three measures from the Anxiety-Stress Questionnaire which measures the tensions and pressures emanating from job requirements. The authors reported a Kuder-Richardson coefficient of .83 for this measure and the reliability of the scale in the present study was alpha = .73.

General Job Satisfaction (1 item). The faces scale (Kunin, 1955), a series of six male faces ranging from a deep frown to a broad smile, was used as a measure of general job satisfaction. Respondents were asked to rate which of the faces best represents their general satisfaction with their job. This scale has been widely used in industrial and organizational research and has been shown to be correlated with other, much longer job satisfaction instruments (N. Schmitt, personal communication).

Results

Data Analysis Strategy

To assess the relationship of the health climate measures with demographic variables, several analyses were performed. Descriptive statistics were computed for

the 12 subscales of the Worksite Health Climate Scales in order to examine the effects of sex and race upon scale scores. Univariate t-tests were conducted to test the statistical significance of the mean differences on these scales. The relationship of the health climate measures with other demographic variables (i.e age, education, and number of years employed with the company) was assessed using correlation coefficients.

The relationship between the 12 health climate subscales and health and well-being variables was assessed by correlation coefficients. These health variables were: reported physical symptoms, number of medical visits in the past 6 months, body mass index, reported exercise habits, reported nutrition habits, reported job stress, and job satisfaction.

To test whether or not there were differences in the health climates of the seven companies in this study, a MANOVA was conducted on the mean scores for the health climate subscales of the different companies. To lend support to the notion that there are climate differences in the companies, there should be significant differences between companies on these measures. Put another way, the amount of variability in ratings of the health climate at worksites needs to be greater between companies than within any given company.

Hierarchical multiple regression was used to examine the predictive relationships between the health climate variables and several health and well-being outcome variables. Four demographic variables (i.e. age, sex, education, and race) were entered in the first step and physical environment ratings (i.e. Air Quality, Thermal Comfort, Noise Comfort, Lighting Comfort, and Spatial Comfort) were

entered in the second step. Finally, the health climate variables were all entered in the third step.

Since the distribution of the medical utilization variable was markedly skewed in a negative direction, respondents were divided into low, medium, and high users of physician services and a MANOVA was conducted on the 12 health climate variables. The same approach was employed for Body Mass Index which was used as a dichotomous variable to divide individuals into overweight and non-overweight groups. Finally, it should be noted that the sample sizes for these different analyses varied because of missing data. The sample size is clarified for all reported analyses.

Collapsing Two of the Sites

Since the two fire stations were similar in many respects, analyses were undertaken to see if they could be considered as one worksite instead of two. The demographic profiles of the two stations showed very similar patterns (see Table 6). The jobs of the employees at the stations were nearly identical, although one station receives slightly more calls than the other. The two fire department stations were located in similar buildings at separate locations and some employees reported that they alternated working at both of the stations. Thus, the types of employees, the work tasks, and the physical environment were very similar at both settings. Additionally, although employees were assigned to a particular station, they occasionally worked at the other station. A MANOVA was conducted on the 12 health climate variables and the 5 physical environment variables for these two stations to see if employees at each station viewed their worksite differently. The

results of the MANOVA (Pillais V = .59; approx. F ((17,8) = .69, p = .75) failed to show any significant differences between the employee perceptions of the two stations and data from both fire stations were combined for data analysis.

Intercorrelations among the 12 health climate scales

The intercorrelations among the health climate scales suggest many of the scale domains are tapping related constructs, although the amount of overlap generally is not problematic. Of the 66 correlations in the matrix in Table 9, five correlations were greater than r = .30, six correlations were greater than r = .40, and one correlation was greater than r = .50. The Support for Healthy Behavior and the Exercise and Nutrition Norms scales appeared to overlap the most with the other constructs. These correlations suggest that the healthy norms tend to occur together.

Differences in health climate ratings by company

To examine whether the perceptions of the health climates differed at the various organizations, a MANOVA was performed on the health climate measures. If the overall MANOVA were significant, support would be given to the notion that there are greater differences among companies in their climate than within the ratings of employees at each site.

Table 9

Worksite Health Climate Scale Intercorrelations in Study Two

	Worksite Health Climate Scale	1	2	3	4	5	6	7	8	9	10	11	12
1	Company health orientation	--											
2	Job flexibility to exercise	.03	--										
3	Health information	.02	-.01	--									
4	Supervisor social support	.45**	.20**	.11	--								
5	Coworker social support	.28**	.11	.11	.41**	--							
6	Support for healthy behavior	.07	.18*	.13	.16*	.35**	--						
7	Nutrition norms	.07	.09	.23**	.04	.24**	.44**	--					
8	Exercise norms	.04	.15*	.30**	.12	.17*	.21**	.39**	--				
9	Pro-exercise attitudes	.23**	-.14*	.11	.06	.24**	.35**	.44**	.10	--			
10	Smoking norms	.02	-.15*	-.11	.00	-.17*	-.36**	-.43**	-.05	-.22**	--		
11	Anti-smoking attitudes	.02	-.15*	.17*	.02	.19**	.45**	.32**	.03	.21**	-.60**	--	
12	Job tension norms	-.19**	.02	.10	-.13	-.06	.20**	.11	.02	.14*	.06	.11	--

*$p < .05$, two-tailed. **$p < .01$ two-tailed.

The means and standard deviations of the health climate ratings for each company are featured in Table 10. The overall MANOVA was statistically significant (Pillais $\underline{V}$ = 1.79; Approximate $\underline{F}$ (72,1014) = 6.00, $\underline{p} < .001$; $Eta^2 = .30$). Univariate ANOVA's were used to explore the impact of each health climate scale in determining the between group differences. The 12 ANOVA's revealed significant differences for all but one of the subscales, providing consistent support for the hypothesis that there are climate differences between the companies. The ANOVA for the amount of supervisor social support failed to reach statistical significance at the .05 level, although a trend-level finding was observed ($\underline{p} = .07$) for that variable.

The gender of the participants was related to several of the climate perceptions and the gender composition of the worksites varied considerably ranging from 5% females at the fire department to 91% females at the college department. Therefore, the influence of gender upon health climate ratings was statistically controlled by conducting a MANCOVA with gender as a covariate. The results indicated that the significant between-company differences still remained even after controlling for gender differences since the MANCOVA statistic was still significant (Pillais $\underline{V}$ = 1.79; Approximate $\underline{F}$ ($\underline{Df}$ 72, 996) = 6.00; $\underline{p} < .001$; $Eta^2 = .29$).

Relationship between health climate and demographic variables

Because the scales developed for this study are attempting to measure a health "climate" which is an individual's perception of their work environment as it pertains to health issues, these perceptions of the work environment should not be strongly influenced by individual difference variables. A first step in assessing the whether

Table 10

Means and Standard Deviations of Seven Companies for the Health Climate Subscales

	Organization															
	Computer Programming 1 (n = 32)		Social Services Administration 2 (n = 19)		Direct Service Site 3 (n = 34)		Fire Departments 4 (n = 36)		Credit Service 5 (n = 17)		College Department 6 (n = 30)		Property Management 7 (n = 14)		Univ. F	
Worksite Health Climate Scale	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	(6,175)	ETA^2
Organizational support																
Company health orientation	3.15	.74	3.50	.70	3.34	.77	3.35	.89	3.25	.80	2.62	.94	3.82	.67	4.77**	.14
Job flexibility to exercise	2.43	.87	2.36	1.17	3.21	.92	3.47	.86	2.60	.81	3.11	1.23	2.61	.95	5.59**	.16
Health information	1.04	.13	1.20	.47	1.10	.19	1.19	.44	1.01	.04	1.36	.37	1.17	.28	3.64**	.11
Interpersonal support																
Supervisor social support	3.88	.94	3.54	1.16	3.73	1.10	3.87	.98	2.91	.94	3.66	1.23	3.80	.91	1.98	.06
Coworker social support	3.33	.91	3.83	.78	2.85	1.02	3.18	.97	2.90	.70	3.49	.87	2.95	.94	3.48**	.11
Support for healthy behavior	2.38	.57	3.00	.69	2.92	.73	2.61	.81	2.43	.70	3.63	.85	3.14	.65	9.96**	.25
Health norms																
Nutrition norms	2.41	.55	3.22	.71	3.10	.61	2.58	.61	2.87	.40	3.47	.69	2.83	.57	11.02**	.27
Exercise norms	1.84	.35	1.84	.49	1.89	.40	2.20	.55	1.61	.16	2.13	.62	1.81	.41	4.82**	.14
Pro-exercise attitudes	4.51	.52	4.59	.80	4.43	.61	4.10	.73	4.68	.56	4.63	.52	4.59	.52	3.00*	.09
Smoking norms	3.22	.48	1.64	.77	2.82	.69	2.76	.53	2.44	.54	1.53	.60	2.73	.48	30.99**	.52
Anti-smoking attitudes	3.11	.63	4.30	.58	3.62	.63	3.37	.76	4.06	.92	4.51	.46	4.07	.61	17.27**	.37
Job tension norms	3.84	.88	3.70	1.06	3.74	.83	2.65	.80	3.06	.88	3.58	.90	2.90	.87	8.35**	.22

Overall MANOVA: Pillais V = 1.79; approx. F(72,1014) = 6.00, p < .001; ETA^2 = .30.

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

individual difference variables were related to health climate perceptions was to examine their covariation with demographic variables assessed in the study.

Of the five demographic variables examined, only the sex of the respondent was consistently related to perceptions of the health climate. Age, ethnicity, education, and number of years at the company, failed to show any consistent or strong relation to the health climate variables.

The means and standard deviations of the health climate variables by sex are listed in Table 11. There were significant gender differences in 7 of the 12 scales. Men reported greater flexibility in their job allowing them to exercise and greater social support from their supervisor. Women generally rated the health norms to be more positive (i.e. healthier) than men. Women rated their worksites as having healthier nutrition norms, more favorable attitudes for exercising, and less favorable attitudes for smoking. Women also reported higher amounts of co-worker support for maintaining healthy behaviors. The only deviation from the trend of women viewing their worksites as healthier, is that men reported rated less common norms for smoking at work. There is no compelling reason why one might expect gender differences in health climate perceptions. Variables that were related to gender were examined to see if they also were related to health climate perceptions. The only variable that was strongly related to gender of the respondents was the number of hours worked per week.

Table 11

Means and Standard Deviations of Health Climate Variables by Gender

Worksite Health Climate Scale	Sex				
	Male		Female		
	M	SD	M	SD	t-test[a]
Organizational support					
Company health orientation	3.31	.84	3.18	.90	1.02
Job flexibility to exercise	3.16	.94	2.73	1.10	2.92**
Health information	1.21	.48	1.14	.25	1.23
Interpersonal support					
Supervisor social support	3.88	.97	3.53	1.12	2.38**
Coworker social support	3.21	.85	3.31	1.05	-.748
Support for Healthy Behavior	2.69	.75	3.10	.91	-3.43**
Health norms					
Nutrition norms	2.73	.65	3.07	.70	-3.52**
Exercise norms	1.99	.44	1.92	.53	.937
Pro-exercise attitudes	4.31	.71	4.64	.51	-3.81**
Smoking norms	2.65	.72	2.31	.91	2.94**
Anti-smoking attitudes	3.57	.78	4.00	.81	-3.76**
Job tension norms	3.28	.99	3.50	.99	-1.56*

[a] The n's varied for each t-test due to missing data on some scales. The ranges for the n's were: Male (94-97), Female (98-102), Total (191-196).

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

The same general pattern of correlations for gender and the health climate variables was observed for the hours worked variable and health climate perceptions. However, due to the cross-sectional nature of this study, it is difficult to determine whether gender or hours worked is the more important factor related to health climate perceptions. In this sample, men reported working an average of 48.5 hours (SD = 11.0) per week which was significantly more than the 39.8 hours (SD = 9.4) per week that women reported ($t = 6.02$, $df = 195$, $p < .001$). The number of hours worked was significantly correlated to 5 of the 12 health climate scales. In all of these instances, the direction of the relationship followed the pattern of how women viewed the worksite and in four of the five cases the correlations reached statistical significance. Women, along with individuals who reported working fewer hours, viewed the norms for eating habits as being healthier, viewed the attitudes against smoking as being stronger, and reported greater social support for healthy behavior. Additionally, women and individuals who reported working fewer hours rated the norms for smoking to be lower. Individuals who worked fewer hours reported higher norms for job tension, a finding that was observed in the same direction for women, but failed to reach statistical significance. Thus, there is some ambiguity as to whether individuals who work more hours view their worksite norms as more unhealthy or whether men generally view the norms in this fashion. Since both variables were related to health climate perceptions and the study was cross-sectional, this question cannot be answered with the available data.

To test whether there were differences in the ratings of the health climate variables by ethnicity, t-tests were computed on the means for the health climate

subscales. Due to the small number of minorities (N = 16) in the total sample (N = 203), all minorities (i.e. African American, Hispanic, Native American, Alaskan Native, and Asian) were combined into one category. There were no significant differences between white and minority participants on the 12 health climate subscales.

Table 12 features the relationship of the health climate subscales with three demographic variables, age, education, and number of years at the company. In general, there were not many significant correlations between these variables. Education was significantly correlated to 3 of the 12 climate scales, Age was significantly correlated to 4 of the 12 climate scales, and number of years worked was significantly correlated to 2 of the 12 climate scales.

The results of the correlations involving education will be discussed first. Education was negatively correlated to the norms for smoking behavior and positively correlated to attitudes discouraging smoking. Thus, individuals with higher levels of education rated lower norms for smoking and rated the anti-smoking attitudes to be stronger. Education was also positively correlated to the norms for job tension. Thus, more educated individuals rated greater norms for tension than individuals with less education.

Age was not generally related to the Organizational or Interpersonal Support categories, but there was a trend for Age to be correlated to the Health Norms scales. Age was significantly correlated to Nutrition Norms, Smoking Norms, Anti-Smoking Attitudes, and Co-worker Support for Healthy Behavior. In each instance, older individuals gave climate ratings in a more healthy direction.

Table 12

Correlation of Health Climate Variables with Demographics

Worksite Health Climate Scale	Demographic variables		
	Education	Age	No. Years at company
Organizational support			
Company health orientation	-.14	.04	-.09
Job flexibility to exercise	.11	.10	.12
Health information	.05	-.03	-.04
Interpersonal support			
Supervisor social support	-.02	.01	.10
Coworker social support	.03	.08	-.04
Health support	.07	.30**	.13
Health norms			
Nutrition norms	.07	.26**	.10
Exercise norms	.03	-.08	.00
Pro-exercise attitudes	.02	.05	-.07
Smoking norms	.15*	.35**	.18*
Anti-smoking attitudes	.14*	.27**	.16*
Job tension norms	.18**	.08	-.06

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Finally, the relationship of the number of years that an employee reported working at an organization was related to the health climate ratings. There is significant overlap between age and employee tenure which is apparent by their correlation of $r = .51$ ($p < .01$) with each other. Although age and employee tenure are related for many individuals, the influence of employee tenure in the health climate ratings needs to be explored to see if newer employees view the norms differently which might indicate that they are poorer judges of the climate due to their relative newness to the setting. The number of years at the company was significantly correlated to ratings of the norms for smoking behavior. The correlation was in a negative direction suggesting that individuals who have worked fewer years rated higher norms for smoking. The correlation between number of years at the company and Anti-smoking Attitudes was positive indicating that more experienced employees felt that co-worker attitudes against smoking were stronger. This same pattern of correlations was observed for age and education (i.e. that with increasing age or education, individuals rated greater norms for smoking and greater attitudes against smoking).

In summary, the most pronounced demographic differences in the ratings of the health climate subscales were for the sex variable. Significant differences were found between males and females for 8 of the 12 subscales. The other demographic variables (i.e. ethnicity, age, years at the company, and education) were not consistently or strongly related to perceptions of the climate for health at the worksite.

The correlation of physical work environment scales with health climate scales

The health climate scales were generally not strongly correlated to the ratings of the physical environment; however, there were a few exceptions (see Table 13). Ratings of the company's orientation on health issues was positively correlated to all of the physical comfort ratings. Thus, individuals rating their physical work environment as pleasant were more likely to give higher ratings of the their organization's commitment to employee health. Interestingly, supervisor social support was correlated to four of the five physical environment ratings. Finally, norms for job tension were negatively correlated to four of the physical comfort scales. Therefore, when the physical environment was rated as uncomfortable, higher ratings of co-worker job tension were given.

Intercorrelations among health and well-being outcome variables

Since most of the analyses were conducted on the health outcome variables separately, their intercorrelations were computed. These correlations are presented in Table 14. Job stress and physical symptoms were moderately correlated and nutrition behaviors were moderately to exercise behaviors. Therefore, some of the results of the statistical tests may be influenced by a small amount of overlap in a few of these health constructs; however, the intercorrelations among most of the health variables do not present problems. In fact, if some of these scales were not significantly correlated, one would question their validity. For example, the number of physical health symptoms should be related to the number of physician contacts or to reported job stress.

Table 13

Correlation of Physical Work Environment Scales with Health Climate Scales

Worksite health climate scale	Physical work environment scales				
	Thermal comfort	Air quality	Noise level comfort	Spatial comfort	Lighting comfort
Organizational support					
Company health orientation	.16*	.32**	.28**	.35**	.26**
Job flexibility to exercise	.07	.16	.02	.05	.01
Health information	.06	.06	.00	-.01	-.08
Interpersonal support					
Supervisor social support	.24**	.16*	.02	.18*	.22**
Coworker social support	.16*	.12	.05	.17*	.06
Support for healthy behavior	-.04	-.05	-.10	-.13	-.08
Health norms					
Nutrition norms	.04	-.08	.00	-.05	-.03
Exercise norms	.10	.14	.08	.09	.08
Pro-exercise attitudes	.17*	.19*	.10	.05	.10
Smoking norms	.05	-.10	-.13	-.10	-.18*
Anti-smoking attitudes	-.03	-.16*	-.06	-.13	-.21**
Job tension norms	-.14*	-.14*	-.28**	-.32**	-.00

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 14

Intercorrelations Among Health & Well-Being Outcome Variables in Study Two

	1	2	3	4	5	6	7	8
1. Physical symptoms	--							
2. Medical visits	.26**	--						
3. Body mass index	.09	.13	--					
4. Exercise behavior	-.21**	-.02	-.10	--				
5. Nutrition behavior	-.15*	.16*	-.04	.39**	--			
6. Smoker Status[a]	.06	-.10	-.03	-.19**	-.02	--		
7. Job stress	.41**	.15	.08	-.10	.03	.02	--	
8. Job satisfaction	-.28**	-.03	-.10	.15*	-.02	-.15*	-.32**	--

[a] 0 = Non-smoker or former smoker, 1 = current smoker. * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

The relationship of health climate variables with health and well-being variables

Climate variables were correlated in order to assess how they were related to the health and well-being variables. It was hypothesized that the scales that indicated a healthy climate (i.e. stronger norms for exercising or healthy eating) would be positively correlated to positive health variables such as better reported health status or the practice of healthy behaviors. Additionally, these scales would be inversely correlated to measures of poor health such as the number of physical symptoms or the number of medical visits. These hypotheses were generally supported by these analyses. Some of the scales appeared to have better evidence for their validity than others. The significant correlations between the 12 WHCS and health and well-being measures will be discussed for each health climate scale.

Among the organizational support scales, the Company Health Orientation scale demonstrated the most consistent relationship to health and well-being outcomes. Ratings of the company health orientation were correlated negatively to reported job stress indicating that individuals rating higher organizational support rated having less personal job stress. Finally, health orientation was positively correlated to Job Satisfaction.

Job Flexibility to Exercise was not correlated to any of the health status variables, but was significantly correlated to two of the health behavior variables and one job quality measure. The scale was positively correlated to personal Exercise Habits, Smoking Status, and to Job Satisfaction.

Table 15

Correlation of Health Climate Variables with Health and Well-Being Variables

	Health and well-being variables							
	Health status			Health behaviors			Job qualities	
Worksite Health Climate Scales	Physical symptoms	Medical visits	Body mass index	Exercise habits	Healthy nutrition habits	Smoker Status[a]	Job stress	Job satisfaction
Organizational support								
Company health orientation	-.11	-.13	.01	-.08	-.09	.13	-.19*	.48**
Job flexibility to exercise	-.07	.03	.07	.16*	.04	-.17*	-.13	.19**
Health information	-.12	.02	-.04	.10	.02	.02	.11	.10
Interpersonal support								
Supervisor social support	-.28**	-.11	.02	.16*	.11	-.07	-.24**	.44**
Coworker social support	-.18*	-.08	-.05	-.01	-.01	-.14	-.04	.37**
Support for healthy behavior	-.07	.12	-.01	.16*	.23**	-.22**	.03	.12
Health norms								
Nutrition norms	-.05	.01	.12	.04	.23**	.17*	-.02	.00
Exercise norms	-.11	-.01	-.06	.16*	.06	.05	-.06	.08
Pro-exercise attitudes	-.07	-.06	-.06	-.03	.14	.07	-.08	.16*
Smoking norms	.20**	-.06	-.06	-.14	-.18*	-.01	.20**	.10
Anti-smoking attitudes	-.08	-.01	.01	.20**	.18**	.01	.04	.12
Job tension norms	.23**	.02	-.13	-.06	.12	.04	.50**	-.34**

[a] For the smoker variable, 0 = non-smokers and former smokers, 1 = current smokers.

*$p < .05$, two-tailed. **$p < .01$, two-tailed.

Supervisor Social Support was negatively correlated to physical symptoms and job stress, and was positively correlated to exercise habits and job satisfaction. Ratings of co-worker Social Support were similarly associated with physical symptoms and job satisfaction.

The final interpersonal support scale, Support for Healthy Behavior, demonstrated no significant relationships to health status or job quality outcomes, but was significantly correlated to all three of the health behavior scales. Individuals reporting greater support for practicing healthy behaviors reported exercising more, eating healthier, and were less likely to be a smoker. This pattern of relationships for the interpersonal support scales suggest that general social support available for dealing with job and other life problems is related to general health status, but perceived support for healthy behaviors was more closely related to specific health habits.

The scales assessing perceived worksite norms and attitudes were generally unrelated to health status, strongly related health behaviors, and were mildly related to job quality measures. As expected, the Nutrition Norms scale was positively correlated with the Healthy Nutrition Habits scale; however smokers reported greater worksite norms for healthy eating. Similarly, the Exercise Norms scale was positively correlated with its companion outcome, Exercise Habits. Surprisingly, Pro-Exercise Attitudes was not related to exercise habits, but was positively correlated with Job Satisfaction.

The Smoking Norms scale was positively correlated to Physical Symptoms and Job Stress, and was negatively correlated to Healthy Nutrition Habits. Anti-smoking

Attitudes was positively correlated to Exercise Habits and Healthy Nutrition Habits. Thus, individuals rating organizational norms that discourage smoking reported higher amounts of personal exercising and eating healthfully, but not less smoking.

Job Tension Norms, not surprisingly, was positively correlated to Physical Symptoms and Job Stress, and negatively to Job Satisfaction. Therefore, individuals rating high norms for job tension at the worksite reported more physical symptoms, higher personal job stress, and lower amounts of job satisfaction.

Overall, the patterns of correlations between the health climate variables and the health and well-being measures were fairly consistent with the hypotheses that positive ratings of health climates would be related to better reported health status and health habits. A more detailed account of how the observed relationships between the health climate perceptions and the health variables is described in the Discussion section.

Interestingly, neither the number of medical visits nor the body mass index were correlated to any of the climate scales. The distribution for the medical visits variable was highly positively skewed which may have prohibited the possibility of isolating relationships to the climate variables. The body mass index variable was also skewed and only 20% of the sample was obese (i.e. a BMI > 28) which reduced the variance for this variable.

Hierarchical regression of health climates scales and health outcomes

Multiple regression techniques were employed to assess the impact of the health climate subscales upon a number of health and well-being measures. The

health climate subscales were entered after demographic information and rating of the physical environment had been entered. Demographic information, such as gender or education, is consistently correlated to many health behaviors and other health outcomes. In order to statistically control for these relationships, demographic information was entered first. The physical environment subscales also were entered because some of these subscales were correlated to the health and well-being outcomes that were used in these regression calculations. The results of these regression analyses are featured in Table 16.

Physical Symptoms

The results revealed that after controlling for age, sex, education, and ethnicity and the physical environment ratings, the health climate measures accounted for a significant amount (18%) of the variance in physical symptoms. Two of the health climate measures had significant beta weights. More severe symptoms were associated with lesser amounts of reported Supervisor Social Support. Also, as Job Tension Norms were rated higher, more severe symptoms were reported. The final equation explained a significant amount of the outcome variance (28%; Adjusted R^2 = .17).

Exercise Habits

The results revealed that after controlling for age, sex, education, and ethnicity and the physical environment ratings, the health climate measures accounted for a significant amount of the variance (11%) in the Exercise Habits scale. The demographic variables predicted a significant amount of the variance in the exercise

variable. Age had a significant beta weight and its direction was negative indicating that older individuals report less exercise. In step two, Air Quality had a significant beta weight, although the increment in explained variance in exercise habits was not significant. Overall, the final equation explained a significant amount of the variance in exercise habits (22%; Adjusted $R^2 = .11$).

Nutrition Habits

The results revealed that after controlling for age, sex, education, and ethnicity and the physical environment ratings, the health climate measures failed to account for a significant amount of the variance in the Nutrition Habits scale. The final model explained a significant amount (24%; Adjusted $R^2 = .13$) of the variance in the nutrition habits outcome measure. Most of the variance in this measure was explained by demographic variables.

Job Stress

The results revealed that after controlling for age, sex, education, and ethnicity and the physical environment ratings, the health climate measures accounted for a significant amount (29%) of the variance in Job Stress. Four of the health climate subscales had significant beta weights. Supervisor Social Support had a negative beta weight indicating that a low amount of supervisor support was associated with higher job stress. Smoking norms had a positive beta weight indicating that higher norms for smoking at the worksite was associated with higher reported job stress. The Job Tension Norms had a positive beta weight indicating that higher norms for job tension at the worksite was associated with higher ratings of personal job stress.

Surprisingly, Health Information had a significant positive beta weight which indicated that greater amounts of health information at the worksite was associated with greater reported job stress. The final equation explained a significant amount (41%; Adjusted R^2 = .32) of the variance in the Job Stress measure.

Job Satisfaction

The results revealed that after controlling for age, sex, education, and ethnicity and the physical environment ratings, the health climate measures accounted for a significant amount of the variance (31%) in the Job Satisfaction measure. Five subscales had significant beta weights. Company Health Orientation, Supervisor and Co-worker Social Support had positive beta weights indicating that these were associated with greater job satisfaction. The beta weights were negative for Nutrition Norms and Job Tension Norms indicating that job satisfaction was lower when norms for healthy eating were rated lower and when norms for job tension were rated higher. Overall, the final equation explained a significant amount (49%; Adjusted R^2 = .42) of the variance in the job satisfaction measure.

The results of the regression equations generally showed that the demographic variables generally did not explain much of the variability in the health outcomes, nor did the physical environment ratings. The health climate variables, however, were significant predictors of the participants' reported health symptoms, exercise habits, job stress, and job satisfaction.

Table 16

Standardized Regression Coefficients (betas) for Demographic and Health Climate Variables Predicting Health and Well-being Variables

Predictors	Physical symptoms[a]
Step 1 - Demographic Variables	
Age	-.07
Sex[b]	-.06
Education	-.24**
Ethnicity[c]	-.03
R^2 Change	.05
Step 2 - Physical Environment Subscales	
Thermal comfort	.11
Air quality	-.10
Noise level comfort	-.13
Spatial comfort	.13
Lighting comfort	-.18
R^2 Change	.04
Step 3 - Health climate subscales	
Company health orientation	.10
Job flexibility to exercise	.05
Health information	-.07
Supervisor social support	-.27**
Coworker social support	-.09
Support for healthy behavior	.09
Nutrition norms	.11
Exercise norms	-.08
Pro-exercise norms	-.05
Smoking norms	-.17
Anti-smoking norms	-.06
Job tension norms	.28**
R^2 Change	.18**
Final R^2	.28**
Adjusted R^2	.17

[a] Standardized Beta Weights are featured from the full model.
[b] 1 = Male 2 = Female.
[c] 1 = White 2 = Minority (e.g. American Indian, Alaskan Native, Asian or Pacific Islander, Hispanic)
* $p < .05$. ** $p < .01$.

Table 16 (con't).

Predictors	Health and well-being Variables			
	Exercise habits[a]	Nutrition habits	Job stress	Job satisfaction
Step 1 - Demographic Variables				
Age	-.18*	.10	-.08	.10
Sex[b]	.03	.22**	-.10	.05
Education	.14	.22**	.07	.09
Ethnicity[c]	.09	-.08	-.03	-.11
R^2 Change	.07*	.17**	.03	.03
Step 2 - Physical Environment Subscales				
Thermal comfort	.08	.12	.03	.00
Air quality	-.24*	-.06	-.04	.02
Noise level comfort	.05	-.07	-.03	-.01
Spatial comfort	.00	.04	-.12	.08
Lighting comfort	-.09	-.02	-.01	.12
R^2 Change	.05	.02	.09**	.16**
Step 3 - Health climate subscales				
Company Health Orientation	-.03	-.15	.04	.25**
Job flexibility to exercise	.13	.02	-.02	.07
Health information	.05	.01	.15*	.07
Supervisor social support	-.02	.21*	-.21**	.17*
Coworker social support	.12	-.02	.10	.15*
Support for healthy behavior	.12	.01	.06	.02
Nutrition norms	-.15	.11	.13	-.17*
Exercise norms	.14	.00	-.13	.05
Pro-exercise attitudes	-.01	.05	-.16	.11
Smoking norms	-.04	.04	.34**	.04
Anti-smoking attitudes	.11	.04	.14	.14
Job tension norms	-.11	.02	.41**	-.31**
R^2 Change	.11*	.05	.29**	.31**
Final R^2	.22**	.24**	.41**	.49**
Adjusted R^2	.11	.13	.32	.42

[a] Standardized Beta Weights are featured from the full model.
[b] 1 = Male 2 = Female.
[c] 1 = White 2 = Minority (e.g. American Indian, Alaskan Native, Asian or Pacific Islander, Hispanic)
* $p < .05$. ** $p < .01$.

Analyses for Medical Utilization and Body Mass Index

Since a regression approach for both medical utilization and body mass index was not appropriate due to the nature of the distributions for these variables, separate analyses were conducted. The medical utilization variable was highly positively skewed. Scores on medical utilization were divided into three categories: low usage, medium usage, and high usage. Low users of medical services had no or one physician contacts in the past 12 months. Medium users had two or three visits and high users had four or more visits in the past 12 months. A MANOVA was conducted on the 12 health climate scales for the three medical visits categories. The results indicated that there were no significant differences among these three groups on the health climate scales (Overall Pillais V = .11; approx F (24,300) = .72; p = .83).

The purpose of calculating body mass index from weight and height was to obtain a number that estimates body adiposity (obesity). If the value of the BMI coefficient was greater than 28, then the individual was classified as being overweight. Since this variable was dichotomous, a regression approach was not used to examine the relationship of the health climate scales and body mass index. A MANOVA was conducted on the 12 health climate scales for overweight and non-overweight participants based on BMI. The results of the MANOVA failed to show a significant difference between these two groups (Pillais V = .05; approx. F (12,163) = .78;p = .67).

CHAPTER IV

DISCUSSION

The findings of these two studies provided support for the notion that there is an identifiable climate for health at the worksite. This research effort demonstrated that worksite health climate constructs can be reliably measured with a self-report questionnaire and that employees within the same organization have similar beliefs regarding the climate for health. There have been other attempts to create instruments that measure the climate for health at the worksite such as the Health Norm Indicators by Allen and Allen (1986) and the measure of the Wellness-Oriented Workplace by Chapman (1987). However, these authors have provided no psychometric information about their instruments and these measures generally have been used by practitioners and not by researchers.

Scale Development and Revision (Study One)

The Worksite Health Climate Scales (WHCS) scales were developed and modified in two different studies. The first study was conducted in conjunction with a medium-sized newspaper company. The goal of Study One was to assess the reliability of the WHCS and ensure that items discriminated properly among the different scales. A total of 83 items constituted the initial item pool which represented 11 health climate constructs. The study noted satisfactory reliability for

most of the health climate scales. Two of the scales, Smoking Norms and Exercise Norms, appeared to be multidimensional and factor analysis assisted in splitting each scale into two separate scales. Two of the four resulting scales had only two items which decreased the reliability of these scales. However, the other scales generally had adequate to fairly high reliabilities. One scale was dismantled, the Healthy Role Models scale, because the items on the scale correlated more highly to constructs measured on other scales. Aside from these changes, items were dropped from their respective scales if they decreased the reliability of the scale. Items that correlated more highly to scales other than their intended scale were generally dropped. Overall, the resulting 65 items improved the reliability of their intended scale and showed excellent discrimination among the 12 different constructs. The revised scales were used in Study Two to assess the validity of the measure.

Variability across Organizations in Health Climate Perceptions

The results from Study Two provided a variety of evidence to support the validity of the WHCS. The scales were sensitive to differences in the perceptions of climate across the seven companies that participated in Study Two. These companies were selected to represent the diversity of small companies. Multivariate analysis of variance was used to compare employee perceptions across the different organizations. The significant results suggested that employee perceptions of the health climates differed across these organizations. Based on the logic of the statistical test, the variability between companies exceeded the variability of employee ratings from the same company. This finding provided the strongest evidence for the notion that health climate is a viable and potentially useful construct. These results

also suggest that employees generally have a fairly unified perception of their work environment within a given organization.

It is important to note that the MANOVA on the WHCS for the seven organizations showed that there were climate differences across organizations. This does not mean that the individuals within each work setting gave nearly identical responses, this just meant that perceptions across organizations had greater variability than within-organization perceptions. In order to reduce the amount of error in employees' ratings, the survey instructions for the health norms questions asked respondents to "think of the people that you work closely with and that you know well." Thus, individuals were not asked to rate their perception of the health attitudes and behaviors of individuals with whom they have little contact or could not accurately assess. It would not be surprising if the health habits of one's peer group were fairly consistent across these co-workers. Thus, there could have been different "pockets" of employees who shared similar values regarding health. These hypotheses, however, were not evaluated in the current research project. Finally, although there may have been small differences in how different groups of workers at a worksite view the climate, this amount of within-company variation ultimately was smaller than the between-company differences.

Demographic Differences in Health Climate Perceptions

Other results examined whether the variability in health climate perceptions was highly related to demographic variables, another important validity concern. The WHCS were generally unrelated to age, ethnicity, amount of education, and number of years worked at the company. However, sex of the respondent was related to

many of the WHCS in Study Two. To try to clarify the nature of this relationship, more detailed analyses were performed and alternative explanations were explored.

Males worked significantly more hours than females and the number of hours worked was significantly correlated to some of the health climate scales. When the pattern of correlations of individuals who worked fewer hours was compared to the pattern of responding by females in the sample, again there was substantial similarity. In sum, there is some evidence that the gender differences in the perception of the climate for health may have been attributable to factors other than simply gender.

Other research on gender differences in the work setting corroborates the present findings. In their review of sex differences in work stress, Jick and Mitz (1985) cited several studies that suggested that there are structural differences in the work situations of men and women. While these differences do not have much explanatory power for men's health problems, Jick and Mitz concluded that structural explanations are useful in clarifying women's greater emotional distress. These authors note that "women tend to have less control and influence over jobs that are more tedious, less well-paying, and understimulating" (p. 413).

In conclusion, there is still some ambiguity as to whether the gender differences in perceptions of the health climate are differences only in response tendencies or because males and females actually have different types of work environments and work situations. The types of jobs that men and women held were different and this may actually explain some of the gender differences. Also, men worked more hours than women and the number of hours worked was correlated to almost half of the health climate variables. Perhaps, individuals who worked fewer

hours were more likely to be part-time employees and have fewer employee benefits, therefore, it would be natural for them to view their work setting differently.

One interesting gender difference in Study Two was that men reported greater supervisor social support than women and there was no significant difference in co-worker support. Although Fusilier, Ganster, and Mayes (1986) found no gender differences in co-worker support among a sample of 274 employees from three Midwestern worksites, women reported greater supervisor support than men.

The Validity of the Worksite Health Climate Scales

The patterns of relationships of the health climate scales with multiple health and well-being measures suggest preliminary evidence for the construct validity of the scales. This discussion will first examine the correlations of the health climate scales with measures of health status (e.g. physical symptoms, medical utilization, Body Mass Index), health behaviors (e.g. exercise, nutrition, and smoking habits), and job qualities (e.g. job stress and job satisfaction). Since the health climate scales were divided into three general categories of measures, the scales in each category will be considered together.

The pattern of correlations for the three organizational support scales showed some evidence for the construct validity of these measures. The company's orientation toward health issues, as expected, was unrelated to ratings of health status and health behavior practices. As expected, this scale was negatively correlated to job stress and positively correlated to job satisfaction. The next scale, the flexibility within one's job to exercise, was positively correlated to exercise behavior and job satisfaction as expected; however, it was also significantly related to smoking status

which was not expected. Finally, as expected, the Health Information scale was not correlated to any of the health outcomes or job quality measures. The anticipated correlations between the this scale and health behaviors were not observed. Perhaps the health information construct is too general to be related to any of the health outcomes or maybe the provision of health information is not related to better health behaviors. Additionally, this scale had very little variance and was positively skewed which also may have precluded statistically significant relationships.

Regarding the interpersonal support scales, the Supervisor and Co-worker Social Support scales generally showed similar patterns of relations with the health status and the job qualities measures. The amount of supervisor and co-worker support was negatively related to physical symptoms as expected, but neither was negatively correlated to the number of medical visits. In fact, none of the correlations involving the medical visits were significant which may have been due to the limited variance and positively skewed distribution. Both support scales were positively correlated to job satisfaction, but only supervisor support was negatively correlated to job stress. Based on the social support literature, one would expect that less perceived social support would be related to more physical health problems. Interestingly, the magnitude of the correlations with these variables was higher for social support from one's supervisor than for co-workers. Thus, supervisor support and co-worker support have similar patterns of correlation, but supervisor support may be more important in explaining health problems and stress at work. Additionally, job stress was related to supervisor support, but this was not true for co-worker support.

A similar finding has been reported by Marcelissen, Winnubst, Buunk, and De Wolff (1988) in a longitudinal study of 2,034 employees of 21 Dutch companies. Their results suggested that the effect of supervisor social support upon job stress was far more important than co-worker support. In a different study, supervisor support was the only significant predictor of burnout (e.g. emotional exhaustion, depersonalization, and personal accomplishment) among four sources (supervisor, co-worker, spouse, friend or relative) in a study of 316 public school teachers (Russell, Altmaier, and Van Velzen, 1987). Given these slightly different findings for supervisor and co-worker support, measures of workplace social support that differentiate between supervisor and co-worker support may be more useful than general measures of social support at work which do not consider the source of support.

Additionally, supervisor support was positively correlated to exercise habits. Although the correlation of supervisor support and exercise habits seems counterintuitive, this finding may be a function of having a supervisor that supports the goals of health promotion. Since the correlation between the supervisor support scale and flexibility to exercise scale was positive, it may be possible that part of the support that supervisors provided was allowing their employees the freedom to exercise. The correlation between exercise flexibility and co-worker support was not significant, perhaps because other employees may not have a voice in allowing a co-worker the freedom to exercise at work. These explanations are tentative and further work is necessary to substantiate these explanations.

The final interpersonal support scale, the level of support for healthy behavior, was positively correlated to exercise habits, healthy nutrition habits, and smoker status. Thus, the amount of support by co-workers for desirable health behaviors was in fact related to health practices as expected. This scale was not significantly related to Body Mass Index as hypothesized; however, none of the scales were significantly related to this index. Since only approximately 20 percent of the sample was classified as overweight using the index, the variance was limited and may have precluded the observation of any significant relationships for this measure.

The health norms scales generally were not related to the health status measures (as expected), but norms scales were unexpectedly related to some of the job quality measures. Most of the hypothesized relationships of the health norms scales and the health behavior measures were confirmed. The norms for nutrition were correlated to nutrition habits; similarly, the norms for exercise habits were correlated only to exercise habits. Smoking norms, however, were not related to smoker status. Interestingly, the norms for smoking were positively correlated to two adverse health outcomes, physical symptoms and job stress, and were negatively correlated to healthy nutrition habits. Ratings of higher norms for job tension were associated with greater personal job stress as expected. However, tensions norms were also related to greater physical symptoms and lesser job satisfaction, perhaps because of the overlap of this scale and the measure of personal job stress. In general, the worksite norms scales were related to their companion outcome measure and the other measures that would be expected to be related to the particular norm rating. There were a few other significant correlations observed that were not

hypothesized; however, no consistent pattern emerged and these are not discussed. The patterns of correlations for Pro-Exercise Attitudes, Smoking Norms, and Anti-Smoking Attitudes generally did not conform to the hypothesized relationships, thus the validity evidence for these scales is less compelling. The Nutrition Norms, Exercise Norms, and Tension Norms scales generally showed the strongest preliminary evidence for their validity.

The results from the multiple regression analyses confirmed the conclusions of the correlational analyses and added some further evidence for the validity of the health climate measures. For the regression analyses, demographic variables and physical environment ratings were entered before the health climate ratings. This hierarchical approach was employed because the outcome variables were correlated to some of the demographic and physical environment variables.

The health climate ratings predicted a significant amount of variance in physical symptoms and exercise behavior after controlling for demographics and physical environment ratings. Finally, the health climate ratings predicted a significant amount of additional variability in ratings of job stress and job satisfaction. In conclusion, the health climate ratings were most useful predictors for employee health status indicators and job quality measures even after the effect of potentially confounding variables was controlled. Medical visits and body mass index were not included in the regression analyses because the distributions of these variables violated the assumptions of the statistical test.

Limitations of the Study and the WHCS

One of the common research problems facing climate research has been the units of analysis problem and establishing that one has been able to measure the perceived climate. Climate is frequently measured at the individual level and then responses are aggregated in some fashion to achieve a climate rating. In this study, the responses of individuals working at the same organization were aggregated and the climates were compared across organizations using MANOVA because there were 12 climate dimensions. This approach to studying climate was utilized by Zohar (1980) in a study of the climate for safety in industrial organizations. Based upon responses to questionnaires, the aggregated perceptions of 20 employees from 20 different factories were used to attain scores for each organization. Analysis of variance was then used to compare the variability between companies to the variability within companies. The resulting F statistic was significant, and the author concluded that this supported the notion of a safety climate in industrial organizations.

Another problem facing climate research is the debate regarding whether climate should be studied at the company level since each company is hypothesized to have a climate or whether analyses should be conducted at the level of individual perceptions. One of the primary reasons for studying climate at the level of individual perceptions has probably been that it is easier and more familiar for psychologists to conduct research at the individual level. To study climate at the company level would require substantial resources since one would want to study at least 50 to 100 different organizations to have adequate statistical power. The resources necessary to undertake a research endeavor of this magnitude would be

substantial and prohibitive. The conclusion regarding the level of analysis problem is that this remains a perennial problem in conducting multi-level research. The present research assessed employee climate perceptions at the individual level which follows the method employed by other climate researchers such as Zohar (1980).

Another serious limitation of this study is that it relied totally upon self-report measures for the variables and therefore many of the findings could be the result of method variance. The key constructs assessed by self-report in this study were health climate perceptions and ratings of health and well-being.

To avoid relying totally upon self-report methods, different approaches to the assessment of the employee health and well-being measures could be explored. Medical records and health screenings at the worksite could be used to obtain more objective indicators of health status. While the use of more objective health measures may be desirable for some health outcomes, there are some constructs that can be better measured by self-report. For instance, perceptions of job stress or current health lend themselves to self-report. Thus, there should be fewer reservations about employing a self-report approach for constructs like these. Moreover, when self-reports for particular variables have been shown by prior research to be fairly accurate, there should be fewer objections to their use. Most of the measures used in this study had some evidence for their validity. In conclusion, a few of the limitations of self-report data sources have been discussed. Several of the constructs in this study were best assessed by self-reports; however, for future research some of the health outcomes could be triangulated with additional health status information.

Although it is feasible to supplement health outcomes with objective measures, the health climate constructs would be difficult to assess using any method other than self-report of the individuals in that setting. However, trained raters could give ratings of some of the health norms. For instance, the norms for smoking might be assessed by having raters count the number of people smoking at different times during work hours. This approach would be a little more problematic for a less tangible construct such as the amount of co-worker support for healthy behavior. Raters would need to spend a lot of time at the site to be able to accurately assess the range of health climate constructs. Research efforts that try to explore alternative methods of obtaining health climate ratings may be fruitful; however, they fail to take into account the theoretical importance of using employee perceptions. After all, employees are the people who spend the most time at the worksite and naturally would have the best sense of the climate for health. If the goal is to try to reduce the amount of bias from self-report methods in health climate research, obtaining objective measures of health status will probably be more useful than finding alternative measures of the climate for health.

Another limitation of the present research was that the sample of worksites differed in many ways such that it was difficult to disentangle the factors that contributed to the between company differences. For instance, the gender differences in the ratings of the WHCS could be attributed to the types of jobs that women had or how many hours they worked. The fact that men and women had different types of jobs in this study is indicative of a general pattern at many other organizations where females are overrepresented in clerical positions and underrepresented in management

and professional positions which complicates the study of sex-differences in the working population (Jick & Mitz, 1985). Further research exploring these gender differences should try to find worksites where there is greater gender parity among the different positions and the number of hours that individuals work.

Another limitation of this study was that the participating organizations in Study Two were all small employers. The largest site had 60 employees. However, these sites were purposely chosen because they were small. The worksites were all self-contained in one building or floor of a building and thus individuals would all be rating the same setting. Research at larger organizations would be a lot more complicated since there would be many different buildings and settings. Individuals in one location of the organization probably would not be able to give general ratings of the climate for the entire organization. Thus, for the initial stages of research, using a sample of small worksites had its advantages. Additionally, using small worksites still allow the findings to be generalizable since three out of four workers in the United States are employed in companies with fewer than 500 employees.

Future Research

Future research in the area of health climate perceptions should explore possible explanations for the gender differences observed in this study. The results showed that women generally had a more favorable impression of the health climate at their organization. As was mentioned earlier, women worked fewer hours than men and were more likely to be part-time employees. Future research could compare part-time and full-time male employees or compare men and women who work the same number of hours. Perhaps, women have different climate perceptions because

their work environment is different. In the second study, women were overrepresented in clerical positions, and slightly underrepresented in management and professional positions. The work tasks and responsibilities of secretaries and professionals are generally quite different, therefore one could easily imagine that some aspects of their work environment would also differ.

Another interesting topic for future research would be to explore the relationship between health climate perceptions and job satisfaction. The job satisfaction measure in the second study was moderately correlated with many of the health climate scales. Some researchers argue that climate perceptions and job satisfaction are basically the same (e.g. Johannesson, 1973), although other researchers argue that there are similarities, but the two are definitely distinct constructs (LaFollette & Sims, 1975; Payne, Fineman, & Wall, 1976). Most of this discussion has centered around the distinction between organizational climate and job satisfaction, but organizational health climate and job satisfaction have not been part of this debate.

A final area for future research would be to investigate longitudinally the impact of health intervention programs which would seek to alter undesirable health norms at different organizations. When the climate for health changes at an organization, does this have an impact upon the health behaviors and well-being of employees? Perhaps the direction is reversed, such that when individuals change their behaviors, the health climate will eventually conform to these changes. Also, since the health climate scales were sensitive to differences across organizations, are these

scales sensitive to changes occurring over time within an organization? These are just a few of the many potential areas of investigation for this line of research.

Conclusions

Research that examines the role of contextual factors in affecting employee health at the work environment is urgently needed. Much of the early work in the area of occupational health and safety looked at role of the workplace environment in influencing employee health and well-being. The overarching theme of the current worksite health promotion movement has been a singular focus upon individual behavior with little reference to context. Since health behaviors do not occur in isolation, the role of environmental influences upon health behaviors and well-being deserves immediate recognition. Castillo-Salgado (1984) asserted that one of the functions of health promotion programs should be to modify the work environment in addition to providing information and support systems to employees for improving their health and security. Research and action in the area of environmental health promotion at work has been curbed partly by the lack of sound measurement tools to assess work environments and their relationship to employee health and well-being.

In addition to providing a tool for research on work environments, the health climate scales might also be used in evaluating the impact of a health promotion intervention at the worksite. The scales could be a useful adjunct to commonly used measures of health status and health behaviors. For example, suppose nutrition classes were offered to teach employees about preparing low-fat and low-cholesterol foods. The Nutrition Norms scale might be used to detect changes in the workplace norms regarding nutrition. There are items that ask if people are concerned about the

amount of cholesterol in the foods they eat, if people bring wholesome snacks to work, and if people bring healthy food to office celebrations. The other health norms scales could be used to evaluate other types of health promotion interventions. Since there is an exercise attitudes scale and an exercise behavior norms scale, one might learn that attitudinal changes were the result of an intervention; however, there were not corresponding changes in the behavior norms. Obviously, the health climate measures are supplementary and more direct measures also need to be utilized in a thorough evaluation of any health program. In sum, the health climate scales should be able to provide useful ancillary information to health promotion interventions. In addition to giving a more balanced perspective to worksite health research, the WHCS have many practical uses for practitioners.

The WHCS could be used by a worksite that has never offered any health promotion activities, but is interested in finding out where to start. A couple of the worksites in Study Two were faced with this situation and welcomed the feedback that accompanied their survey results. Information from the survey was used by a health promotion committee at the worksite to plan health-related activities. Obviously, the climate ratings need a context for comparison so norms could be established for the different scales or the results could be compared to similar organizations in the vicinity.

Many individuals are very apprehensive about discussing their health behaviors and health status with their employer, but these same people might be more comfortable giving health climate ratings. Employers could use information from the scales, with or without individual health information, to help plan health promotion

activities. The nutrition and exercise norms were both correlated to personal nutrition and exercise behaviors, respectively. Thus, the climate scales could be useful in obtaining sensitive information from employees who are hesitant to reveal personal health practices. The problem of confidentiality is often avoided by administering anonymous surveys or by having a health vendor collect the information confidentially and then present it in aggregate form to the organization. The WHCS could provide another alternative to obtaining information that many employees feel is sensitive.

In conclusion, the results of Study One showed that the health climate scales generally demonstrated sufficient reliability. The results from Study Two provided some evidence for the validity of the health climate scales by demonstrating that the climates of the various organizations significantly differed, that the ratings generally were not strongly related to individual difference variables (with the exception of gender), and that these scales generally were correlated in predictable ways to the health outcomes. While needing further research, the Worksite Health Climate Scales show promise in helping organizations understand and refine their work environment to create the healthiest possible context for employees. Additionally, these scales will provide a useful tool for researchers who are trying to understand the relationship of the work environment to employee health and well-being.

BIBLIOGRAPHY

BIBLIOGRAPHY

Abrams, D. B., & Follick, M. J. (1983). Behavioral weight-loss intervention at the worksite: Feasibility and maintenance. Journal of Consulting & Clinical Psychology, 51, 226-233.

Allen, V. R. (1986). Health promotion in the office. American Association of Occupational Health Nurses Journal, 40, 764-770.

Allen, J. A., & Allen, R. F. (1986). Achieving health promotion objectives through cultural change systems. American Journal of Health Promotion, 1(1).

Allen, R. A., & Kraft, C. (1980). Beat the system! A way to create more human environments. New York: McGraw-Hill.

Allen, R. A., & Kraft, C. (1982). Health promotion: generating wellness life-styles. In The organizational unconscious: How to create the corporate culture you want and need (pp. 171-185). Englewood Cliffs, NJ: Prentice-Hall.

Allen, R. A., & Kraft, C. (1984). The importance of cultural variables in program design. In M. P. O'Donnell & T. H. Ainsworth (Eds.), Health promotion in the workplace (pp. 69-95). New York: John Wiley & Sons.

Allen, R. A., & Linde, S. (1981). Lifegain: The exciting new program that will change your health-and your life. New York: Appleton-Century-Crofts.

Bader, B. S., Jones, L. D., & Yenney, S. (1982). Planning hospital health promotion services for business and industry. Chicago: American Hospital Association.

Beehr, T. A. (1985). The role of social support in coping with organizational stress. In T. A. Beehr & R. S. Bhagat (Eds.), Human stress and cognition in organizations (pp. 375-398). New York: John Wiley & Sons.

Biener, L., Abrams, D. B., Follick, M. J., & Dean, L. (1989). A comparative evaluation of a restrictive smoking policy in a general hospital. American Journal of Public Health, 79, 192-195.

Borland, R., Chapman, S., Owen, N., & Hill, D. (1990). Effects of workplace smoking bans on cigarette consumption. American Journal of Public Health, 80, 178-180.

Brown, E. R., McCarthy, W. J., Marcus, A., Baker, D., Froines, J. R., Dellenbaugh, C., & McQuiston, T. (1988). Workplace smoking policies: Attitudes of union members in a high-risk industry. Journal of Occupational Medicine, 30, 312-320.

Brownell, K. D., Heckerman, C. L., Westlake, R. J., Hayes, S. C., & Monti, P. M. (1978). The effect of couples training and partner co-operativeness in the behavioral treatment of obesity. Behavior Research and Therapy, 16, 323-333.

Caplan, R. D. (1985). Psychosocial stress in work. Management and Labour Studies, 10(2), 63-76.

Caplan, R. D., Cobb, S., French, J. R. P. Jr., Van Harrison, R., & Pinneau, S. R. Jr. (1975). Job Demands and Worker Health. Washington, DC: U.S. Department of Health, Education, and Welfare (NIOSH).

Carrington, P., Collings, G. H., Benson, H., Robinson, H., Wood, L. W., Lehrer, P. M., Woodfolk, R. L., Cole, J. W. (1980). The use of meditation-relaxation techniques for the management of stress in a working population. Journal of Occupational Medicine, 22, 221-231.

Castillo-Salgado, C. (1984). Assessing recent developments and opportunities in the promotion of health in the American workplace. Social Science and Medicine, 19, 349-358.

Chapman, L. (1987). Creating a wellness oriented workplace: policies, places and norms (No. 18). Seattle: Corporate Health Designs.

Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. Journal of Applied Social Psychology, 13, 99-125.

Connell, C. M., & D'Augelli, A. R. (1990). The contribution of personality characteristics to the relationship between social support and perceived physical health. Health Psychology, 9, 192-207.

Conrad, P. (1987). Who comes to work-site wellness programs? A preliminary review. Journal of Occupational Medicine, 29, 317-320.

Conyne, R. K., & Clack, R. J. (1981). Environmental classification: Understanding the human environment. In Environmental assessment and design: A new tool for the applied behavioral scientist (pp. 21-44). New York: Praeger.

Curry, S. Thompson, B., Sexton, M., & Omenn, G. S. (1989). Psychosocial predictors of outcome in a worksite smoking cessation program. American Journal of Preventive Medicine, 5(1), 2-7.

Devellis, R. F. (1991). Scale development: Theory and applications. Newbury Park, CA: Sage.

Dillman, D. A. (1978). Mail and telephone surveys: The total design method. New York: John Wiley & Sons.

Donatelle, R. J., & Hawkins, M. J. (1989). Employee stress claims: Increasing implications for health promotion programming. American Journal of Health Promotion, 3(3), 19-25.

Drazen, M., Nevid, J. S., Pace, N., & O'Brien, R. M. (1982). Worksite-based behavioral treatment of mild hypertension. Journal of Occupational Medicine, 24, 511-514.

Eakin, J. M., Gotay, C. G., Rademaker, A. W., & Cowell, J. W. (1988). Factors associated with enrollment in an employee fitness center. Journal of Occupational Medicine, 30, 633-637.

Everly, G. S., & Feldman, R. H. (1985). Occupational health promotion: Health behavior in the workplace. New York: John Wiley & Sons.

Fielding, J. E. (1984a). Corporate health management. Reading, MA: Addison-Wesley.

Fielding, J. E. (1984b). Health promotion and disease prevention at the worksite. Annual Review of Public Health, 5, 237-265.

Fielding, J. E. (1990). Worksite health promotion programs in the United States: Progress, lessons and challenges. Health Promotion International, 5(1), 75-84.

Flora, J. A., Maibach, E. W., & Maccoby, N. (1989). The role of media across four levels of health promotion intervention. Annual Review of Public Health, 10, 181-201.

Frankenhaeuser, M., Lundberg, U., Fredrikson, M., Melin, B., Tuomisto, M., Myrsten, A, Hedman, M., Bergman-Losman, B., & Wallin, L. (1989). Stress on and off the job as related to sex and occupational status in white-collar workers. Journal of Organizational Behavior, 10, 321-346.

Fusilier, M. R., Ganster, D. C., & Mayes, B. T. (1986). The social support and health relationship: Is there a gender difference? Journal of Occupational Psychology, 59, 145-153.

Glasgow, R. E., & Terborg, J. R. (1988). Occupational health promotion programs to reduce cardiovascular risk. Journal of Consulting and Clinical Psychology, 56, 365-373.

Glasgow, R. E., Klesges, R. C., Godding, P. R., Vasey, M. W., & O'Neill, H. K. (1984). Evaluation of a worksite-controlled smoking program. Journal of Consulting and Clinical Psychology, 52, 137-138.

Goodstadt, M. S., Simpson, R. I., & Loranger, P. O. (1987). Health promotion: A conceptual integration. American Journal of Health Promotion, 1(3), 58-63.

Green, L. W. (1984). Modifying and developing health behavior. Annual Review of Public Health, 5, 215-236.

Greenberger, E., Goldberg, W. A., Hamill, S., O'Neill, R., & Payne, L. K. (1989). Contributions of a supportive work environment to parents' well-being and orientation to work. American Journal of Community Psychology, 17, 755-783.

Guthrie, H. A. (1986). Introductory Nutrition. St. Louis, MO: Time-Mirror/Mossey College Publ.

Hole, D. J., Gillis, C. R., Chopra, C., & Hawthorne, V. M. (1989). Passive smoking and cardiorespiratory health in a general population in the west of Scotland. British Medical Journal, 299, 423-427.

House, J. S. & Cottington, E. M. (1986). Health and the Workplace. In L. H. Aiken & D. Mechanic (Eds.), Applications of social science to clinical medicine and health policy. New Brunswick, NJ: Rutgers University Press.

House, R. J., & Rizzo, J. R. (1972). Role conflict and ambiguity as critical variables in a model of organizational behavior. Organizational Behavior and Human Performance, 7, 467-500.

Ilgen, D. R. (1990). Health issues at work: Opportunities for industrial/organizational psychology. American Psychologist, 45, 273-283.

Ivancevich, J. M., Matteson, M. T., Freedman, S. M., & Phillips, J. S. (1990). Worksite stress management interventions. American Psychologist, 45, 252-261.

Jackson, D. N. (1970). A sequential system for personality scale development. In C. D. Spielberger (Ed.), Current topics in clinical and community psychology Vol. 2. New York: Academic Press.

Jick, T. D., & Mitz, L. F. (1985). Sex differences in work stress. Academy of Management Review, 10, 408-420.

Johannesson, R. E. (1973). Some problems in the measurement of organizational climate. Organizational Behavior and Human Performance, 10, 118-144.

Karasek, R. A., Theorell, T., Schwartz, J. E., Schnall, P. L., Pieper, C. F., & Michela, J. L. (1988). Job characteristics in relation to the prevalence of myocardial infarction in the US Health Examination Survey (HES) and the Health and Nutrition Examination Survey (HANES). American Journal of Public Health, 78, 910-918.

King, A. C., Carl, F., Birkel, L., & Haskell, W. L. (1988). Increasing exercise among blue-collar employees: The tailoring of worksite programs to meet specific needs. Preventive Medicine, 17, pp. 357-365.

Kizer, W. M. (1987). The healthy workplace: A blueprint for corporate action. New York: John Wiley & Sons.

Kunin, T. (1955). The construction of a new type of attitude measure. Personnel Psychology, 8, 65-77.

LaFollette, W. R., & Sims, H. P. Jr. (1975). Is satisfaction redundant with organizational climate? Organizational Behavior and Human Performance, 13, 257-278.

Lehmann, P. E., & Kalmar, V. (1979). Improving the quality of the work environment. In Healthy people: The surgeon general's report on health promotion and disease prevention: background papers (DHEW Publication No.79-55071A). Washington, DC: U.S. Dept. of Health, Education, and Welfare.

Levenstein, C. (1989). Worksite health promotion [editorial]. American Journal of Public Health, 79(1), 11.

Loper, J. F., & Barrows, K. K. (1985). A nutrition and weight-control program in industry. Journal of the American Dietetic Association, 85, 1487-1488.

Marcelissen, F. H. G., Winnubst, J. A. M., Buunk, B., & De Wolff, C. J. (1988). Social support and occupational stress: A causal analysis. Social Science and Medicine, 26, 365-373.

McLeroy, K. R., Bibeau D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. Health Education Quarterly, 15, 351-377.

National Center for Health Statistics. (1986). Current Estimates from the National Health Interview Survey, United States, 1985. Washington DC: U.S. Dept. of Health and Human Services, Public Health Service.

O'Donnell, M. P. (1984). The Design Process. In M. P. O'Donnell & T. H. Ainsworth (Eds.), Health Promotion in the Workplace (pp. 39-55). New York: John Wiley & Sons.

O'Donnell, M. P. (1989). Definition of health promotion: Part III: Expanding the definition. American Journal of Health Promotion, 3(3), 5.

O'Donnell, M. P., & Ainsworth, T. H. (Eds.). (1984). Health Promotion in the Workplace. New York: John Wiley & Sons.

Office of Disease Prevention and Health Promotion. (1987). National Survey of Worksite Health Promotion Activities: A Summary. Washington, DC: U.S. Dept. of Health and Human Services, Public Health Service.

Opatz, J. P. (1985). A Primer of Health Promotion: Creating Healthy Organizational Cultures. Washington DC: Oryn Publications.

Ostwald, S. K. (1989). Changing employees' dietary and exercise practices: An experimental study in a small company. Journal of Occupational Medicine, 31(2), 90-97.

Payne, R. L., Fineman, S., & Wall, T. D. (1976). Organizational climate and job satisfaction: A conceptual synthesis. Organizational Behavior and Human Performance, 16, 45-62.

Pearce, J. W., LeBow, M. D., Orchard, J. (1981). Role of spouse involvement in the behavioral treatment of overweight women. Journal of Consulting and Clinical Psychology, 49, 236-244.

Pender, N. J. (1989). Health promotion in the workplace: Suggested directions for research. American Journal of Health Promotion, 3(3), 38-43.

Peters, R. K., Benson, H., & Porter, D. (1977). Daily relaxation response breaks in a working population: I. Effects on self-reported measures of health, performance, and well-being. American Journal of Public Health, 67, 946-952.

Quick, J. C., & Quick, J. D. (1984). Organizational Stress and Preventive Management. New York: McGraw-Hill Book Company.

Revicki, D. A., & Israel, R. G. (1986). Relationship between body mass indices and measures of body adiposity. American Journal of Public Health, 76, 992-994.

Revicki, D. A., & May, H. J. (1985). Occupational stress, social support, and depression. Health Psychology, 4, 61-77.

Ries, C. P., & Schoon, D. K. (1986). Evaluation of a cafeteria-based education program for college students. Journal of Nutrition Education, 18, 107-110.

Robbins, S. B., & Slavin, L. A. (1988). A measure of social support for health-related behavior change. Health Education, 19(3), 36-39.

Rosen, G. M., & Lichtenstein, E. (1977). An employee incentive program to reduce cigarette smoking. Journal of Consulting and Clinical Psychology, 45, 957.

Rosow, J. M., Zager, R., & Hanft, R. S. (1985). Improving health-care management in the workplace. New York: Pergamon Press.

Rousseau, D. M. (1988). The construction of climate in organizational research. In C. L. Cooper & I. Robertson (Eds.), International Review of Industrial and Organizational Psychology (pp. 139-158). New York: John Wiley & Sons.

Russell, D. W., Altmaier, E., & Van Velzen, D. (1987). Job-related stress, social support, and burnout among classroom teachers. Journal of Applied Psychology, 72, 269-274.

Schmitt, N., Colligan, M. J., & Fitzgerald, M. (1980). Unexplained physical symptoms in eight organizations: Individual and organizational analyses. Journal of Occupational Psychology, 53, 305-317.

Schmitz, M. F., & Fielding, J. E. (1986). Point-of-choice nutritional labeling: Evaluation in a worksite cafeteria. Journal of Nutrition Education, 18, S65-S68.

Shephard, R. J., Corey, P., Renzland, P., & Cox, M. (1982). The influence of an employee fitness and lifestyle modification program upon medical care costs. Canadian Journal of Public Health, 73, 259-263.

Sloan, R. P. (1987). Workplace health promotion: A commentary on the evolution of a paradigm. Health Education Quarterly, 14, 181-194.

Sloan, R. P., Gruman, J. C., & Allegrante, J. P. (1987). Investing in employee health: A guide to effective health promotion in the workplace. San Francisco: Jossey-Bass.

Stachnik, T., & Stoffelmayr, B. (1983). Worksite smoking cessation programs: A potential for national impact. American Journal of Public Health, 73, 1395-1396.

Stokes, J. P., Wilson, D. G. (1984). The inventory of socially supportive behaviors: Dimensionality, prediction, and gender differences. American Journal of Community Psychology, 12, 53-69.

Vischer, J. C. (1989). Environmental quality in offices. New York: Van Nostrand Reinhold.

Walker, S. N., Sechrist, K. R., & Pender, N. J. (1987). The health-promoting lifestyle profile: Development and psychometric characteristics. Nursing Research, 36(2), 76-81.

Wallston, B. S., Alagna, S. W., DeVellis, B. M., & DeVellis, R.F. (1983). Social support and physical health. Health Psychology, 2, 367-391.

Ware, A., Sleet, D. A., & Bigelow, B. E. (1986). Seat belt use at work prevents accident costs, lost work time. Occupational Health & Safety, 55(2), 20-25.

Westgaard, R. H., & Aaras, A. (1985). The effect of improved workplace design on the development of work-related musculo-skeletal illnesses. Applied Ergonomics, 16, 91-97.

Wilbur, C. S., Zifferblatt, S. M., Pinsky, J. L., & Zifferblatt, S. (1981). Healthy vending: A cooperative pilot research program to stimulate good health in the marketplace. Preventive Medicine, 10, 85-93.

Winett, R. A. (1985). Ecobehavioral assessment in health life-style: Concepts and methods. In P. Karoly (Ed.), Measurement strategies in health psychology (pp. 147-181). New York: John Wiley & Sons.

Winett, R. A., King, A. C., Altman, D. G. (1989). Health in the workplace. In Health psychology and public health: An integrative approach (pp. 285-313). New York: Pergamon Press.

Zedeck, S., & Mosier, K. L. (1990). Work in the family and employing organization. American Psychologist, 45, 240-251.

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