Final Report

Healthy Work Organization: Intervention Effectiveness

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ABSTRACT

The overall goal of this research was to develop, implement, and evaluate a healthy work organization intervention. Research has examined various aspects of healthy work organization, but there have been very few tests of comprehensive models and virtually no attention to evaluating relevant interventions. This research was guided by three specific aims: 1) to investigate changes in both employee health and financial performance as a function of the healthy work organization intervention; 2) to investigate how the intervention impacts organizational climate; and 3) to explore the impact of the intervention on the exogenous and endogenous components of our theoretical model of healthy work organization. Prior to evaluating the intervention, we developed a healthy work organization audit instrument and tested the theoretical model using structural equation modeling techniques.

The theoretical model developed for this research consists of six interrelated components: 1) organizational core attributes, 2) job design 3) organizational climate, 4) job future, 5) psychological work adjustment, and 6) organizational effectiveness. The model advances the argument that organization-level action is critical to creating and maintaining the healthy organization. That is, well-designed jobs, supportive organizational climates, and positive career options exist largely as a function of the policies and actions pursued by the leaders of the organization. Organizational effectiveness was conceptualized to include health and well-being indicators as well as performance and financial measures.

With the cooperation of a large national retailer, baseline data were collected from employees in 21 stores during the first year of the project. Two districts (11 stores) were assigned to the intervention group, and two districts (10 stores) served as control sites. Treatment and control groups were configured by district to minimize intervention spillover and to simplify the logistics of intervention facilitation and data collection. Baseline surveys (organizational health audits) were conducted at all 21 sites six months prior to the start of the intervention. This same survey was re-administered approximately 12 months later, and again at 24 months. The intervention process commenced six months after the baseline survey. The final samples consisted of 2207 employees at pretest, 1723 at posttest, and 1510 at the second follow up, representing 53%, 44%, and 35%, of employees at each time frame. Store-level financial and HR data were collected from the company on a monthly basis throughout the project.

The intervention was designed to build capacity for employee participation and decision-making, and create a healthier work organization. The data-driven problem-solving intervention combined elements from total quality management (TQM), worker involvement, and community engagement. Employee problem-solving teams, called “ACTion Teams,” were organized at each intervention store. The teams were charged with developing a tailored plan of action for addressing the issues or problems identified within the store. With assistance from trained facilitators, the ACTion teams developed their action plans using a five phase problem-solving process: familiarization, skill building, prioritization, action, and reaction. The level of facilitation was gradually reduced over time to help the teams become more independent and self-sustaining.

Using structural modeling techniques, the theoretical model demonstrated good fit overall and statistically significant associations among most of the hypothesized second-order latent variables. The only relationship not supported was between organizational climate and psychological work adjustment. Consequently, a second model was hypothesized with organizational climate providing the foundation for the job design and job future dimensions.

This model was supported in a post-hoc analysis using the first study data and validated in a second study on an entirely new sample.

Intervention effectiveness was assessed in terms of several sets of outcome measures: organizational climate, work behavior, employee health and well-being, and financial performance. Impacts on the exogenous and endogenous components of the theoretical model were also examined. All analyses were 2 (treatment) by 3 (time) repeated measures ANOVAs, conducted at the store level (n = 21). Preliminary tests revealed no systematic differences between intervention and control store samples in terms of race, gender, age, job tenure, or education.

Pertinent to Aim 1, there were no intervention effects on any of the employee health and well-being measures. However, significant treatment x time interactions were obtained for two of the four financial measures: sales per labor hour and employee turnover. In both cases, the outcomes favored those stores receiving the intervention. There were no effects for comparable sales or average ticket.

Aim 2 hypothesized that intervention should operate by changing store climate. Consistent with this, significant interactions were found for the communication and workplace safety and health dimensions of organizational climate; the interaction for organizational support was marginally significant. The pattern of results suggest that the intervention provided a buffering or braking effect on the negative trends that were apparent in all stores.

Regarding Aim 3, significant treatment x time interactions were found for several dimensions of both job design and job future, again revealing beneficial intervention effects. Several additional job design and job future effects fell just short of significance. For psychological work adjustment, interactions approaching significance were obtained for job satisfaction, organizational commitment, and work stress. Finally, among the core organizational attributes, significant interactions, favoring the intervention, were obtained for involvement policies and organizational values.

In summary, the intervention worked as intended. The lack of stronger effects on the principal outcomes was at least partially due to the small number of stores (21 stores). But more importantly, this research took place during a time of unprecedented change and uncertainty for this corporation, including transitions of senior leadership, economic recession, severe competitive and market pressures, and major world events. Reflective of this, virtually all of the measures tracked declined substantially across the three measurement periods. The process evaluation showed that the team process was well-received, but some difficulties were encountered in sustaining and fully integrating the team process, and in making operational changes within the stores

<u>Significant Findings</u>

- This research provides the most systematic test to date of a comprehensive theoretical model of healthy work organization.

- This research developed, tested, and refined a modular instrument for comprehensively assessing the principal dimensions of healthy work organization.

- This research demonstrated the feasibility of conducting workplace audits of healthy work organization using a questionnaire methodology.

- This research demonstrated the feasibility and potential of a team-based, problem-solving methodology for identifying and remedying work organization issues.

Usefulness of Findings

In their recent report, the NIOSH Organization of Work Taskforce (Landsbergis, 2003; NIOSH, 2002) identified four research and development needs: 1) improved surveillance mechanisms to track changes in the organization of work; 2) accelerated research on the safety and health impacts of the changing organization of work; 3) increased emphasis on organizational interventions to protect workers; and 4) steps to formalize and nurture organization of work as a distinctive field in occupational safety and health. The research described in this report addresses all four of these priorities to some degree. In particular, the organizational health audit instrument developed and tested in this project should be useful for surveillance purposes and for assessing the quality of work life. In a sense, we view it as an organizational risk appraisal instrument (DeJoy & Wilson, 2003). As constructed, this instrument goes well beyond conventional job design and work stress factors, and reflects a comprehensive and contemporary perspective on today's workers and workplaces. The theoretical model developed and tested in this research identifies major worklife domains, specifies relationships among key variables, emphasizes the role of organizational factors and the need to alter basic employee-employer relationships, and expands upon traditional definitions of organizational effectiveness. The intervention process tested focuses on evidence-based problem-solving, worker involvement, and capacity-building strategies. Its use in this research reflects one of the few attempts to systematically implement and evaluate a broad-based work organization initiative. Certainly, the lessons learned in this project should be useful to future researchers in this important area.

Background and Aims

The National Occupational Research Agenda (NIOSH, 1996, 2002) has identified work organization as one of the national occupational safety and health research priority areas. Work organization refers to the way work processes are structured and managed, including scheduling, job design, interpersonal aspects, management style, organizational characteristics, and related topics. Work organization is a cross-cutting theme that calls attention to environmental and organizational factors as risk factors for disease and injury in the workplace (Landsbergis, 2003; Rosenstock, 1997; Sauter, Lim, & Murphy, 1996). There is a growing body of literature which suggests that the organization of work affects virtually all areas of occupational safety and health (e.g., Danna & Griffin, 1999; DeJoy, 1996; DeJoy & Wilson, 2003; Edmondson, 1996; Hofmann, Jacobs, & Landy, 1995;; Lindstrom, 1994; Rosen & Berger, 1991; Shannon, Mayr, & Haines, 1997; Smith, Kaminstein, & Makadok, 1995).

Inherent in the concept of healthy work organization is the idea that a) it should be possible to identify a set of job and organizational factors or dimensions that characterize the healthy organization or workplace, and b) such workplaces should have healthier, safer, and more productive workers - the by-product of which should be increased profitability and/or mission success. Although researchers have examined various aspects of healthy work organization, there have been few tests of comprehensive models and virtually no attention to developing and evaluating interventions. Data are clearly lacking on the parallel benefits hypothesis, which holds that actions taken to improve employee health and well-being should also benefit bottom-line financial performance. The intervention developed for this project was derived from theory and research on total quality management, worker involvement, and community engagement, and was implemented using a participatory process that involves data-driven, problem-solving teams. This intervention study was conducted with the cooperation of a large national retailer.

This research is directly relevant to two National Occupational Research Agenda (NORA) priority areas: work organization and intervention effectiveness research. The healthy work organization concept is generalizable to a wide spectrum of occupations and injury/illness priority areas. This particular research targeted workers in retail trade, which is a significant and growing segment of the rapidly expanding service sector of the American economy.

Specific Aims

Aim 1: To investigate changes in indices of health/safety and financial performance as a function of a work organization intervention involving data-driven, problem-solving teams.

Aim 2: To investigate changes in organizational climate as a function of an work organization intervention involving data-driven, problem-solving teams.

Aim 3: To explore the impact of the problem-solving intervention on the primary exogenous and endogenous components in our theoretical model of healthy work organization**.**

Theoretical Model of Healthy Work Organization

Figure 1 presents our theoretical model of healthy work organization (see also DeJoy & Wilson, 2003). Using the terminology of structural equation modeling, it was hypothesized that healthy work organization is comprised of six interrelated second order latent variables. These include: 1) organizational core attributes, 2) job design 3) organizational climate, 4) job future, 5) psychological work adjustment, and 6) organizational effectiveness. The first of these variables (Core Organizational Attributes) is considered to be exogenous because it is subject to influence by factors outside of the proposed model. Organizations do not exist in isolation; they are subject to a variety of extra-organizational influences, such as economic or market conditions, social-cultural trends, and legislative or legal actions (DeJoy & Southern, 1993). The exogenous variable in this model is viewed as affecting organizational effectiveness through the endogenous variables in the model. The remaining variables are endogenous because their variability is determined by other variables in the model.

Insert Figure 1 about here

The accompanying table (see Table 1) shows the components of the model and their principal constituent elements. Each major component of the model can be described in terms of several variables, and in LISREL terms, these variables can be thought of first order latent variables. Transforming these components and dimensions into a workable theoretical model of healthy work organization requires more than simply devising a diagrammatic representation. In a very real sense, the dimensions of healthy organization identified above are really more "effects" than "causes." Thus, there must be some entity or construct or set of constructs that enable these effects to occur. The present model advances the argument that organization-level action is critical to creating and maintaining the healthy organization. That is, well-designed jobs, supportive organizational climates, and positive career tracks exist largely as a function of the policies and actions pursued by the leaders of the organization. The proposed theoretical model of healthy work organization (see Figure 1) posits that three sets of core organizational attributes drive this process: organizational values, organizational beliefs, and management practices and policies. Values pertain to how the organization views its people and the relative balance between production and employee orientations. At the next level, organizational beliefs involve how the organization views its commitment to and responsibility for employee health and well-being. Presumably, organizational beliefs are derived from the basic values of the organization. The third level focuses on managerial behavior or how the organization's values and beliefs are operationalized into human resources-related policies and programs (Kotter & Heskett, 1992; Jamieson & O'Mara, 1991).

Insert Table 1 about here

Research Design and Methods

Overview

The primary purpose of this research was to evaluate the effectiveness of a field-based intervention designed to improve healthy work organization. This research was conducted with the cooperation of a national Fortune 500 retailer. Four operational districts within the Southern region of this "big box" retailer agreed to participate in the intervention study. Two districts (comprising 11 stores) were assigned to the intervention group, and two districts (10 stores) served as control sites. Treatment and control groups were configured by district to minimize

intervention spillover and to simplify the logistics of onsite facilitation of the intervention and data collection.

Individual stores within this particular retail chain tend to be analogous in basic operations, store layout, and product mix, and range in size from about 150 to 375 employees. Assignment to treatment and control was conducted to make the two sets of stores as comparable as possible in location demographics, employee characteristics, and sales volume. The basic design for this intervention study is presented in Figure 2. Baseline surveys (organizational audits) were conducted at all 21 sites six months prior to the start of the intervention in the treatment stores. This same survey was then re-administered approximately 12 months later (posttest), and again 24 months later (follow up). The intervention commenced in the intervention stores approximately six months following the baseline survey. To simplify logistics and the onsite facilitation of the intervention process, a staggered data collection protocol was followed. Baseline data collection began in two of the districts (one treatment/one control) on March 2000, and in the other two districts on September 2000. Store-level organizational effectiveness data were collected from the company beginning January 2000 for all stores participating in the study. These data were collected through September 2002. The timeline for implementation is summarized in Table 2.

Insert figure 2 and Table 2 about here

Participants

The final sample consisted of 2207 employees at pretest, 1723 at posttest, and 1510 at follow up representing 53%, 44%, and 35%, respectively, of employees at each time frame. Participation rates in the intervention and control sites were similar (56%, 43%, and 36% for intervention sites; 49%, 45%, and 35% for control sites). Table 3 provides summary demographic data for the participants.

Insert Table 3 about here

Surveys were administered at each site during two consecutive work days. Research team members were onsite to coordinate the distribution and collection of surveys. To the extent possible, data were collected on the same days of the week in each store. All store employees, including managers and supervisors were encouraged to complete surveys. All responses were completely anonymous and participation was encouraged but voluntary. Employees were given time on the clock to participate, and were provided with a relatively quiet environment (a training room) in which to complete the survey. Completed questionnaires were deposited into locked storage boxes by the respondents to reinforce confidentiality of the information. The boxes were subsequently retrieved by research tem members or mailed back to the University of Georgia. At the request of the organization, all data collection was to be completely anonymous; hence, it was not possible to track individual respondents across time. In an attempt to examine the impact of this limitation, a question was asked on the posttest and follow up surveys to determine if participants had completed the previous survey(s).

Organizational Health Audit Instrument

One survey instrument was used to operationalize all six higher-order components underlying the theoretical model. The development and validation of the questionnaire consisted

of a four step process which included: 1) selection of candidate measures from the scientific literature, 2) content validation by three subject matter experts from the National Institute for Occupational Safety and Health, 3) exploratory factor analyses, and 4) confirmatory factor analyses (details are available from the authors by request). The description of the scales below follows the order of the categories from left to right in Figure 1. The description begins with the exogenous variables (organizational attributes) and ends with the outcome variables (organizational effectiveness). Unless otherwise indicated, all measures were scaled on a five-point Likert scale.

Organizational Attributes. From the theoretical model, core organizational attributes were conceptualized in terms of three dimensions: organizational values, organizational beliefs, and organizational policies and practices. These three dimensions address the fundamental importance of organization-level action in creating and maintaining healthy work organization.

Values. Values refer to the internalized normative beliefs, which guide behavior and desired end-states within organizations (Rokeach, 1979). While there are different "value sets" (e.g., people, production, etc.), the instrument focused on what O'Reilly, Chatman, and Caldwell (1991) refer to as values with an employee orientation (e.g., tolerance). The six-item measure asked respondents: "thinking about your company or organization as a whole, how characteristic are each of the following traits," and they were subsequently presented the six traits (alpha = .89).

Beliefs. Beliefs entail employees' perceptions as to how the strongly the organization views its commitment to and responsibility for employee health and well-being (Sandroff, Bradford, and Gilligan, 1990; Ribisl and Reischl, 1993). An example from the nine-item scale includes "employees should have a say in decisions that affect how they do their jobs" (alpha = .90).

Policies and practices. An important attribute to reinforcing certain organizational values is the broad (i.e., organizational) policies and practices perceived by employees as the true boundary conditions, which guide their actions. This study focused on three themes underlying policies and practices, which were based largely on the work of Jamieson and O'Mara (1991) and Vandenberg, Richardson, and Eastman (1999). All items regardless of theme asked respondents "to what extent does your company or organization as a whole have specific policies and/or programs in place for . . ." The first theme was policies and practices for high involvement work practices and consisted of 10 items ("incorporating changes or innovations suggested by employees or employee groups;" alpha = .93). The second theme focused on policies and practices facilitating employees' abilities to balance work and non-work issues ("offering EAPs to help employees deal with stress, family problems, substance abuse, etc.;" alpha = .85). The third theme was policies and practices reinforcing safety and health practices ("providing applicable occupational safety and health training;" alpha = .90). The scales for both of the last two themes consisted of four items each.

Job Design. Seven dimensions derived largely from reviews of the job stress literature (Cooper and Cartwright, 1994; Lindstrom, 1994; Sauter, et al., 1990) were included as part of the job design component.

Workload. An employee's workload consists of the daily demands of the work situation. This construct was measured with four items taken from a task demand scale developed by

Klitzman, House, Israel, and Mero (1990). An example of items included: "I am asked to do an excessive amount of work" (alpha = .78).

Control/autonomy. Autonomy is the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out. The three-item scale contained in the Job Diagnostic Survey (Hackman and Oldham, 1975) was applied in the current study (e.g., "my job permits me to decide on my own how to go about doing the work;" alpha = .77).

Job content. Job content is the extent to which the job is viewed as being meaningful, valuable, and worthwhile. A six-item scale (House, McMichael, Wells, Kaplan, and Landerman, 1979) was used to measure this construct ("I have an opportunity to develop my own special skills and abilities;" alpha = .80).

Role clarity. Role clarity is the extent to which an employee's work goals and responsibilities are clearly communicated and whether the individual understands the processes required to achieve these goals (Sawyer, 1992). The four-item scale used to measure this construct was adapted from Rizzo, House, and Lirtzman (1970). A sample item included "there are clear, planned goals and objectives for my job" (alpha = .82).

Environmental and physical work conditions. Based both on the work of Johansson, Johnson, and Hall (1991), and "walk throughs" of the store's work environment conducted by the authors, two scales were created to assess working conditions. The seven-item environmental conditions scale encompassed employees' perceptions of the potential hazards found in their immediate work areas such as the noise and poor lighting (alpha = .84). The five-item physical work demands scale assessed factors such as lifting and repetitive motion (alpha =. 82).

Work schedule. The scheduling of work time encompasses a variety of options such as full or part time, fixed or rotating schedules, and day versus other shift arrangements. The five-item work schedule scale used in this study consisted of items from Morrow, McElroy, and Elliott (1994) with additional items developed by the investigators to reflect scheduling issues unique to the participating company ("my work hours are unpredictable from one week to the next" alpha = .84).

Organizational Climate. This component emphasized the perceptions of employees about their overall work environment, particularly in terms of the climate for support, communication and involvement. Six dimensions were included in this component.

Organizational Support. Organizational support involves the actions undertaken at the organizational level that encourage, bolster, or assist the employees in undertaking their tasks and responsibilities. Eisenberger, Huntington, Hutchison and Sowa's (1986) nine-item global measure was used in this study ("the organization really cares about my well-being" alpha= .91).

Coworker Support. This variable focuses on the informal social/interpersonal relationships that develop among peers. Ribisl and Reischl's scale (1993) was used to measure this construct ("my coworkers care about me as a person" alpha = .92).

Participation with others and with supervisors. Participation, in general, refers to a climate in which employees are encouraged to involve themselves in some meaningful way with

the people in the organization. The three-item involvement with supervisors scale (Vroom, 1959) included items such as "do you feel you can influence decisions of your immediate supervisor regarding things about which you are concerned?" (alpha = .77). The three-item involvement with others scale (Caplan, Cobb, French, Harrison, and Pinneau, 1975) included items such as "I take part with others at my workplace in making decisions that affect me" (alpha = .88).

Communication. This is the extent to which employees see an effective information exchange within the organization. The eight-item communication climate scale was adapted from Vandenberg and colleagues (1999), and included items such as "management gives enough notice to employees before making changes in policies and procedures" (alpha = .86).

Safety and health climate. This involves the degree to which a climate for the safety and health of employees is promoted in the work environment. The seven-item scale used in the current study was a version of the NIOSH Safety Climate Scale (DeJoy, Murphy, and Gershon, 1995). An item from the scale included "there are no significant shortcuts taken when workplace safety and health are at stake" (alpha = .90).

Job Future. Widespread industry restructuring, globalization, changes in employee benefits, and other factors have altered the traditional employer-employee relationship (Rosseau, 1997). To reflect these trends, five dimensions were included in the job future component (the discussion of two, procedural and distributive equity, are collapsed for brevity).

Job security. This variable consists of the employees' perceptions about the likely continuity of their employment with the organization. A five-item scale (Kuhnert, Sims, and Lahey, 1989) was used to measure this variable ("I am afraid of losing my job;" alpha = .79).

Procedural and distributive equity. Equity refers, in general, to perceived fairness. From its long and rich research history, two forms of equity have emerged as important in the study of organizations. Distributive equity represents the perceived fairness attached to the amount of rewards (e.g., merit pay increases) and their allocation along some performance criterion. The current study used the four-item distributive equity scale from Bavendam, Boyer, and Sorensen (1986). An example item is "I am fairly rewarded considering my responsibilities" (alpha = .95). Procedural equity entails the perceived fairness of how the "rules" are applied across people. The six-item procedural equity scale by Greenberg (1986) was used, and included items such as "when pay and promotion decisions are made, all sides affected by the decisions have a say" (alpha = .95).

Learning opportunities. Learning opportunities entail employees' beliefs about available opportunities to learn new skills or keep current skills updated. Five items adapted from Vandenberg et al. (1999) were used to assess this dimension ("I am given a real opportunity to improve my knowledge and skills;" alpha = .90).

Flexible work arrangements. This variable involves the extent to which job requirements limit employees' ability to fulfill various non-work obligations and activities. Bohen and Viveros-Long's (1981) six-item scale was used to measure this construct ("how easy or difficult is it to arrange time to do each of the following on a typical workday" with items including "go to a health care appointment" and "respond to the needs of your children or other family members;" alpha = .87).

Psychological Work Adjustment. The five dimensions for this component were selected on the premise that satisfied, committed, high efficacy, and "low stress" employees contribute positively to organizational effectiveness and are reflective of healthy work organizations.

Job satisfaction. This construct examines how satisfied employees are with their specific work situation, tasks, demands, and responsibilities. The five-item scale (Hackman and Oldham, 1975, 1980) included items such as "generally speaking, I am very satisfied with my job" (alpha = .81).

Organizational commitment. Organizational commitment is the strength of employees' attachment to the company. The nine-item version of the Organizational Commitment Questionnaire (Mowday, Steers, and Porter, 1979) was used to measure this construct ("I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful;" alpha = .92).

Efficacy. Efficacy involves a person's sense of mastery and confidence in their work role. Adapting Spreitzer's (1995) perspective and operationalizations, we utilized two forms of efficacy. Self-efficacy refers to a person's own sense of confidence in their ability to effectively work at their job. This was measured with Spreitzer's three-item scale ("I am confident about my ability to do my job;" alpha = .81). The second form, impact, refers to a person's perception about their ability to meaningfully influence their workgroup or team. Again, Spreitzer's (1995) three-item measure was used ("my impact on what happens in my workgroup is large;" alpha = .88).

Job stress. Job stress focused on the employee's perceptions and reactions to stressors at work. The six-item scale was adapted from Cohen, Kamarck, and Mermelstein (1983), and included items such as "in the last month, how often have you been upset because of something that happened unexpectedly at work" (alpha = .88).

Organizational Effectiveness

For this study, the effectiveness component included two set of measures: a) employee health and well-being, and 2) store-level financial performance.

Employee Health and Well-being

Employee health. Self-reported health was assessed using a single-item adapted from the SF-36 Health Survey (Ware and Sherbourne, 1992). The question asked respondents to rate their overall health from "poor" to "excellent."

Alcohol and tobacco use. Two measures were adapted from the U.S. Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance Survey to assess alcohol and tobacco use. The alcohol measure provided an overall measure of alcohol consumption during a 30-day period. It was the combination of responses to drinking frequency (number of days alcohol consumed per month) multiplied by quantity (number of drinks typically consumed on a day that alcoholic beverages were consumed). Tobacco use was assessed using "yes" or "no" responses to a question asking respondents whether they currently used tobacco (cigarettes, cigars/pipes, or chewing or smokeless tobacco).

Psychological health. Three measures were used here. The first two, adapted from Ilfeld (1978), assessed depressive symptoms, and anger/hostility. Depressive symptoms were represented using seven-items (e.g. feel downhearted and blue, feel lonely; alpha = .86), and anger was operationalized with four items (e.g. feel easily annoyed, feel critical of others; alpha =.87). Respondents were asked to report how often they had experienced these symptoms or feelings during the past month, using a four-point scale: "never," "once in a while," "fairly often," "very often." The third measure, somatic symptoms, included seven symptom states generally associated with stress and/or anxiety (e.g. headache, heart beating hard, sweaty hands). Respondents indicated how often they had experienced these symptoms during the past month (alpha = .89).

Attendance behaviors. This component was operationalized through employees' self-rated turnover intentions, their frequency of absences, and their lateness or tardiness for work. Turnover intention was captured with a single item that queried respondents about their likelihood of leaving the company within the next 12 months. The five response categories were in percent likelihood intervals: 0 to 20% ("not likely"), 21 to 40% ("somewhat likely"), and so forth. Absenteeism was also assessed with a single item that asked respondents to indicate the number of days they had missed work during the previous three months (excluding vacations, holidays, and other scheduled leave). The Tardiness measure assessed how many times the employee had been late for work during the previous month (5-point scale: "never" to "almost daily").

Job performance. Job performance was assessed using two single-item measures. Using 6-point scales ("outstanding" – "unsatisfactory"), respondents were asked 1) how their supervisor had rated their performance during their last performance evaluation, and 2) how they would have rated their own job performance during that same time period.

Workplace safety. Three single-item measures were used. The first question asked about number of workplace accidents they had experienced during the previous 12 months. Second, they were asked to judge their overall perceived level of safety at work ("very safe" – "very unsafe"). And third, respondents were asked whether their work performance had been limited during the previous 12 months by any injury or health condition ("yes"-"no").

High risk status. High-risk status was an index used to operationalize the degree to which an employee was at risk of contracting a severe disease or illness. It was created from several measures tapping whether or not employees used tobacco products, whether or not they had high cholesterol, high blood pressure or other risk factors for major diseases, and whether or not they engaged in vigorous exercise. It was coded such that higher scores denoted greater risk.

Preventive behaviors. A similar procedure was used to create an index of preventive behaviors. Briefly, both genders were asked how frequently they were examined by medical professionals for high blood pressure and cholesterol (1 – "never had an exam" to 5 = "within the past 12 months"). Similarly, both sexes were asked whether they protect themselves from sun exposure and had flu shots. For males, their responses to the latter four "baseline" questions plus another denoting whether they were screened for testicular cancer were averaged together. For females, their responses to the four "baseline" questions were averaged also with their responses to questions regarding the frequency with which they had pap smears, physical breast examinations, and mammograms. Responses were coded such that the higher the score, the greater their engagement in preventive behaviors.

Financial Performance

The selection of objective criteria, particularly financial measures, is complicated by the fact that many of them are not strongly influenced by what the employees may or may not do because of an organizational intervention or change. For example, investments into inventory or of assets into some capital gain mechanism are not decisions that have any input from the general employee population. Input as used in the last statement means either direct input such as communicating some informed opinion, or indirect input such as changing employee behavior. Rather, these are dictated by decisions made by store management sometimes, and by professionals in the corporate environment most of the time. As such, store management was consulted to identify a set of objective criteria that would most likely be influenced by changing employees' perceptions of the various dimensions and attributes characterizing the workplace model as a function of the intervention process. In this vein, four objective measures were selected:

Employee turnover. The percentage rate of employees leaving at the end of a given month. It is calculated by dividing the number of employees who quit the organization by the end of the month with the total number of employees in the organization at the start of that month.

Comparable sales. The percentage increase or decrease in sales at the end of month relative to the same month in the previous year. It is calculated by subtracting sales for a given month from the sales of the same month in the previous year, and dividing that difference by sales of the same month in the previous year.

Sales per labor hour. An actual dollar amount representing the average sales in a given month for each labor hour expended in that month. It is calculated by dividing sales at the end of the month by labor hours used during that month.

Average ticket. An actual dollar amount representing the average receipt in a given month for each employee in the store. It is calculated by taking the total cash register receipts at the end of the month and dividing by the number of store employees.

Intervention: Data-Driven Problem-Solving Teams

Our healthy work organization intervention represents the combination of principles and techniques from total quality management (TQM), worker involvement, and community engagement. The emphasis on problem-solving comes largely from TQM (e.g., Dean & Evans, 1994; Deming, 1986; Waldman, 1994), however, we rely strategies from worker involvement (e.g., Lawler, 1986, 1992) and community engagement (e.g., CDC, 1997) to implement and facilitate the problem-solving teams. To a considerable extent, TQM was developed as a management-driven and management-led process. We wished to retain the data-driven and problem-solving aspects of TQM, but to make it a more inclusive and participatory process. To accomplish this, the problem-solving teams must provide opportunities for meaningful participation on the part of employees at all levels of the organization; there should also be opportunities for open communication and information exchange; and employees should gain a sense of empowerment in the workplace. Information, involvement, and resources are the underlying principles that provided the foundation for the strategies that were incorporated throughout the intervention process. Figure 3 highlights the key aspects of the intervention process.

Insert Figure 3 about here

The intervention was designed to build capacity for employee participation and decision-making, and create a healthier work organization. Specifically, an employee problem-solving team, called the "ACTion Team," was organized within each intervention store. Consisting of approximately 8 to 12 employees, the ACTion Team was founded on the premise of creating a shared, mutual relationship between store employees and management for the purpose of improving employee health and well-being and store effectiveness. The ACTion team members came from all departments and organizational levels within the store. Team members could be either full- or part-time employees, and no minimum length of employment was required for participation. An important goal in constructing teams was to create teams that were broadly representative of the employees in each store. Store managers were not eligible to participate on the team, but all teams had one member from upper management and at least one from middle management on the team. The teams were charged with developing, implementing, and evaluating a tailored plan of action for addressing the issues or problems identified within the store. With assistance from trained facilitators provided by the research team, the ACTion team developed their action plans using a five phase problem-solving process: familiarization, skill building, prioritization, action, and reaction (see Table 4). An intervention team manual provided guidance and resource materials for the teams as they worked their way through the successive stages of the intervention process.

Insert Table 4 about here

In the familiarization phase, the roles and responsibilities of the team were explained and discussed. In addition, the timeline for the project was presented, and the entire six month intervention process was described. Goals for the team were suggested and determined by the team members and the intervention facilitator. Information dissemination (i.e., feedback reports, team minutes) was discussed as well as what support could be expected from the facilitator. In the skill-building phase, certain roles were determined (e.g., team captain, recorder, project liaison), and a regular weekly meeting time was set. Ground rules for the team were established, including that key decisions would be decided by majority vote, that all opinions should be respected, and that team conversations should remain confidential unless otherwise decided by the group. In the skill-building phase, a variety of structured activities were used by the facilitators, directed at improving team communication and cohesiveness (team mapping, mirroring, etc.), as well as developing problem-solving (e.g., weighing pros and cons), time management (e.g., prioritizing tasks), and conflict resolution (anger control, negotiation, etc.) skills.

Using the baseline survey results for their store, the ACTion team identified issues to be addressed in the prioritization phase and began developing an action plan to tackle top priority issues. The facilitator helped the team through a systematic set of activities that involved: 1) brainstorming to identify salient issues, 2) issue clarification exercises to determine and understand the mediating factors impacting those issues, 3) priority matrices (i.e., importance versus changeability) to prioritize identified issues, 4) strategy matrices (i.e., feasibility versus impact) to design solutions, and 5) construction of an initial work plan for the team's efforts.

In the action phase, the ACTion team developed a detailed work plan to meet team goals and address the identified priority issues. This action plan specified the strategies that would be employed for improving each store issue, the tasks that would be completed, who would perform

the required work, when the tasks would be completed, follow-up steps needed, and evaluation procedures. Action plan worksheets were used to help map out the necessary steps for addressing the store's priorities and for informing the rest of the workforce about the team's initiatives and progress. The action plans were discussed at regularly scheduled store meetings (which all or most employees must attend) and posted in the store's employee break room to foster maximum awareness of the team's activities and to widen employee participation and input. Finally in the reaction phase, the ACTion team reviewed the action plan, monitored progress, and communicated with each other and the rest of the store's employees concerning what steps were being taken to refine and adjust the overall action plan.

As the team became established, the level of facilitation was gradually reduced in an effort to help the teams become more independent and self-sustaining. Although all intervention stores used this same five-stage intervention process and intervention manual, specific activities and initiatives undertaken varied from site to site based on identified needs and specific action strategies adopted by the teams. In control stores, teams were not formed and organized activities or consultations were not provided.

Process Evaluation

Evaluation of the intervention process consisted of 1) detailed notes kept by the intervention facilitators throughout the process, 2) surveys of the intervention team members conducted at the end of the intervention, 3) ratings of intervention dose by the facilitators at the end of the intervention, and 4) interviews conducted of randomly selected team members and employees three months after the intervention. Intervention facilitators were required to complete a detailed summary of each session immediately following the conducted session. In addition, the facilitators met as a group with the project coordinator each week to discuss the intervention implementation and revise their notes as needed. Participation in the team member survey was voluntary and anonymous, although all team members present at the time agreed to complete the survey (95% of participating members). At the end of the intervention, the facilitators met with the project coordinator to discuss and assign a rating of the intervention dose at each site. Previously established criteria for each category were used to assign the rating. Participation in the interviews on the part of the team members and employees at the site was voluntary and anonymous. Interviews were conducted, taped, transcribed, and summarized by project staff trained in interview techniques and qualitative analysis, but who had not been associated with the intervention.

The process measures including the ACTion team survey, the facilitator summaries, and intervention dose criteria were developed entirely by the investigators for use in this study. The team survey included measures of participation, commitment, barriers, communication, management support, organizational support, and individual development, all related to the intervention process. The intervention dose criteria, adopted from other studies (Dusenbury, Brannigan, Falco, and Hansen, 2003; Patterson, et al., 1997), looked at the extent of involvement in the intervention by each site. Since this study encouraged organizational as well as individual involvement, the criteria were expanded to capture involvement at a variety of levels including top management and middle management support, team cohesiveness, communication, participation, and leadership, and employee awareness and support. Since information concerning employees' personal beliefs, opinions and insights about the intervention can be important, semi-structured interviews were chosen. The semi-structured interview technique builds into the questions sufficient flexibility to capture insights that may otherwise be lost with the imposition of structured questions (Connell, Lynch, & Waring, 2001).

Results

Cross-sectional Test of the Theoretical Model of Healthy Work Organization

The first set of analyses was performed to test the theoretical model guiding this research. The baseline organizational audit data provided the data sets for these analyses. Although several authors have tried to identify and describe the job and organizational characteristics associated with healthy organizations (e.g., Cooper and Williams, 1994; Danna and Griffin, 1999; Sauter, et al., 1996; Smith, et al., 1995), there has been little systematic analysis of the hypothesized characteristics and/or their relationship to relevant outcome measures. Figure 4 showed the model as initially tested. The far right portion of the figure shows the outcome or effectiveness measures used in these analyses.

Insert Figure 4 about here

The test of the theoretical model of healthy work organization was conducted in two phases. Study 1 was conducted using baseline survey data collected at nine locations. It was designed as a test of the model described earlier in this report. Study 2 was conducted using baseline data from the remaining 12 locations and was based on a revised model. Revisions on the second model were based on the results of the test of the first model. The primary goal of the studies was to test the fit of the proposed conceptual model. A second goal was to test the relationship among the second order constructs of the proposed model (see also: Vandenberg, Park, DeJoy, Wilson, & Griffin-Blake, 2002).

Study 1

Subjects and data collection. The sample for Study 1 consisted of 1130 employees, which represented 53% of all employees in the nine locations. Given that our model was ultimately examined using structural equation modeling procedures, the expected maximization (full information maximum likelihood) multiple imputation procedure (LISREL Version 8.5; Du Toit and Du Toit, 2001) was applied to impute the missing values. As a point of reference, only 4% of the total number of responses were missing.

Analytic procedures. The analyses were guided by the two-stage process outlined in Gerbing and Anderson (1987): a) tests of the measurement models followed by b) the tests of the hypothesized associations among the constructs. All analyses were undertaken using the AMOS structural equation modeling program (Arbuckle and Wothke, 1999) and utilizing the variance/covariance matrix. Taking into consideration the complexity of the model, six fit indices were used: chi-square goodness of fit test, chi-square to degrees-of-freedom ratio, standardized root mean square residual (SRMSR), root mean square error of approximation (RMSEA; Steiger, 1990), Tucker-Lewis Index (TLI; Tucker and Lewis, 1973) and the Relative Noncentrality Index (RNI; McDonald and Marsh, 1990).

Results. The means, standard deviations and correlations among the primary variables are reported in Table 5. The diagonal elements represent the internal consistency reliability coefficients (all were above .70).

Insert Table 5 about here

With respect to the seven tests of the measurement models, these are represented by the first seven rows of Table 6. Looking first at the tests of the six major model components, generally good fit may be inferred among the different model components when the dimensions of the components are tested relative to one another. Exceptionally strong fit was observed for the job future and organizational effectiveness components. In contrast, the fit was least strong, but still acceptable, for the employee perceptions and organizational attributes components of the model as indicated particularly by their chi-square to degrees-of-freedom ratios.

Insert Table 6 about here

The seventh row of Table 6 contains the fit indices for the test of the measurement model including all dimensions. Three of the fit indices suggested very strong fit: the chi-square to degrees-of-freedom ratio, the RMSEA, and SRMSR. In contrast, the TLI and RNI fell somewhat below the .90 standard to infer strong fit. The values for the TLI and RNI were not wholly unexpected as these indices heavily penalize complex models.

The third to the last row in Table 6 provides the fit indices for the tests of hypothesized associations among the model components presented in Figure 4. As indicated there, the addition of 522 more degrees of freedom (representing the difference in d.f. from the "big" measurement model to the hypothesized one) had little impact on the values of the fit indices relative to those observed from testing the "big" measurement model. The increased complexity had, as expected, the biggest impact on the TLI and RNI. All in all, while taking into consideration the complexity of the hypothesized model, we were satisfied with its fit to the data, and thus, not concerned that the model was misspecifying the relationships among the variables. As such, the path coefficients could be meaningfully interpreted.

In this vein and turning now to the top two-thirds of Table 7, the results indicate that the specification of the second-order variables was very successful. In brief, all of the first-order dimensions had statistically significant loadings on their respective second-order factors, and the signs of the obtained estimates were all in the expected directions. Strong support, therefore, was observed for specifying a common overriding, 2^{nd}-order latent construct for each set of the first-order dimensions. That is, there was a systematic source of common variation across each of the dimensions within a set after accounting for the systematic variance within a dimension, and that would have normally been pushed into the error term if the tests of hypotheses had only been conducted at the 1^{st}-order level (i.e., the traditional test).

Insert Table 7 about here

As observed in the bottom 3^{rd} of Table 7, all of the hypothesized relationships were completely supported with one exception – organizational climate to psychological work adjustment. Specifically, the second order organizational attributes component had statistically significant and positive associations with the second order components of job design, organizational climate and job future. Hence, as organizations strengthen their attributes (their policies regarding employee involvement, safety and health, values concerning people, etc.), we can fully expect to see a corresponding strengthening of perceptions regarding the way people relate to the job (the degree of autonomy, etc.), regarding the climates in the organization (for communication, involvement, etc.), and regarding their future in the organization (job security, opportunities to learn new things, etc.).

Similar support was observed for the relationships from job design and job future to work adjustment. Therefore, a strengthening in job design (i.e., increasing its positive attributes such as autonomy and decreasing its negative attributes such as workload) is associated with a strengthening in psychological work adjustment (i.e., increases in its positive attributes such as job satisfaction and decreases in its negative attributes such as job stress). Similarly, a strengthening in job future (increasing job security, learning opportunities, etc.) would be associated also with a strengthening in psychological work adjustment.

Additionally, as we strengthen psychological work adjustment (i.e., increase its positive attributes such as job satisfaction and decrease its negative attributes such as job stress), we see corresponding decreases in psychological risk, alcohol consumption, tobacco use, intentions to quit, and absenteeism, and increases in perceptions of general health. Indeed, an examination of the unstandardized coefficient for alcohol consumption (-4.7) indicates that for every unit of strengthening in work adjustment, employees consume approximately five less drinks per month. In a similar vein, tobacco use gets closer to zero (the unstandardized coefficient was -.04) with a corresponding unit strengthening in work adjustment.

The exception within the hypothesis tests was the failure to support a positive association between climate and psychological work adjustment. In developing our theoretical model, organizational climate was viewed as one of the three domains of healthy work organization, along with job design and job future (DeJoy & Wilson, 2003). This conceptualization was largely consistent with the core themes noted in previous research on healthy work organization. However, an alternate view of organizational climate is also possible, namely that climate is a surface manifestation of the core attributes of the organization. Support for this position can be found in discussions of the differences and similarities between organizational culture and organizational climate (e.g., Moran & Volkwein, 1992; Reichers & Schneider, 1990; Schein. 1985). Within our model core organizational attributes (values, beliefs, etc.) essentially reflect the culture of the organization, and these attributes can be viewed as leading to supportive or non-supportive climates. The organizational climate, in turn, shapes the immediate work situation (i.e., job design and job future). The constituents of organizational climate in our model also seem consistent with this alternative view. Our second order climate factor is not limited to organizational and social support, but also includes measures of employee involvement, communication, and personal safety and health. These fundamental organizational processes are typically thought to have broad influence on the work experience within the organization, and thus organizational climate could reside logically as an intermediate factor between core organizational attributes and job design and job future (Figure 5).

Insert Figure 5 about here

Accepting the above as a post-hoc rationale, we respecified the model as shown in Figure 5, and re-conducted the analyses. The fit indices for this re-analysis are presented in the next to the last row of Table 6. The fit indices completely supported this model, and indeed the difference in chi-square between this model and the hypothesized one is statistically significant. Hence, the post-hoc model possessed a slightly stronger fit to the data than did the original model. Further, the findings in the top two-thirds of Table 8 under the column labeled “study 1: post hoc” mirror the corresponding ones from Table 7. Thus, while there would be no statistical reason for expecting otherwise, the respecification of model indicated strong support for the 2nd-order variables. Most importantly, the bottom one-third of Table 8 for the post-hoc study indicated strong support for the associations among the 2nd-order variables. That is, organizational attributes possessed a positive and statistically significant association with the

climates within the organization, which in turn had positive and statistically significant associations with both job design and job future.

Insert Table 8 about here

In conclusion, it appears that organizational climate operates as a intermediate factor between core organizational attributes and the job design and job future domains, helping to shape the overall work situation experienced by employees. However, recognizing that the above analyses were fully post-hoc, confidence in the reliability of those findings remains problematic until another study can be conducted. As such, we undertook Study 2 representing an a priori test of the respecified model.

Study 2

Subjects and data collection. The sample for Study 2 consisted of 1078 employees in 12 different locations of the same retail organization as Study 1. The respondents represented 47% of the total employee population in these locations. The data were collected approximately 6 months after Study 1 using the exact same procedures.

Analytic procedures. The measures administered in Study 2 were identical to the measures employed in Study 1. Also, the same analytic procedure used in Study 1 was adopted for Study 2. Missing data were handled in the same fashion as described in Study 1 resulting in 956 usable respondents.

Results. The means, standard deviations and correlations among the variables for the new sample are presented in Table 9. As observed in Study 1, the reliabilities of each dimension (presented in the diagonal) were quite high and within the .70 standard used to infer strong reliability.

Insert Table 9 about here

Clearly, as evidenced by the fit indices in the last row of Table 6, the respecified model fit the new data. The fit was comparable to and even slightly stronger than that observed in Study 1. Hence, we could proceed with meaningfully interpreting the observed parameter estimates which are presented in Table 8 under the column labeled “study 2: a priori”. The specification of the second-order latent variables for each of the item sets was again very successful. Indeed, a quick glance of the observed estimates (top 2/3rds of Table 8) notes that the absolute values were very similar to those observed in Study 1, and of the same rank order. Thus, the second-order constructs appear to generalize across time and samples lending support to their overall validity.

Most importantly, the hypothesized associations among the second-order variables were completely supported. Hence, as organizations strengthen their attributes (their policies regarding employee involvement, safety and health, values concerning people, etc.), they can expect to see a corresponding strengthening of perceptions regarding the climates in the organization (for communication, involvement, etc.). In turn, as employees’ perceptions regarding the climates within the organization are raised there is an associated increase regarding the way people relate to the job (the degree of autonomy, etc.), and their future in the organization (job security, opportunities to learn new things, etc.).

Similar support was observed for the relationships from job design and job future to psychological work adjustment. Therefore, a strengthening in job design (i.e., increasing its positive attributes such as autonomy and decreasing its negative attributes such as workload) is associated with a strengthening in employees work adjustment (i.e., increases in its positive attributes such as job satisfaction and decreases in its negative attributes such as job stress). Similarly, a strengthening in job future (increasing job security, learning opportunities, etc.) would be associated also with a strengthening in employee work adjustment.

With one exception, the associations among the second-order work adjustment variable and each of the single-item outcome variables were supported as well. That is, as we strengthen psychological work adjustment (i.e., increase its positive attributes such as job satisfaction and decrease its negative attributes such as job stress), we see corresponding decreases in psychological risk, alcohol consumption, intentions to quit, and absenteeism, and increases in perceptions of general health. Indeed, an examination of the unstandardized coefficient for alcohol consumption (-5.1) indicates that for every unit of strengthening in work adjustment, employees consume approximately five less drinks per month. The exception was the association to tobacco use. Unlike Study 1, employee perceptions had no significant impact on employees' use of tobacco.

Discussion and Implications

The results are consistent with, and provide support for, the proposed healthy organization model. Clearly, work characteristics influence psychological work adjustment factors that ultimately affect employee health and well-being. Although considerable previous research has supported the association between certain work characteristics and various measures of health and well-being, this research is the first to provide empirical support for a comprehensive model that explains the nature of the relationships among these highly researched constructs. Due to the cross-sectional design of the study and the complexity of the interrelationships among the proposed variables, a cause-effect relationship should not be inferred from these findings. However, this is an important first step to understanding how organizational actions impact employees.

The initial proposed model demonstrated good fit overall as well as significant associations among most of the hypothesized second-order latent variables. Unexpectedly, the one relationship that was not supported was between organizational climate and psychological work adjustment. Clearly, dropping organizational climate from consideration in our model was not a credible option. It would be quite difficult to argue that organizational support, communication, and participation factors have no impact on an organization or its employees. What was originally overlooked was that the climate constructs measured in this model were actually drivers of other work characteristics that ultimately drive psychological work adjustment factors. Consequently, the second model was hypothesized with organizational climate providing the foundation for the job design and job future dimensions. This model was supported in a post-hoc analysis using the first study data and validated in a second study on an entirely new sample. Rarely do you see a complex model of this nature where all hypothesized associations among second-order constructs and second- to first-order constructs demonstrate statistical significance.

Intervention Effectiveness

Although this particular company had demonstrated an impressive record of sustained growth and financial success during the previous two decades, this research actually took place during a period of significant leadership transition, and in an economy that negatively affected most business sectors nationwide. The following major corporate or world events took place during the conduct of the study: 1) new CEO hired from outside of retail (December, 2000); 2) new executive VP for human resources hired from outside of retail (March, 2001); 3) major new operational changes implemented (June, 2001); 4); 4) Terrorist attack on U.S. (September, 2001); 5) significant economic recession (officially, March to November, 2001) and subsequent slow recovery; 6) broad-scale changes in corporate-wide HR policies (January, 2002); Southeast regional headquarters closed and some staff relocated to corporate headquarters (February, 2002); major changes made to corporate performance review process (March, 2002); and the U.S. war against Afghanistan (February, 2002).

The principal purpose of this research was to examine the effectiveness of a broad-based healthy work organization intervention involving a data-driven and participatory problem-solving process. Specific Aim 1 focused on assessing the impact of the intervention on employee health and well-being and financial performance. Employee health and well-being were assessed in terms of two sets of measures: 1) employee health and well-being, and 2) store level financial performance. These measures served as the principal assessment of intervention effectiveness.

However, from our preliminary work, we reasoned that improvements in work organization would require changes in the traditional employer-employee relationship. Thus, Specific Aim 2 posited that the intervention worksites (relative to the controls) should show positive changes in the dimensions of organizational climate, particularly those pertaining to participation and communication. Since the problem-solving teams were charged with developing action plans to remedy deficiencies and other problems at their worksites, we expected that the positive treatment group effects would spill-over to other dimensions of organizational climate (e.g., organizational support, safety and health climate). To some extent, this second aim provided a check on manipulation effectiveness and allowed us to explore how the intervention exerts its effects on the principal outcome measures discussed above.

Specific Aim 3 explored the impact of the problem-solving intervention on the primary exogenous and endogenous components in our theoretical model of healthy work organization. Here, intervention and control stores were compared in terms of changes in the remaining components of our theoretical model: 1) organizational attributes; 2) job design, 3) job future, and 4) core organizational attributes.

Analytic Procedures

Tests for demographic differences. The general purpose of these analyses was to determine whether there were differences between the intervention and control store samples in the proportion of respondents by race and gender, and in the means for age, job tenure and education. With respect to race and gender, a Mann-Whitney test of differences (a nonparametric test) was conducted within each of the three periods of data collection between the intervention and control stores. In summary, no statistically significant sample differences were detected between the intervention and control stores in either race or gender within the three time intervals (Z-values for Time 1, Gender = -.636 & Race = -.581; for Time 2, Gender = -

.828 & Race = -1.378; for Time 3, Gender = -.018 & Race = -1.727). Thus, there was no need to control for these characteristics in the analyses of intervention effectiveness.

To test whether there were mean differences between the control and intervention samples in age, job tenure and education, univariate analyses of variance were conducted on each of those variables within each of the time periods. Recalling that anonymity constraints precluded the ability to track respondents across time, it was not possible to conduct a repeated measures analysis of variance at the individual level. However, respondents were asked at Times 2 and 3 whether or not they had completed the survey during a previous administration. Their response to this variable was included as a covariate to control somewhat for the correlation across time from simply administering the survey to the same individuals. With respect to age, no statistically significant differences were found at each time period (Time 1, $F[1, 1527] = .12$; Time 2, $F[1, 1547] = 2.83$; Time 3, $F[1, 1260] = 3.29$). Similarly, no differences emerged within each time period for job tenure (Time 1, $F[1, 1527] = 2.85$; Time 2, $F[1, 1547] = .698$; Time 3, $F[1, 1260] = 1.77$). In contrast, education was statistically significant within all 3 time periods (Time 1, $F[1, 1527] = 13.14$, $\underline{p} < .0001$, $r^2 = .009$; Time 2, $F[1, 1547] = 4.00$, $\underline{p} < .05$, $r^2 = .003$; Time 3, $F[1, 1260] = 15.06$, $\underline{p} < .0001$, $r^2 = .01$). Given the lack of differences between the intervention and control samples on age and job tenure, there was no need to control for them in the tests for intervention effects. Further, it was also decided on practical grounds that there was no need to also control for education. That is, while the F-values were statistically significant, the r-square values indicated that there was little practical significant difference between the intervention and control samples in education. Namely, the statistical significance is due to the large sample sizes at each time period, but the r-square values indicated that in 2 out of 3 cases, less than 1% of the variance in education was being accounted for in the tests by differences between individuals in the intervention and control groups. Therefore, due to the nature of the analysis undertaken below where degrees of freedom were absolutely critical, it was decided not to control for education which would have used one of the degrees of freedom in that role given that there was little practical to gain from its control.

Main tests of intervention effectiveness. In all cases, these analyses were conducted at the store level - first on the aggregated perceptual variables, and second on the objective financial measures. The fact that there were only 21 stores in the database had two primary implications for the analyses. The first was the small number of degrees of freedom. Hence, including additional variables other than the code representing intervention vs. control group status had to be severely curtailed, as each additional variable uses at least one of those degrees of freedom. The second implication was power. Power impacts the researcher's ability to accept the null hypothesis when it is true. Hence, interpreting null findings in the following analysis is problematic at this point. However, it does not impact one's ability to interpret statistically significant findings. Indeed, observing statistically significant effects with a small sample is a positive testament to the magnitude of those effects.

All analyses in this phase were 2 by 3 repeated measures of analyses of variance with the 3-level factor representing the three times of measurement of a given variable, and the 2-level factor representing codes for intervention and control stores. Interest was with detecting a significant treatment (control vs. intervention) by time interaction with a pattern favoring the intervention group over the control group of stores. With respect to the analyses on the perceptual variables, codes representing the SPI initiative (1 and 2) and store profits were entered as control variables in all analyses. The SPI initiative involved significant change in store operations (initiated by the new senior management) that were initiated midway through our project.

Controlling for store profitability is a common practice within the organizational sciences when analyzing variables representing employee perceptions of various workplace attributes that have been aggregated to the higher-unit level (e.g., Vandenberg, et al., 1999). The basic rationale for doing so is that the climate or culture of a store is dictated in some degree by the profits. For example, more profitable stores can perhaps literally afford to permit employees to engage in the discretionary activities characterizing the present intervention or change process. Less profitable stores may hinder or constrain participation. Further, profitable stores could, for example, have an overall happier and/or more motivated work force simply because people like working in or being associated with things that are doing well. The main point, though, is that controlling for store profitability removes those possibilities as potential alternative explanations for the findings, at least with respect to the perceptual, aggregated variables. The SPI variable, but not profitability was entered as a control variable in the analyses of the objective financial measures. Not controlling for profit was necessitated by the fact that profit is typically a component in the calculation of those financial measures. Thus, controlling for it removes a critical component going into that calculation.

Results

As will be seen, the results across the three time periods generally showed declining levels for most of the measures assessed. This research took place during a time of unprecedented and rather sudden change within this organization, especially in terms of leadership when the legendary founders of the corporation voluntarily relinquished control to a hand-picked leadership team brought in from outside of retail. This transition, combined with economic recession and unsettling world events, made for a challenging time of change and uncertainty for many employees.

Effects of the intervention on organizational climate indices (Aim 2). As can be seen in Table 10, significant treatment x time interactions were obtained for communication and workplace safety and health, and an interaction approaching significance was observed for organizational support ($p < .08$). The two significant interactions are plotted in Figure 6a and b. It appears that the intervention process buffered or had a braking effect on the negative trends that were occurring within the organization. This impact took some time to develop and became apparent only after the first follow up survey.

Insert Table 10 and Figure 6a-b about here

Effects of the intervention on employee health and well-being (Aim 1). Separate repeated measures ANOVAs were computed for each of the employee health and well-being measures used in the model test analyses (perceived health, depressive symptoms, anger, alcohol use, tobacco use, and somatic stress symptoms). These measures were supplemented by four additional measures. Two of these measures pertained to workplace safety: number of workplace accidents and perceived safety at work. The other two measures assessed preventive health behaviors and high risk status. The ANOVA results are presented in Table 11. There were no significant interaction effects for any of these measures.

Insert Table 11 about here

Effects of the intervention on worker behavior (Aim 1). For these analyses, the two employee attendance measures used in the model test (turnover intention and absences) were

supplemented with a measure of lateness or tardiness. In addition, two measures of self-rated job performance were also assessed. Respondents were asked how their supervisor had rated their job performance at their last evaluation, and how they would have rated it. The final measure of worker behavior was work limitations. Respondents were asked whether their work performance had been limited by any injury or health condition. The ANOVA results are presented in Table 12. There were no significant interaction effects for any of these measures.

Insert Table 12 about here

Effects of the intervention on financial performance and employee turnover (Aim 1). In as much as the effects from an intervention process are not immediate, but rather lagged, to become pervasive enough to impact objective data, it was decided to use the objective data from the third month after the survey data were collected. The mean values from each of the objective measures are presented in Table 13. Of the four objective measures, however, only the time by treatment interactions for sales per labor hour and employee turnover were statistically significant. In both cases, the outcomes favored those stores receiving the intervention. That is, looking at the trends from Time 2 (which represents the survey administration closest to the intervention process) to Time 3, it should be noted that the intervention stores experienced an increase in sales per labor hour and a leveling of employee turnover. In contrast, control stores during that same time period experienced a decline in sales per labor hour, and an ever increasing rate of employee turnover. These trends are graphically displayed in the Figures 7a and b.

Insert Table 13 and Figures 7a-b about here

Effects of the intervention on the other exogenous and endogenous components of the theoretical model (Aim 3). In these analyses, we computed repeated measures ANOVAs using the various dimensions of job design, job future, psychological work adjustment, and organizational attributes as dependent variables. The purpose of these analyses was to determine if the intervention process have brought about any changes in these factors. For example, work scheduling is almost always an issue in retail because stores are open seven days a week and some of the busiest times are in the evenings and on weekends. Also, in this segment of retail, the early morning periods can also be quite busy. As such, we might expect that scheduling would be targeted by the problem-solving teams, and over time, changes would be apparent in how employees perceived this dimension of their workplace.

Results for the seven dimensions of job design are presented in Table 14. Significant treatment x time interactions were obtained for job content and work schedule; the interaction for role clarity fell just short of the .05 level ($p < .06$). The results for job content and work schedule are plotted in Figure 8a and b. Once again, the buffering effect of the intervention seems to be operative for job content, but the work scheduling effect shows a steep improvement or reversal in the intervention stores between the first and second follow up surveys.

Insert Table 14 and Figure 8a-b about here

Results for the job future dimensions are shown in Table 15. Significant interactions were obtained for learning opportunities and procedural equity. The interaction results for the other measures showed a similar pattern of effects, but only flexible work arrangements came close to statistical significance ($p < .08$). Plots for the significant interactions can be found in

Figures 9a and b. Again, we see diminished negative trends or reversals in the interventions stores as compared to the control stores.

Insert Table 15 and Figure 9a-b about here

For the five dimensions of employee work adjustment, effects approaching significance were observed for three of the dimensions: job satisfaction ($p < .09$), organizational commitment ($p < .09$), and perceived stress ($P < .10$). Table 16 summarizes these results.

Insert Table 16 about here

Core organizational attributes, the exogenous variable in our model, was assessed in terms of five dimensions. The ANOVA results for these measures are presented in Table 17. Significant interactions were obtained for involvement policies and organizational values. Once again, the plots of these interactions (see Figure 9a-b) suggest that the intervention process had a positive impact on these dimensions.

Insert Table 17 and Figure 10a-b about here

Discussion and Implications

The primary purpose of this research was to develop, implement, and evaluate a healthy work organizations intervention. Intervention effectiveness was evaluated in terms of several sets of outcome measures: organizational climate, work behavior, employee health and well-being, and financial performance. Impacts on the exogenous and endogenous components of the theoretical model were also examined. One one way or another, all three specific aims dealt with intervention effectiveness.

Specific Aim 1 focused on assessing health and well-being and financial outcomes. There were no intervention effects on any of the employee health and well-being measures. However, significant treatment x time interactions were obtained for two of the four financial measures: sales per labor hour and employee turnover. In both cases, the outcomes favored those stores receiving the intervention. There were no effects for the other two financial measures: comparable sales or average ticket. Specific Aim 2 hypothesized that intervention should operate by changing store climate. Consistent with this, significant interactions were found for the communication and workplace safety and health dimensions of organizational climate; the interaction for organizational support was marginally significant. The pattern of results suggest that the intervention provided a buffering or braking effect on the negative trends that were apparent in all stores. Regarding Specific Aim 3, significant treatment x time interactions were found for several job design and job future dimensions, again revealing beneficial intervention effects. Several additional job design and job future effects fell just short of significance. For psychological work adjustment, interactions approaching significance were obtained for job satisfaction, organizational commitment, and work stress. Finally, among the core organizational attributes, significant interactions, favoring the intervention, were obtained for involvement policies and organizational values.

In summary, the intervention seemed to operate as intended. The lack of stronger effects on the principal outcomes was at least partially due to the small number of stores (21 stores). But more importantly, this research took place during a time of unprecedented change and uncertainty for this corporation, including transitions of senior leadership, economic recession,

severe competitive and market pressures, and major world events. Reflective of this, virtually all of the measures tracked declined substantially across the three measurement periods. As will be seen below, the process evaluation showed that the team process was well-received, but that some difficulties were encountered in sustaining and fully integrating the team process, and in actually being able to make operational changes within the stores.

Process Evaluation

Facilitator notes. The detailed notes taken by the facilitators during the intervention process emphasized differences among sites with respect to the issues that were identified, the way those issues were prioritized, and the specific actions taken to resolve those issues. There were some similarities across sites with communication, work schedule, and coworker support being identified as key issues across multiple sites. Other issues identified less frequently included: participation, pay and promotion equity, working conditions, safety, management support, job satisfaction, job security, teamwork, and employee recognition. These issues coincided with the areas showing less positive responses on the baseline survey.

Also, as expected, there was considerable variation in the action strategies that the teams chose to implement. Three sites tried pass down books as a means for improving communication, two used bulletin boards in the employee break room, two developed newsletters to keep employees informed, and three used suggestion boxes. Every site chose at least three different issues to work on and proposed three or four different strategies for dealing with the identified issues. During this time there was an organization wide initiative being planned that was going to impact work scheduling. Hence, most of the teams placed the work schedule issue on hold to see what would happen as a result of the organizational initiative.

Survey of ACTion teams. ACTion Teams were surveyed at the end of the facilitated portion of the intervention process to assess their perceptions of the process and its overall success. In general, team members rated the teams high in participation and communication, particularly with respect to team members, intervention facilitators, and store management. Rated less positively on these attributes were coworkers and department supervisors. When asked what the ACTion Team "had done a good job of doing", the highest levels of satisfaction were with identifying problem areas, setting priorities, and devising effective solutions. As can be seen in Figure 11, there was less satisfaction about being able to make actual changes in their stores. When the Team was asked what they personally gained by participating on the ACTion Team, the most frequent responses were having a chance to express my views and learning more about the company. These responses are presented in Figure 12. Finally, when asked how they would rate the success of the ACTion Team all things considered, 74% indicated very good or excellent (Figure 13).

Insert Figures 10, 11, and 12 about here

Intervention site ratings. Each intervention site was rated in terms of the following factors: : store manager support, assistant manager/department head support, team cohesiveness, team communication, team participation, team leadership, employee support, employee knowledge of team activities, and team support of intervention process. Ratings were made by the intervention facilitators using a 4-point scale ("barely present/ insufficient" to "high/excellent"). The final ratings given by the intervention facilitators coincided very well with the facilitation notes and discussions about which sites were performing the best.

Interviews and focus groups. Interviews were conducted in the intervention stores to provide information that would help facilitate the implementation of the intervention process and obtain feedback on the process after implemented. Due to the interventions being implemented in two staggered waves, the extent of the interviews varied across the two sets of intervention stores. In the first group of intervention sites (Phase I), pre-intervention interviews were conducted with key informants (store manager, training director, assistant manager, randomly selected employees, five to seven total) at each site for the primary purpose of learning more about the organization and how it operated, so that we could more effectively introduce and implement the intervention process. These interviews were not collected in the second group of intervention stores (Phase II) as we felt they would not add much beyond what we had already learned.

In wave I (the first group of intervention sites), post-intervention interviews were conducted with site managers (two) and randomly selected employees (two to five) at each location. A focus group was also conducted with the ACTion Team to obtain feedback specifically on the intervention process. In Phase II (the second group of intervention sites), there were too many sites to conduct interviews at each site, so we choose three of the best performing and two of the poorest performing sites (based on the rating system discussed above). Interviews and focus groups were conducted using the same methods as in Phase I. Focus group and interviews were audio-taped and transcribed verbatim. Analysis was conducted by three researchers, including the focus group facilitator, working on the project. A constant comparative method of analysis was used to examine data and develop themes. As categories emerged, the research team compared findings and applied the stages of concern model.

Analysis of these data revealed several themes across multiple sites. First, the ACTion Teams identified communication as a key issue and worked to improve communication with top management, but were not very successful in facilitating communication horizontally - among fellow employees. Consequently, the majority of employees in most of the stores did not know much about the ACTion Team or the work they were doing. Second, the team members felt that they had the skills, knowledge, and training necessary to impact the store. However, a lack of "power" (i.e., sufficient time and flexible scheduling to meet and brainstorm about organization issues and make store decisions) inhibited their abilities to create a healthy work organization. Third, issues regarding trust were evident in views expressed about the surveys used in the project. Some employees felt coerced into completing them. Some focus group members indicated fear of retaliation and distrust in the store. Fourth, the focus groups emphasized the importance of recognition on an individual level. Teams expressed how they would have appreciated receiving some type of recognition for their efforts. Fifth, attrition of team members became an serious issue over time, with some teams losing the majority of their original members due to scheduling conflicts, job changes, turnover, and other factors. Sixth, management support was a real key to intervention success, with the critical support being at the site level (store managers). Finally, staffing and scheduling were major issues that had a negative impact on the overall effectiveness of the ACTion Teams. Employees felt management cooperation in scheduling people to work when there was an ACTion Team meeting would have benefited the process. However, they recognized the difficulties faced by management with respect to scheduling.

General Discussion and Conclusions

This research began with the idea that a) it should be possible to identify a set of job and organizational factors or dimensions that characterize the healthy organization or workplace, and b) such workplaces should have healthier, safer, and more productive workers – and better "bottom-line" success. Data are clearly lacking on the parallel benefits hypothesis, which holds that actions taken to improve employee health and well-being should also benefit bottom-line financial performance.

Pertinent to the first part of this idea, we developed and tested a comprehensive model of healthy work organization. The results of the model test provided good support for the proposed model. Clearly, work characteristics influence psychological work adjustment factors that ultimately affect employee health and well-being. Although considerable previous research has supported the association between certain work characteristics and various measures of health and well-being, this research is the first to provide empirical support for a comprehensive model that explains the nature of the relationships among these highly researched constructs. The initial proposed model demonstrated good fit overall as well as significant associations among most of the hypothesized second-order latent variables. Unexpectedly, the one relationship that was not supported was between organizational climate and psychological work adjustment. Clearly, dropping organizational climate from consideration in our model was not a credible option. Consequently, a second model was hypothesized with organizational climate providing the foundation for the job design and job future dimensions. This model was supported in a post-hoc analysis using the first study data and validated in a second study on an entirely new sample. Rarely do you see a complex model of this nature where all hypothesized associations among second-order constructs and second- to first-order constructs demonstrate statistical significance.

The intervention developed for this project was derived from theory and research on total quality management, worker involvement, and community engagement, and was implemented using a participatory process that involved data-driven, problem-solving teams. It was implemented using a five phase process, with onsite facilitation. Intervention effectiveness was evaluated in terms of several sets of outcome measures: organizational climate, work behavior, employee health and well-being, and financial performance. Impacts on the exogenous and endogenous components of the theoretical model were also examined. All analyses evaluating intervention effectiveness were 2 by 3 repeated measures of analyses of variance with the 3-level factor representing the three times of measurement of a given variable, and the 2-level factor representing codes for intervention and control stores. Interest was with detecting a significant treatment (control vs. intervention) by time interaction with a pattern favoring the intervention group over the control group of stores

The results showed no intervention effects on any of the employee health and well-being measures. However, significant treatment x time interactions were obtained for two of the four financial measures: sales per labor hour and employee turnover. In both cases, the outcomes favored those stores receiving the intervention. There were no effects for comparable sales or average ticket. As such, we have some indication that the intervention impacted financial performance without impacting worker health and well-being.

We hypothesized that intervention would operate by changing store climate. Consistent with this, significant interactions were found for the communication and workplace safety and

health dimensions of organizational climate. In addition, the interaction for organizational support was marginally significant. Significant treatment x time interactions were also found for several dimensions of job design and job future, again revealing beneficial intervention effects. Other job design and job future effects fell just short of conventional statistical significance. For psychological work adjustment, interactions approaching significance were obtained for job satisfaction, organizational commitment, and work stress. Finally, among the core organizational attributes, significant interactions, favoring the intervention, were obtained for involvement policies and organizational values.

Taken together, these results suggest that the intervention worked as intended. The lack of stronger effects on the principal outcomes was partially due to the small number of stores (21 stores). But as pointed out before, this research took place during a very unsteady time for this corporation. There were major transitions in corporate leadership, major operational shifts, economic recession, severe competitive and market pressures, and major world events. Reflective of this, virtually all of the measures tracked in this study showed declines across the three measurement periods. The process evaluation indicated that the team process was effectively implemented and well-received, but some difficulties were encountered in sustaining and fully integrating the team process, and in making needed changes within the stores. As several informants commented, "there were often too many plays being called at the same time"

In conclusion, this research furthers our understanding of healthy work organization in several ways. In their recent report, the NIOSH Organization of Work Taskforce (NIOSH, 2002; Landsbergis, 2003) identified four research and development needs: 1) improved surveillance mechanisms to track changes in the organization of work; 2) accelerated research on the safety and health impacts of the changing organization of work; 3) increased emphasis on organizational interventions to protect workers; and 4) steps to formalize and nurture organization of work as a distinctive field in occupational safety and health. The research described in this report addresses all four of these priorities to some degree. In particular, the organizational health audit instrument developed and tested in this project should be useful for surveillance purposes and for assessing the quality of work life. We view it as an organizational risk appraisal instrument (DeJoy & Wilson, 2003). As constructed, this instrument goes well beyond conventional job design and work stress factors, and reflects a comprehensive and contemporary perspective on today's workers and workplaces. The theoretical model developed and tested in this research identifies major work-life domains, specifies relationships among key variables, emphasizes the role of organizational factors and the need to alter basic employee-employer relationships, and expands upon traditional definitions of organizational effectiveness. The intervention process tested focuses on evidence-based problem-solving, worker involvement, and capacity-building strategies. Its use in this research reflects one of very few attempts to systematically implement and evaluate a broad-based work organization initiative. Certainly, the lessons learned in this project should be useful to future researchers in this important area.

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Manuscripts Pending/Under Review

Wilson, M.G., DeJoy, D.M., Vandenberg, R.J., Richardson, H., & McGrath, A.L. Work characteristics and employee health and well-being: Test of a model of healthy work organization. *Accepted pending revision*: Journal of Organizational and Occupational Psychology.

DeJoy, D.M., Gershon, R.M.M., & Schaffer, B.S. Management and organizational influences on safety: Effects of safety climate. *Accepted pending revision*, Professional Safety.

Park, K.O., Schaffer, B.S., Griffin-Blake, C.S., DeJoy, D.M., Wilson, M.G., & Vandenberg, R.J. Effectiveness of a healthy work organization intervention: Racial group differences. *Revised manuscript submitted to*: Journal of Occupational and Environmental Medicine.

Vandenberg, R.J., Schaffer, B.S., Butts, M., DeJoy, D.M., & Wilson, M.G. Individual reactions to high involvement work processes. *Submitted to*: Journal of Applied Psychology.

Bierema, L., D'Abundo, M., Griffin-Blake, C.S., DeJoy, D.M., Wilson, M.G., & Vandenberg, R.J. The tribulations of innovation: Creating healthy work organization in retail environments. *Submitted to*: Human Resources Development Quarterly.

Manuscripts Anticipated

Implementing a healthy work organization intervention in retail: Outcome and process evaluation results.

Improving Safety Culture: Effects of commitment-based safety practices on safety performance.

Managing change in an organization: Evaluation of a "top-down" work organization intervention.

The demand-control model and employee health and well-being in the retail sector.

Presentations at Scientific Meetings and Conferences

DeJoy, D.M., Vandenberg, R.J., & Wilson, M.G. (2004, March). Improving Safety Culture: Effects of commitment-based safety practices in achieving world class Safety. Invited presentation, ASSE Symposium on Achieving World Class Safety, New Orleans

Wilson, M.G., DeJoy, D.M., Schaffer, B.S., Vandenberg, R.J., & Griffin-Blake, C.S. (2003, November). Building capacity for health in organizations: Results of the ACT Project. Presented at the meeting of the American Public Health Association, San Francisco.

Park, K.O., Griffin-Blake, C.S., Schaffer, B.S., DeJoy, D.M., & Wilson, M.G. (2003, November). Effectiveness of a healthy work organization program: Racial difference on occupational climate and well-being. Presented at the meeting of the American Public Health Association, San Francisco.

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Vandenberg, R.J., Schaffer, B.S., Butts, M., DeJoy, D.M., & Wilson, M.G. (2003, May). Predicting employee well-being: Roles of involvement, self-efficacy, and organizational support. Presented at the meeting of the Society of Industrial and Organizational Psychology, Orlando.

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Table 1. Major Components Constituent Dimensions of the Theoretical Model

Model Component	**Dimensions/ Variables**
Job Design	Workload Control/Autonomy Job Content Role Clarity Environmental Conditions Work Schedule
Organizational Climate	Organizational Support Co-Worker Support Involvement/Participation Communication Safety/Health Climate
Job Future	Job Security Procedural/Distributive Equity Learning Opportunities Flexible Work Arrangements
Psychological Work Adjustment	Job Satisfaction Organizational Commitment Efficacy Job Stress
Core Organizational Attributes	Values Beliefs Policies and Practices
Organizational Effectiveness	Employee Health Alcohol/Tobacco Use Psychological Health Attendance Behaviors Job Performance Workplace Safety Preventive Behaviors High Risk Status Financial Performance/Turnover

Table 2. Timeline for Implementation and Evaluation of the Healthy Work Organization Intervention

Data Collection Plan

District	Time →						
1	Survey 1	Tx	Survey 2			Survey 3	
2	Survey 1		Survey 2			Survey 3	
3		Survey 1			Survey 2		Survey 3
4		Survey 1		Tx	Survey 2		Survey 3

Table 3. Sample Demographics for the Survey Administrations

		Baseline	**Follow-Up 1**	**Follow-Up 2**
Total	% 39 years of age and younger - 40 and over	60 - 40	55 - 45	57- 43
	% Male - Female	65 - 35	66 - 34	70 - 30
	% White - Black - Hispanic - Other	80 - 8 - 6 - 6	79 - 6 - 6 - 9	78 - 8 - 6 - 8
Intervention sites	% 39 years of age and younger - 40 and over	60 - 40	54 - 46	56- 44
	% Male - Female	65 - 35	66 - 34	70 - 30
	% White - Black - Hispanic - Other	80 - 6 - 7 - 7	76 - 6 - 7 - 11	74 - 8 - 8 - 10
Control sites	% 39 years of age and younger - 40 and over	59 - 41	56 - 44	57- 43
	% Male - Female	64 - 36	65 - 35	70 - 30
	% White - Black - Hispanic - Other	80 - 10 - 4 - 6	81 - 7 - 5 - 7	83 - 8 - 5 - 4

Table 4. Five Phases of the Participatory, Problem-Solving Intervention Process

Stage of Intervention Process	Key Elements or Activities
Familiarization	Teams receive charge from Corporate senior management; team-building activities; briefings on corporate goals/strategies/performance and healthy work organization concepts.
Skill-Building	Teams engage in tutorials and structured activities related to data collection/interpretation; interpersonal communication/group processes/conflict management; capacity-building and problem-solving.
Prioritization	Teams develop their decision-making and communication structure; review baseline data; identify information gaps/resource needs; construct priority matrix; formalize/present action plan.
Action	Teams assign responsibilities for specific action plan initiatives; organize implementation/monitoring protocols; inform and involve other store employees.
Reaction	Teams monitor results; implement new/revised initiatives as needed; review follow-up audit and organizational effectiveness data; brief other store employees

TABLE 5: Correlation Matrix for Test of Theoretical Model (Study 1)

Variable	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Values	3.75	.82	(.89)									
2. Beliefs	4.27	.55	.33	(.90)								
3. Involvement Policies	3.57	.81	.69	.26	(.93)							
4. Balance Policies	3.36	.93	.54	.21	.72	(.85)						
5. Safety Policies	3.99	.81	.55	.39	.64	.56	(.90)					
6. Workload	2.77	.65	-.30	-.15	-.26	-.25	-.19	(.78)				
7. Autonomy	3.17	.57	.44	.13	.43	.36	.32	-.17	(.77)			
8. Content	3.97	.72	.53	.17	.54	.43	.42	-.20	.62	(.80)		
9. Clarity	3.88	.78	.47	.16	.50	.38	.33	-.30	.43	.50	(.82)	
10. Schedule	3.04	.91	.38	.09	.39	.39	.21	-.27	.38	.36	.40	(.84)
11. Physical Demands	3.56	1.00	-.11	-.04	-.13	-.13	-.11	.33	-.16	-.16	-.13	-.24
12. Environ. Conditions	2.58	.96	-.33	-.09	-.36	-.32	-.33	.38	-.25	-.32	-.26	-.25
13. Organizational Support	3.40	.75	.70	.22	.73	.57	.51	-.31	.52	.65	.53	.42
14. Coworker Support	3.35	.79	.48	.20	.47	.33	.37	-.30	.29	.41	.41	.27
15. Involvement w/ Others	3.14	1.10	.37	.13	.46	.34	.29	-.01	.40	.41	.36	.32
16. Involvement w/ Superv.	3.27	.88	.43	.13	.49	.38	.29	-.18	.47	.46	.43	.34
17. Communication	3.34	.69	.62	.23	.67	.53	.52	-.28	.45	.52	.54	.35
18. Health/Safety	3.91	.72	.57	.34	.55	.45	.61	-.24	.35	.46	.39	.25
19. Security	3.76	.79	.55	.25	.41	.32	.32	-.26	.34	.38	.36	.26
20. Procedural Equity	3.12	.96	.61	.19	.63	.47	.44	-.28	.39	.48	.46	.38
21. Distributive Equity	3.04	1.04	.53	.17	.61	.47	.38	-.31	.43	.50	.43	.40
22. Learning Opportunities	3.75	.82	.63	.27	.64	.51	.53	-.24	.45	.59	.48	.36
23. Flexible Arrangements	3.09	.91	.34	.09	.39	.38	.26	-.27	.29	.31	.31	.51
24. Job Satisfaction	3.56	.78	.61	.25	.57	.46	.45	-.28	.50	.63	.47	.45
25. Org. Commitment	3.87	.72	.62	.38	.56	.44	.50	-.17	.42	.59	.40	.32
26. Stress	2.67	.86	-.45	-.14	-.38	-.30	-.28	.51	-.28	-.32	-.32	-.32
27. Efficacy	4.32	.61	.15	.36	.07	.08	.16	-.03	.11	.10	.16	.11
28. Impact	3.50	.89	.45	.19	.46	.35	.31	-.05	.48	.42	.43	.35
29. Alcohol Use	18.86	41.35	-.05	-.04	-.02	-.03	-.07	.10	-.04	-.08	-.06	-.05
30. Tobacco Use	.36	.48	-.05	.01	-.09	-.05	-.06	.03	-.01	.01	-.06	-.08
31. General Health	3.59	.86	.15	.08	.14	.09	.10	.01	.11	.11	.07	.08
32. Turnover Intentions	1.59	1.13	-.29	-.08	-.29	-.21	-.19	.13	-.24	-.39	-.23	-.23
33. Absenteeism	1.74	.95	-.11	-.04	-.12	-.07	-.10	.06	-.09	-.13	-.08	-.08
34. Somatic Symptoms	1.40	.65	-.20	-.16	-.12	-.08	-.17	.10	-.11	-.12	-.10	-.11
35. Depression	1.50	.55	-.22	-.06	-.22	-.16	-.17	.05	-.18	-.28	-.16	-.14
36. Anger	1.73	.64	-.21	-.04	-.20	-.14	-.17	.15	-.13	-.20	-.14	-.10

TABLE 5 (continued)

Variable	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
1. Values												
2. Beliefs												
3. Involvement Policies												
4. Balance Policies												
5. Safety Policies												
6. Workload												
7. Autonomy												
8. Content												
9. Clarity												
10. Schedule												
11. Physical Demands	(.82)											
12. Environ. Conditions	.45	(.84)										
13. Organizational Support	-.17	-.41	(.91)									
14. Coworker Support	-.14	-.29	.57	(.92)								
15. Involvement w/ Others	-.09	-.14	.48	.39	(.88)							
16. Involvement w/ Superv.	-.20	-.26	.55	.41	.49	(.77)						
17. Communication	-.14	-.38	.69	.51	.38	.48	(.86)					
18. Health/Safety	-.13	-.41	.57	.46	.32	.40	.61	(.90)				
19. Security	-.15	-.29	.47	.30	.29	.41	.44	.42	(.79)			
20. Procedural Equity	-.14	-.35	.66	.46	.39	.41	.61	.51	.45	(.95)		
21. Distributive Equity	-.22	-.36	.67	.43	.37	.44	.52	.43	.39	.60	(.95)	
22. Learning Opportunities	-.16	-.37	.68	.43	.38	.45	.62	.57	.46	.61	.59	(.90)
23. Flexible Arrangements	-.23	.-30	.39	.24	.22	.27	.37	.25	.25	.36	.36	.34
24. Job Satisfaction	-.23	-.38	.66	.43	.37	.45	.55	.50	.43	.55	.58	.59
25. Org. Commitment	-.09	-.26	.64	.36	.34	.39	.51	.51	.41	.50	.52	.58
26. Stress	.22	.41	-.43	-.37	-.12	-.29	-.41	-.33	-.33	-.39	-.40	-.36
27. Self-Efficacy	.01	.02	.08	.03	.09	.09	.11	.18	.13	.05	.03	.13
28. Impact	-.12	-.16	.50	.32	.49	.50	.41	.32	.35	.39	.41	.41
29. Alcohol Use	.12	.11	-.04	-.05	-.01	-.01	-.05	-.09	-.04	-.01	-.07	-.01
30. Tobacco Use	.08	.04	-.04	-.05	-.03	-.02	-.03	-.02	-.05	-.07	-.07	-.05
31. General Health	.07	-.09	.12	.08	.08	.01	.13	.10	.15	.11	.10	.08
32. Turnover Intentions	.17	.16	-.34	-.19	-.20	-.26	-.25	-.23	-.21	-.27	-.29	-.29
33. Absenteeism	.05	.13	-.14	-.11	-.04	-.03	-.14	-.11	-.07	-.11	-.13	-.14
34. Somatic Symptoms	.06	.21	-.16	-.12	.02	-.08	-.17	-.19	-.17	-.13	-.10	-.15
35. Depression	.05	.22	-.25	-.17	-.15	-.18	-.24	-.15	-.17	-.19	-.21	-.25
36. Anger	.01	.25	-.23	-.20	-.07	-.10	-.18	-.16	-.09	-.18	-.19	-.16

TABLE 5 (continued)

Variable	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
1. Values														
2. Beliefs														
3. Involvement Policies														
4. Balance Policies														
5. Safety Policies														
6. Workload														
7. Autonomy														
8. Content														
9. Clarity														
10. Schedule														
11. Physical Demands														
12. Environ. Conditions														
13. Organizational Support														
14. Coworker Support														
15. Involvement w/ Others														
16. Involvement w/ Superv.														
17. Communication														
18. Health/Safety														
19. Security														
20. Procedural Equity														
21. Distributive Equity														
22. Learning Opportunities														
23. Flexible Arrangements	(.87)													
24. Job Satisfaction	.40	(.81)												
25. Org. Commitment	.30	.69	(.92)											
26. Stress	-.32	-.49	-.37	(.88)										
27. Self-Efficacy	.08	.19	.34	-.05	(.81)									
28. Impact	.28	.45	.49	-.16	.33	(.88)								
29. Alcohol Use	-.04	-.07	-.07	.11	-.08	-.01	(--)							
30. Tobacco Use	-.11	-.06	-.04	.07	-.01	-.04	.21	(--)						
31. General Health	.08	.10	.07	-.15	.07	.05	-.06	-.11	(--)					
32. Turnover Intentions	-.21	-.48	-.46	.20	-.02	-.19	.10	.02	.05	(--)				
33. Absenteeism	-.12	-.16	-.16	.16	-.07	-.06	.04	.07	-.15	.11	(--)			
34. Somatic Symptoms	-.16	-.21	-.19	.34	-.15	-.07	.10	.04	-.21	.09	.20	(.89)		
35. Depression	-.22	-.31	-.23	.32	-.08	-.14	.12	.07	-.19	.15	.16	.44	(.86)	
36. Anger	-.19	-.24	-.22	.42	-.05	-.10	.23	.07	-.21	.10	.17	.36	.59	(.87)

N = 1027; absolute correlations of .06 or higher are significant at $p \leq .05$ level; parenthetical values represent internal consistency reliability coefficients; (--) = no reliability value due to single-item status.

TABLE 6: Fit Statistics for the Measurement and Structural Models (Study 1)

Model	X^2 (d.f.)	X^2/d.f.	SRMSR	RMSEA	TLI	RNI
Measurement Model for Organizational Attributes (5 factors; values – policies)	2372.35 (454)	5.2	.05	.06	.90	.91
Measurement Model for Job Design (7 factors; content – environmental conditions)	1886.53 (506)	3.7	.06	.05	.90	.91
Measurement Model for Organizational Climate (6 factors; organizational support – health/safety climate)	2248.54 (614)	3.7	.04	.05	.92	.93
Measurement Model for Job Future (5 factors; security – flexible arrangements)	1151.72 (289)	4.0	.03	.05	.95	.96
Measurement Model for Work Adjustment (5 factors; job satisfaction – job stress)	1689.50 (289)	5.8	.06	.07	.90	.91
Measurement Model for Organizational Effectiveness (6 factors; somatic symptoms – retention)	800.67 (216)	3.7	.04	.05	.93	.94
Measurement Model for All Dimensions (34 factors; values – anger)	30886.41 (15015)	2.0	.04	.03	.86	.87
Study 1: Hypothesized Model	34751.89 (15537)	2.2	.06	.04	.84	.84
Study 1: Post-Hoc Model	34607.89 (15538)	2.2	.06	.04	.84	.84
Study 2: Cross-Validation of Study 1 Post-Hoc Model.	33091.46 (15538)	2.1	.06	.03	.85	.85

Note: X^2 (d.f.) = chi-square (degrees of freedom); SRMSR = standardized root mean square residual; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis Index; RNI = relative noncentrality index.

TABLE 7. Structural Model Estimates and Fit Statistics (Study 1)

Parameter	Estimate (Standard Error)	*t*-value
Standardized Factor Loadings of the 2nd-Order Latent to 1st-Order Latent Constructs		
Attributes to Values	.86 (RI)	
Attributes to Beliefs	.33 (.04)	9.06
Attributes to Involvement Policies	.88 (.06)	18.85
Attributes to Balance Policies	.74 (.07)	16.99
Attributes to Safety Policies	.69 (.05)	16.67
Job Design to Job Content	.84 (RI)	
Job Design to Autonomy	.68 (.05)	16.97
Job Design to Work Schedule	.61 (.06)	14.67
Job Design to Role Clarity	.66 (.05)	15.34
Job Design to Workload	-.35 (.05)	-8.86
Job Design to Physical Demands	-.27 (.05)	-7.05
Job Design to Environmental Conditions	-.52 (.05)	-11.15
Climate to Organizational Support	.92 (RI)	
Climate to Coworker Support	.65 (.04)	16.69
Climate to Involvement with Others	.56 (.05)	14.88
Climate to Involvement with Supervision	.70 (.04)	16.44
Climate to Communication	.85 (.05)	18.49
Climate to Health/Safety	.73 (.04)	16.60
Job Future to Job Security	.62 (RI)	
Job Future to Procedural Equity	.79 (.10)	14.24
Job Future to Distributive Equity	.76 (.10)	14.48
Job Future to Learning Opportunities	.85 (.09)	14.36
Job Future to Flexible Work Arrangements	.50 (.07)	10.89
Work Adjustment to Job Satisfaction	.94 (RI)	
Work Adjustment to Org. Commitment	.84 (.03)	15.44
Work Adjustment to Self-Efficacy	.30 (.02)	8.66
Work Adjustment to Impact	.59 (.03)	15.56
Work Adjustment to Stress	-.58 (.04)	-16.57
*Self-Rated Health**	(SI)	
*Health Risk Factors 1: Alcohol Use**	(SI)	
*Health Risk Factors 2: Tobacco Use**	(SI)	
*Attendance 1: Turnover Intentions**	(SI)	
*Attendance 2: Absenteeism**	(SI)	
Psychological Risk to Somatic Symptoms	.56 (RI)	
Psychological Risk to Depression	.90 (.11)	12.44
Psychological Risk to Anger	.76 (.08)	12.68
Hypothesized Associations Among the Latent Variables in Figure 1		
Attributes to Job Design	.88 (.06)	17.52
Attributes to Climate	.97 (.07)	18.61
Attributes to Job Future	.96 (.07)	13.61
Job Design to Work Adjustment	.61 (.09)	8.61
Climate to Work Adjustment	-.09 (.13)	ns
Job Future to Work Adjustment	.41 (.19)	3.54
Work Adjustment to Alcohol Use	-.09 (1.7)	-2.78
Work Adjustment to Tobacco Use	-.07 (.02)	-2.24
Work Adjustment to Psychological Risk	-.41 (.02)	-9.29
Work Adjustment to Self-Rated Health	.13 (.04)	3.99
Work Adjustment to Turnover Intentions	-.49 (.04)	-15.80
Work Adjustment to Absenteeism	-.20 (.04)	-6.01

Note. RI = reference indicator, and hence, no standard error and t-value are calculated. SI = single item indicator where the item was treated as a manifest variable only, and hence, there are no latent-to-manifest parameters to estimate. *Indicates that these variables were modeled as 1st-order manifest variables only.

TABLE 8. Study 1 Post-Hoc and Study 2 A-Priori Cross Validation Structural Model Estimates

Parameter	Study 1: Post Hoc		Study 2: A Priori	
	Estimate (SE)	***t*-value**	**Estimate (SE)**	***t*-value**
Standardized Factor Loadings of the 2nd-Order Latent to 1st-Order Latent Constructs				
Attributes to Values	.86 (RI)		.78 (RI)	
Attributes to Beliefs	.34 (.04)	9.24	.27 (.04)	7.35
Attributes to Involvement Policies	.93 (.06)	19.18	.94 (.08)	16.97
Attributes to Balance Policies	.80 (.07)	17.76	.85 (.09)	16.32
Attributes to Safety Policies	.73 (.06)	17.19	.73 (.07)	15.38
Job Design to Job Content	.84 (RI)		.80 (RI)	
Job Design to Autonomy	.68 (.05)	17.09	.66 (.06)	15.54
Job Design to Work Schedule	.61 (.06)	14.68	.61 .07)	14.23
Job Design to Role Clarity	.66 (.05)	15.45	.67 (.05)	14.63
Job Design to Workload	-.35 (.05)	-8.87	-.38 (.05)	-9.27
Job Design to Physical Demands	-.27 (.05)	-7.09	-.25 (.05)	-6.48
Job Design to Environmental Conditions	-.52 (.05)	-11.22	-.59 (.06)	-11.89
Climate to Organizational Support	.93 (RI)		.90 (RI)	
Climate to Coworker Support	.65 (.04)	16.63	.69 (.04)	17.38
Climate to Involvement with Others	.56 (.05)	14.96	.60 (.05)	15.78
Climate to Involvement with Supervision	.70 (.04)	16.60	.72 (.04)	16.57
Climate to Communication	.84 (.05)	18.49	.81 (.05)	18.36
Climate to Health/Safety	.72 (.04)	16.54	.76 (.04)	17.61
Job Future to Job Security	.62 (RI)		.53 (RI)	
Job Future to Procedural Equity	.79 (.10)	14.22	.74 (.15)	10.85
Job Future to Distributive Equity	.77 (.10)	14.51	.73 (.18)	11.28
Job Future to Learning Opportunities	.85 (.09)	14.33	.81 .16)	11.31
Job Future to Flexible Work Arrangements	.49 (.07)	10.86	.57 (.14)	9.91
Work Adjustment to Job Satisfaction	.95 (RI)		.97 (RI)	
Work Adjustment to Org. Commitment	.84 (.03)	15.44	.83 (.03)	16.16
Work Adjustment to Self-Efficacy	.30 (.02)	8.59	.31 (.02)	8.44
Work Adjustment to Impact	.59 (.03)	15.59	.59 (.03)	15.44
Work Adjustment to Stress	-.58 (.04)	-16.58	-.66 (.04)	-18.74
*Self-Rated Health**	(SI)		(SI)	
*Health Risk Factors 1: Alcohol Use**	(SI)		(SI)	
*Health Risk Factors 2: Tobacco Use**	(SI)		(SI)	
*Attendance 1: Turnover Intentions**	(SI)		(SI)	
*Attendance 2: Absenteeism**	(SI)		(SI)	
Psychological Risk to Somatic Symptoms	.55 (RI)		.65 (RI)	
Psychological Risk to Depression	.90 (.11)	12.44	.84 (.09)	13.41
Psychological Risk to Anger	.76 (.08)	12.68	.82 (.08)	13.12
Hypothesized Associations Among the Latent Variables in Figure 2				
Attributes to Climate	.92 (.07)	18.07	.92 (.08)	16.77
Climate to Job Design	.90 (.04)	19.11	.92 (.04)	18.49
Climate to Job Future	.97 (.05)	14.20	.96 (.04)	11.36
Job Design to Work Adjustment	.61 (.09)	8.16	.62 (.13)	6.63
Job Future to Work Adjustment	.33 (.11)	4.61	.29 (.21)	3.17
Work Adjustment to Alcohol Use	-.09 (1.7)	-2.77	-.09 (1.9)	-2.72
Work Adjustment to Tobacco Use	-.07 (.02)	-2.20	.02 (.02)	ns
Work Adjustment to Psychological Risk	-.41 (.02)	-9.29	-.52 (.03)	-11.12
Work Adjustment to Self-Rated Health	.13 (.04)	3.95	.22 (.04)	6.44
Work Adjustment to Turnover Intentions	-.49 (.04)	-15.84	-.57 (.04)	-18.57
Work Adjustment to Absenteeism	-.20 (.04)	-6.04	-.19 (.04)	-5.76

Note. RI = reference indicator, and hence, no standard error and t-value are calculated. SI = single item indicator where the item was treated as a manifest variable only, and hence, there are no latent-to-manifest parameters to estimate. *Indicates that these variables were modeled as 1st-order manifest variables only.

TABLE 9. Correlation Matrix for Test of Theoretical Model (Study 2)

Variable	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Values	3.74	.81	(.88)									
2. Beliefs	4.35	.65	.26	(.94)								
3. Involvement Policies	3.53	.77	.64	.26	(.92)							
4. Balance Policies	3.32	.91	.52	.17	.72	(.83)						
5. Safety Policies	4.00	.83	.49	.28	.64	.60	(.90)					
6. Workload	2.70	.97	-.30	-.05	-.28	-.27	-.19	(.80)				
7. Autonomy	3.65	.84	.41	.14	.43	.35	.32	-.19	(.76)			
8. Content	3.97	.71	.52	.20	.58	.43	.40	-.16	.51	(.87)		
9. Clarity	3.86	.75	.43	.17	.52	.39	.40	-.31	.41	.50	(.87)	
10. Schedule	3.04	.95	.30	.05	.39	.40	.26	-.32	.34	.36	.39	(.83)
11. Physical Demands	3.44	.98	-.10	-.04	-.11	-.12	-.13	.34	-.12	-.12	-.12	-.22
12. Environ. Conditions	2.51	.97	-.37	-.09	.40	-.38	-.32	.41	-.30	-.32	-.31	-.29
13. Organizational Support	3.42	.83	.62	.20	.73	.61	.50	-.31	.53	.65	.55	.46
14. Coworker Support	3.35	.83	.46	.17	.56	.47	.43	-.32	.28	.46	.44	.35
15. Involvement w/ Others	3.19	1.04	.38	.13	.45	.34	.32	-.11	.41	.44	.38	.35
16. Involvement w/ Superv.	3.25	.90	.44	.14	.52	.41	.37	-.17	.44	.42	.41	.35
17. Communication	3.30	.73	.53	.13	.67	.52	.48	-.28	.44	.50	.50	.37
18. Health/Safety	3.96	.75	.56	.28	.62	.52	.64	-.25	.36	.47	.46	.29
19. Security	3.84	.80	.46	.16	.36	.29	.24	-.19	.33	.31	.34	.20
20. Procedural Equity	2.98	.92	.51	.15	.63	.51	.42	-.28	.36	.47	.41	.37
21. Distributive Equity	2.96	1.06	.46	.10	.58	.50	.36	-.36	.34	.43	.43	.41
22. Learning Opportunities	3.76	.88	.54	.20	.64	.49	.50	-.24	.40	.60	.49	.32
23. Flexible Arrangements	3.05	.96	.38	.07	.42	.45	.34	-.27	.31	.32	.33	.51
24. Job Satisfaction	3.49	.77	.58	.13	.61	.52	.41	-.34	.47	.60	.47	.45
25. Org. Commitment	3.86	.73	.59	.28	.59	.49	.45	-.22	.41	.59	.43	.34
26. Stress	2.62	.97	-.45	-.04	-.45	-.41	-.33	.49	-.35	-.35	-.35	-.35
27. Efficacy	4.32	.61	.18	.29	.12	.08	.19	-.05	.08	.16	.20	.08
28. Impact	3.49	.89	.42	.16	.45	.30	.29	-.07	.42	.43	.35	.30
29. Alcohol Use	22.31	45.88	-.06	-.05	-.04	-.06	-.09	.13	-.03	-.01	-.02	-.04
30. Tobacco Use	.32	.47	-.05	.02	.01	.03	-.01	.02	.02	.04	.05	.01
31. General Health	3.58	.90	.12	.12	.16	.16	.12	-.03	.08	.08	.07	.09
32. Turnover Intentions	1.58	1.12	-.35	-.07	-.36	-.30	-.26	.17	-.29	-.35	-.27	-.24
33. Absenteeism	1.78	1.10	-.10	-.03	-.11	-.13	-.10	.01	-.12	-.10	-.02	-.09
34. Somatic Symptoms	1.41	.62	-.21	-.07	-.20	-.20	-.17	.16	-.16	-.16	-.17	-.15
35. Depression	1.52	.55	-.23	-.03	-.25	-.27	-.14	.11	-.18	-.23	-.15	-.15
36. Anger	1.76	.65	-.21	-.04	-.25	-.24	-.13	.18	-.18	-.23	-.20	-.21

TABLE 9 (continued)

Variable	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
1. Values												
2. Beliefs												
3. Involvement Policies												
4. Balance Policies												
5. Safety Policies												
6. Workload												
7. Autonomy												
8. Content												
9. Clarity												
10. Schedule												
11. Physical Demands	(.78)											
12. Environ. Conditions	.44	(.85)										
13. Organizational Support	-.18	-.45	(.94)									
14. Coworker Support	-.19	-.36	.60	(.92)								
15. Involvement w/ Others	-.11	-.24	.49	.42	(.87)							
16. Involvement w/ Superv.	-.14	-.31	.54	.44	.49	(.76)						
17. Communication	-.16	-.42	.66	.46	.46	.47	(.88)					
18. Health/Safety	-.12	-.42	.62	.47	.36	.40	.60	(.91)				
19. Security	-.05	-.30	.39	.27	.25	.35	.36	.31	(.76)			
20. Procedural Equity	-.15	-.38	.61	.41	.37	.43	.58	.50	.33	(.93)		
21. Distributive Equity	-.16	-.40	.61	.48	.33	.44	.51	.42	.28	.57	(.96)	
22. Learning Opportunities	-.12	-.33	.67	.47	.41	.48	.57	.57	.36	.54	.58	(.92)
23. Flexible Arrangements	-.14	-.37	.45	.33	.34	.36	.42	.36	.28	.37	.43	.36
24. Job Satisfaction	-.23	-.45	.64	.50	.41	.44	.54	.51	.46	.54	.58	.58
25. Org. Commitment	-.14	-.36	.63	.41	.40	.37	.49	.57	.37	.43	.44	.55
26. Stress	20	.44	-.48	-.41	-.26	-.32	-.41	-.39	-.33	-.38	-.44	-.38
27. Self-Efficacy	.04	-.05	.09	.13	.08	.08	.11	.19	.13	.01	.04	.10
28. Impact	-.10	-.21	.47	.38	.50	.49	.40	.35	.30	.36	.33	.41
29. Alcohol Use	.09	.09	-.03	-.01	.04	.06	-.01	-.03	-.03	-.05	-.06	.01
30. Tobacco Use	.03	-.05	.01	-.01	.06	.02	.01	.03	-.03	-.04	-.02	.02
31. General Health	.01	-.12	.15	.09	.08	.06	.17	.10	.15	.11	.19	.13
32. Turnover Intentions	.12	.26	-.37	-.23	-.23	-.27	-.34	-.34	-.32	-.26	-.30	-.35
33. Absenteeism	.12	.15	-.16	-.11	-.10	-.09	-.08	-.08	-.09	-.03	-.09	-.11
34. Somatic Symptoms	.14	.30	-.24	-.18	-.09	-.17	-.18	-.25	-.22	-.15	-.20	-.18
35. Depression	.02	.17	-.26	-.21	-.14	-.17	-.21	-.20	-.22	-.17	-.22	-.23
36. Anger	.08	.26	-.29	-.24	-.14	-.15	-.22	-.23	-.22	-.19	-.24	-.17

TABLE 9 (continued)

Variable	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
1. Values														
2. Beliefs														
3. Involvement Policies														
4. Balance Policies														
5. Safety Policies														
6. Workload														
7. Autonomy														
8. Content														
9. Clarity														
10. Schedule														
11. Physical Demands														
12. Environ. Conditions														
13. Organizational Support														
14. Coworker Support														
15. Involvement w/ Others														
16. Involvement w/ Superv.														
17. Communication														
18. Health/Safety														
19. Security														
20. Procedural Equity														
21. Distributive Equity														
22. Learning Opportunities														
23. Flexible Arrangements	(.89)													
24. Job Satisfaction	.44	(.80)												
25. Org. Commitment	.34	.69	(.92)											
26. Stress	-.38	-.59	-.41	(.91)										
27. Self-Efficacy	.09	.19	.33	-.13	(.80)									
28. Impact	.30	.46	.47	-.33	.26	(.87)								
29. Alcohol Use	-.02	-.10	-.05	.15	-.04	.02	(--)							
30. Tobacco Use	-.02	.02	.07	.05	.02	-.01	.17	(--)						
31. General Health	.18	.18	.16	-.20	.18	.11	-.05	-.09	(--)					
32. Turnover Intentions	-.21	-.53	-.49	.38	-.11	-.29	.09	.02	-.06	(--)				
33. Absenteeism	-.08	-.16	-.17	.14	-.04	-.12	.03	.06	-.17	.13	(--)			
34. Somatic Symptoms	-.23	-.21	-.20	.39	-.14	-.16	.06	.06	-.28	.18	.25	(.87)		
35. Depression	-.20	-.34	-.30	.42	-.13	-.19	.08	.04	-.23	.29	.18	.48	(.85)	
36. Anger	-.20	-.36	-.29	.48	-.08	-.16	.12	.04	-.23	.23	.18	.46	.59	(.87)

N = 956; absolute correlations of .06 or higher are significant at $p \leq .05$ level; parenthetical values represent internal consistency reliability coefficients; (--) = no reliability value due to single-item status

Table 10. Intervention Effects for Organizational Climate (ANOVA results)

Variable	Time 1	Time 2	Time 3	F-Statistic	w/in subj. Sig.
1. Organizational Support					
Treatment	3.408	3.121	3.138	F(2,34) = 2.783	.076
Control	3.382	3.081	2.896		
2. Coworker Support					
Treatment	3.376	3.320	3.365	F(2,34) = .255	.298
Control	3.310	3.277	3.207		
3. Participation w/ Others					
Treatment	3.136	2.942	2.968	F(2,34) = 1.582	.220
Control	3.169	2.968	2.835		
4. Participation w/ Supervisors					
Treatment	3.225	3.073	3.130	F(2,34) = 1.142	.331
Control	3.274	3.105	3.055		
5. Communication					
Treatment	3.306	3.055	3.064	F(2,34) = 6.313	.005
Control	3.308	3.089	2.893		
6. Workplace Safety/Health					
Treatment	3.910	3.882	3.841	F(2,34) = 3.396	.045
Control	3.960	3.943	3.718		

Table 11. Intervention Effects for Employee Health and Well-Being (ANOVA Results)

Variable	Time 1	Time 2	Time 3	F-Statistic	W/in subj. Sig.
1. Job Accidents					
Treatment	1.169	1.157	1.199	F(2,34) = .306	.739
Control	1.195	1.223	1.241		
2. Perceived Health (General)					
Treatment	3.589	3.594	3.624	F(2,34) = 1.357	.271
Control	3.612	3.573	3.524		
3. Depression					
Treatment	1.523	1.517	1.536	F(2,34) = .048	.953
Control	1.514	1.520	1.533		
4. Anger					
Treatment	1.740	1.718	1.776	F(2,34) = .556	.578
Control	1.767	1.806	1.838		
5. Somatic Stress Symptoms					
Treatment	1.423	1.400	1.425	F(2,34) = .414	.664
Control	1.411	1.396	1.450		
6. Preventative Behavior					
Treatment	3.075	3.114	3.076	F(2,34) = 1.607	.215
Control	3.010	3.185	3.132		
7. Perceived Work Safety					
Treatment	3.982	3.893	3.880	F(2,34) = .020	.980
Control	3.848	3.742	3.744		
8. Alcohol Use					
Treatment	20.091	16.145	21.225	F(2,34) = .222	.711*
Control	18.982	17.884	21.336		
9. Tobacco Use					
Treatment	1.35	1.30	1.30	F(2,34) = .999	.38
Control	1.30	1.30	1.30		
10. High Risk Status					
Treatment	.287	.283	.299	F(2,34) = .136	.873
Control	.292	.290	.294		

* Mauchly's Test of Sphericity is significant. Greenhouse-Geisser Tests of Within-Subjects Effects reported

Table 12. Intervention Effects for Worker Behaviors (ANOVA Results)

Variable	Time 1	Time 2	Time 3	F-Statistic	W/in subj. Sig.
1. Turnover Intention					
Treatment	1.609	1.916	2.013	F(2,34) = .754	.445*
Control	1.567	1.962	2.151		
2. Absenteeism					
Treatment	1.743	1.739	1.714	F(2,34) = .432	.597*
Control	1.784	1.759	1.826		
3. Lateness					
Treatment	1.478	1.472	1.524	F(2,34) = .523	.597
Control	1.598	1.524	1.586		
4. Self Performance					
Treatment	1.924	1.980	1.902	F(2,34) = 1.023	.370
Control	1.932	1.968	1.996		
5. Supervisor Performance					
Treatment	2.237	2.333	2.290	F(2,34) = .239	.788
Control	2.255	2.376	2.390		
6. Work Limitations					
Treatment	.267	.222	.212	F(2,34) = .176	.840
Control	.268	.254	.222		

* Mauchly's Test of Sphericity is significant. Greenhouse-Geisser Tests of Within-Subjects Effects reported

Table 13. Intervention Effects for Financial Performance (ANOVA Results)

Variable	Time 1	Time 2	Time 3	F-Statistic	W/in subj. Sig.
7. Comparable Sales (%)					
Treatment	.10	-.01	-.03	F(2, 32) = .57	.46
Control	.06	.03	-.02		
8. Sales per Labor Hour ($)					
Treatment	134.51	151.82	160.95	F(2, 36) = 3.64	.04
Control	138.01	155.21	154.83		
9. Average Ticket ($)					
Treatment	51.02	50.72	51.14	F(2, 36) = .28	.71
Control	47.22	46.47	47.76		
10. Employee Turnover (%)					
Treatment	.11	.13	.12	F(2, 36) = 4.10	.025
Control	.10	.09	.14		

Table 14. Intervention Effects for Job Design (ANOVA Results)

Variable	Time 1	Time 2	Time 3	F-Statistic	W/in Subj. Sig.
1. Autonomy/Control					
Treatment	3.651	3.461	3.456	F(2,34) = .599	.555
Control	3.608	3.396	3.321		
2. Role Clarity					
Treatment	3.889	3.746	3.767	F(2,34) = 3.165	.055
Control	3.824	3.733	3.557		
3. Job Content					
Treatment	3.977	3.762	3.737	F(2,34) = 4.546	.018
Control	3.954	3.728	3.513		
4. Workload					
Treatment	2.648	2.811	2.851	F(2,34) = .319	.729
Control	2.814	2.915	3.010		
5. Work Schedule					
Treatment	3.032	2.920	3.066	F(2,34) = 4.406	.043*
Control	3.034	2.889	2.823		
6. Physical Work Demands					
Treatment	3.429	3.530	3.574	F(2,34) = .372	.692
Control	3.575	3.605	3.693		
7. Environmental Stressors					
Treatment	2.478	2.589	2.601	F(2,34) = 2.429	.103
Control	2.640	2.731	2.942		

* Mauchly's Test of Sphericity is significant. Greenhouse-Geisser Tests of Within-Subjects Effects reported

Table 15. Intervention Effects for Job Future (ANOVA Results)

Variable	Time 1	Time 2	Time 3	F-Statistic	W/in subj. Sig.
1. Job Security					
Treatment	3.852	3.319	3.403	F(2,34) = 1.621	.213
Control	3.750	3.318	3.224		
2. Learning Opportunities					
Treatment	3.632	3.347	3.244	F(2,34) = 6.095	.005
Control	3.703	3.314	2.986		
3. Flexible Work Arrangements					
Treatment	3.104	2.955	3.005	F(2,34) = 2.840	.077
Control	3.006	2.962	2.807		
4. Promotion Equity (Procedural)					
Treatment	3.046	2.752	2.795	F(2,34) = 4.604	.018
Control	3.006	2.736	2.548		
5. Pay Equity (Distributive)					
Treatment	3.017	2.757	2.766	F(2,34) = 1.952	.158
Control	2.949	2.720	2.572		

Table 16. Intervention Effects for Work Adjustment (ANOVA Results)

Variable	Time 1	Time 2	Time 3	F-Statistic	w/in subj. Sig.
1. Job Satisfaction					
Treatment	3.524	3.284	3.256	F(2,34) = 2.588	.090
Control	3.500	3.239	3.075		
2. Organizational Commitment					
Treatment	3.852	3.606	3.475	F(2,34) = 2.634	.086
Control	3.853	3.547	3.300		
3. Perceived Stress (Job)					
Treatment	2.606	2.786	2.737	F(2,34) = 2.446	.102
Control	2.688	2.844	2.978		
4. Self-Efficacy at Work					
Treatment	4.305	4.270	4.223	F(2,34) = 1.592	.218
Control	4.326	4.319	4.198		
5. Personal Impact on Work Group					
Treatment	3.467	3.332	3.367	F(2,34) = 2.163	.131
Control	3.518	3.393	3.244		

Table 17. Intervention Effects for Core Organizational Attributes (ANOVA Results)

Variable	TIME 1	TIME 2	TIME 3	F-STATISTIC	W/IN SUBJ. SIG.
1. Involvement Policies					
Treatment	3.545	3.256	3.348	F(2,34) = 4.767	.015
Control	3.550	3.320	3.162		
2. Quality of Work/Life Policies					
Treatment	3.359	3.058	3.239	F(2,34) = .924	.407
Control	3.322	3.042	3.087		
3. Safety & Health Attributes					
Treatment	3.986	3.831	3.867	F(2,34) = 2.062	.143
Control	3.990	3.937	3.791		
4. Organizational Values					
Treatment	3.730	3.349	3.352	F(2,34) = 3.267	.050
Control	3.730	3.357	3.130		
5. Organizational Beliefs					
Treatment	4.337	4.271	4.163	F(2,34) = .515	.550*
Control	4.287	4.194	4.156		

* Mauchly's Test of Sphericity is significant. Greenhouse-Geisser Tests of Within-Subjects Effects reported

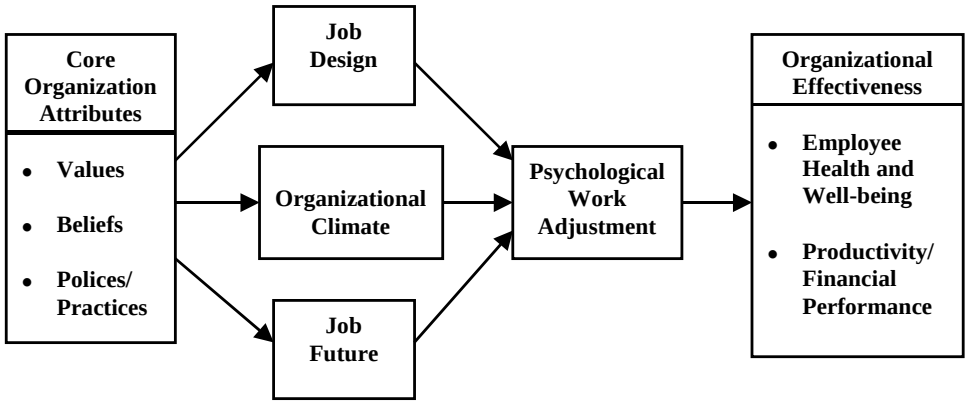


Figure 1. Proposed Theoretical Model of Healthy Work Organization

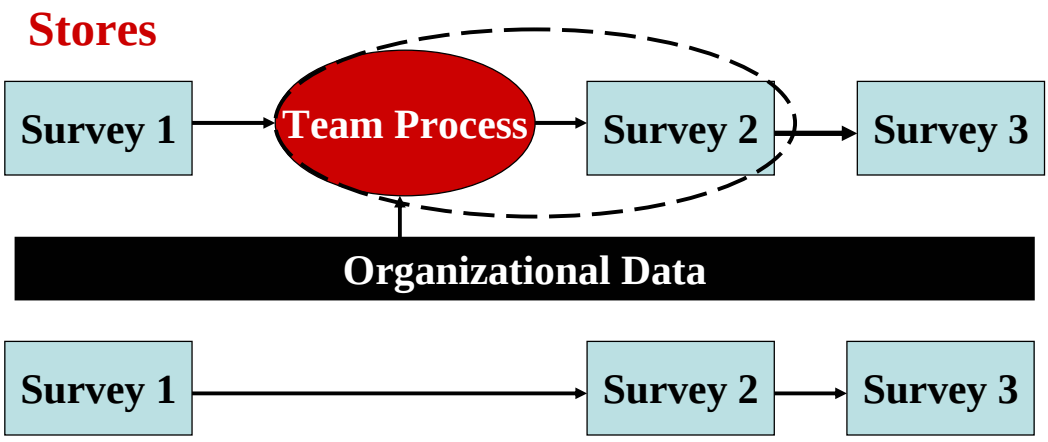


Figure 2. Research Design for the Healthy Work Organization Intervention Study

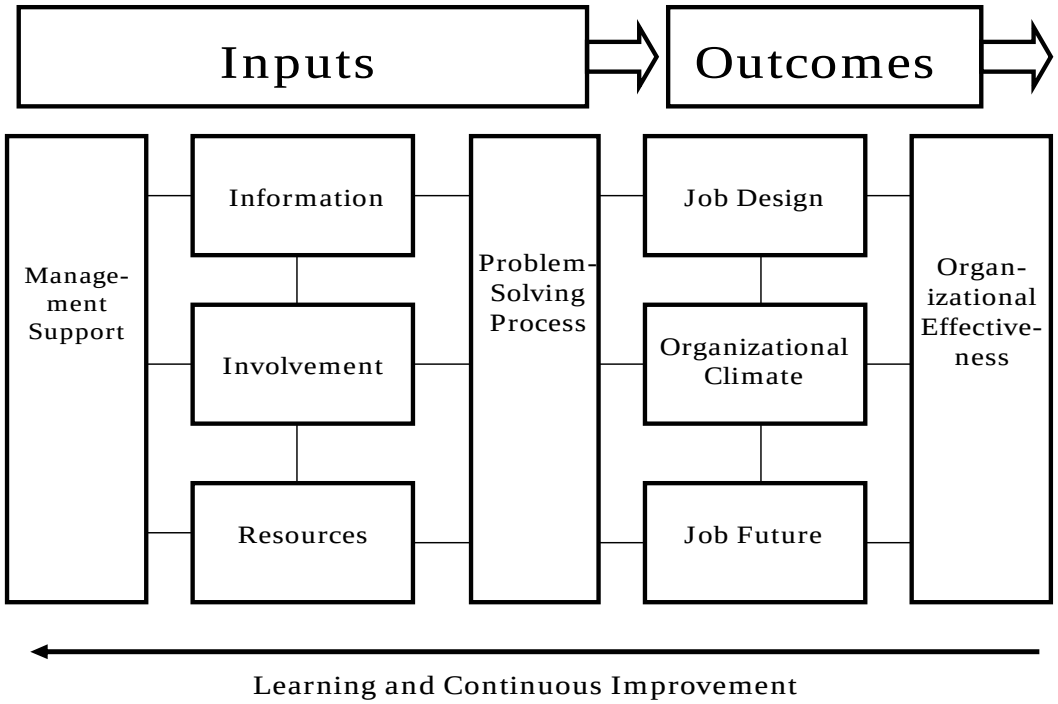
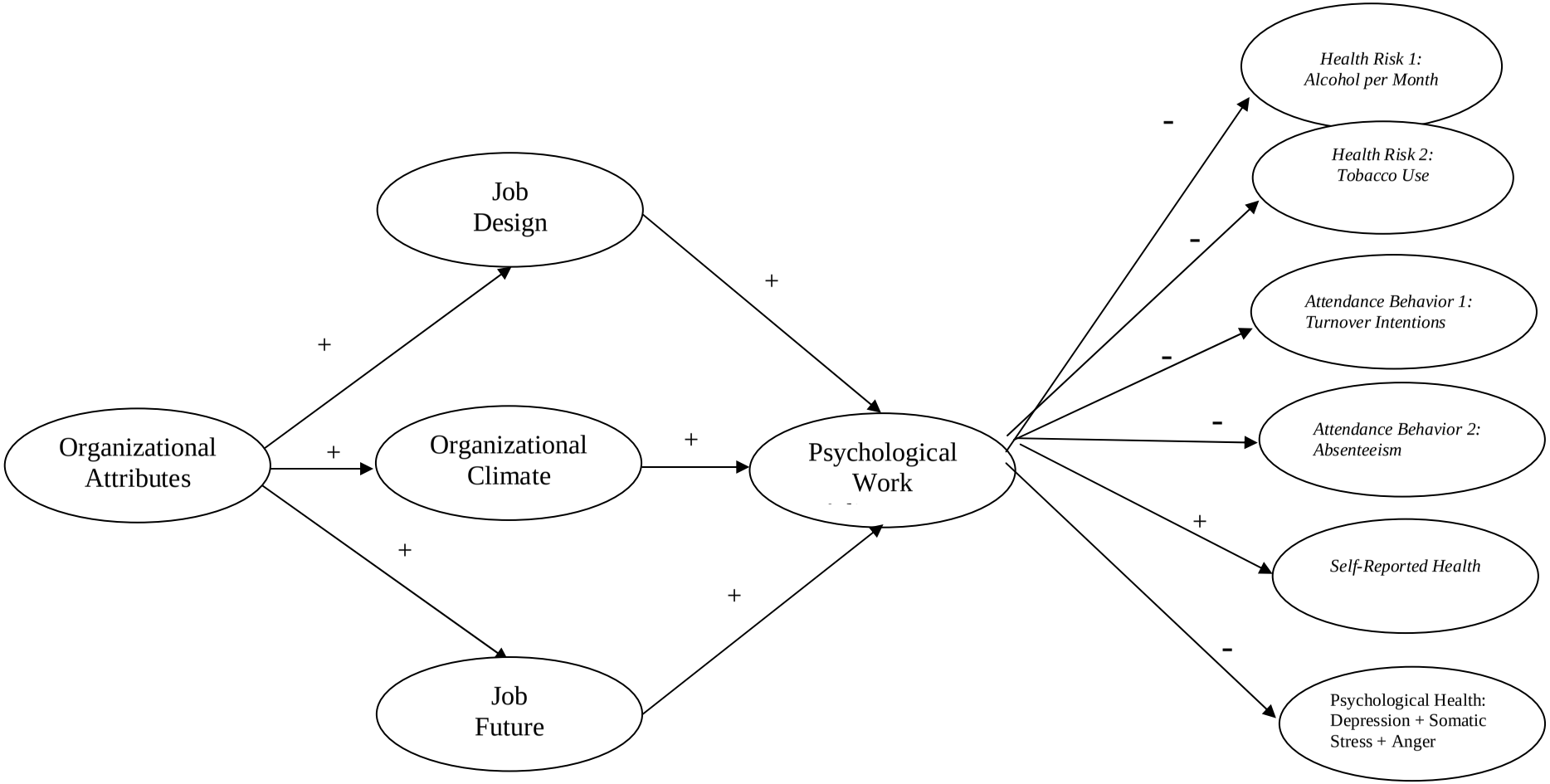
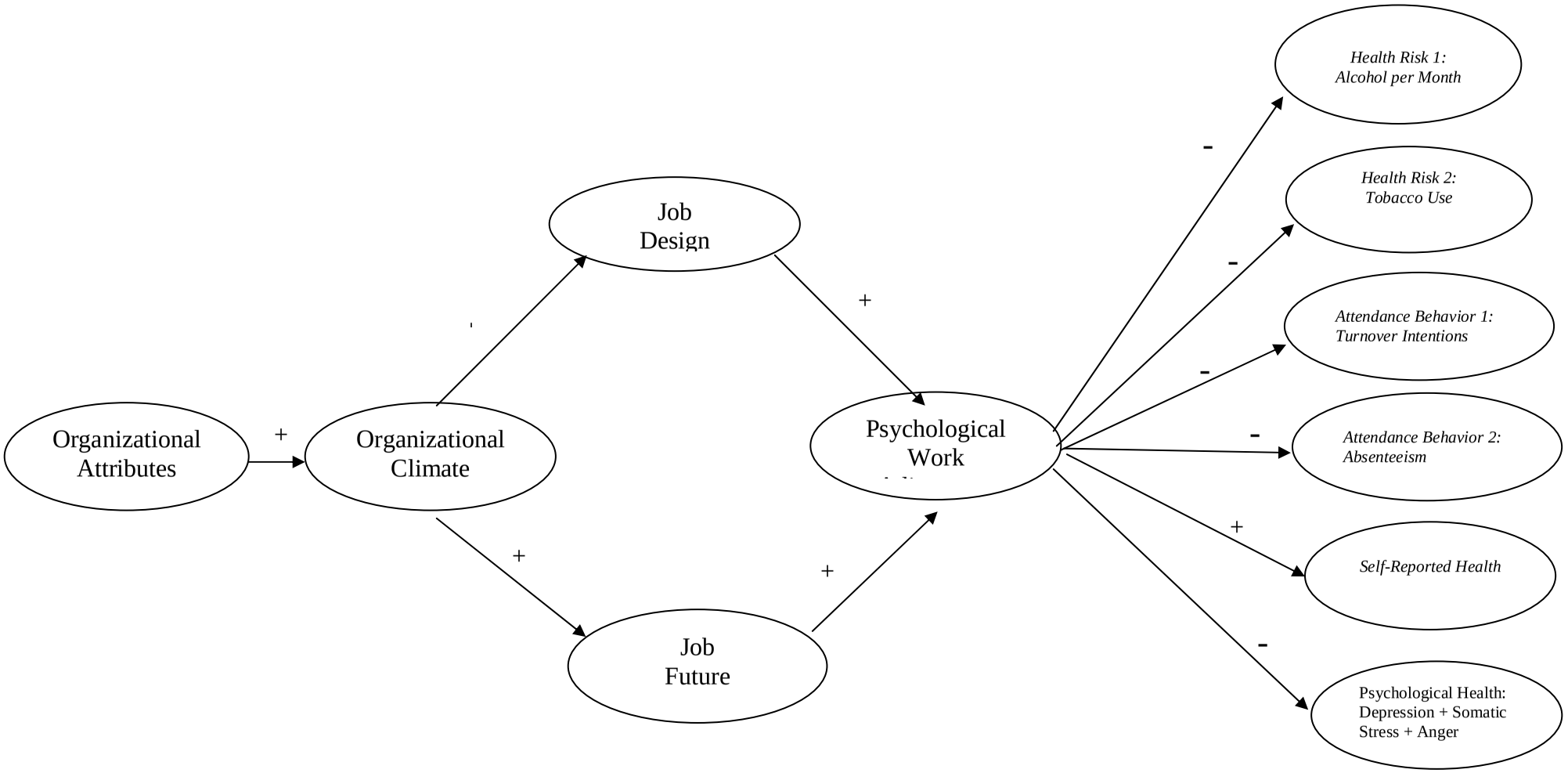


Figure 3. Key Aspects of the Healthy Work Organization Intervention Process



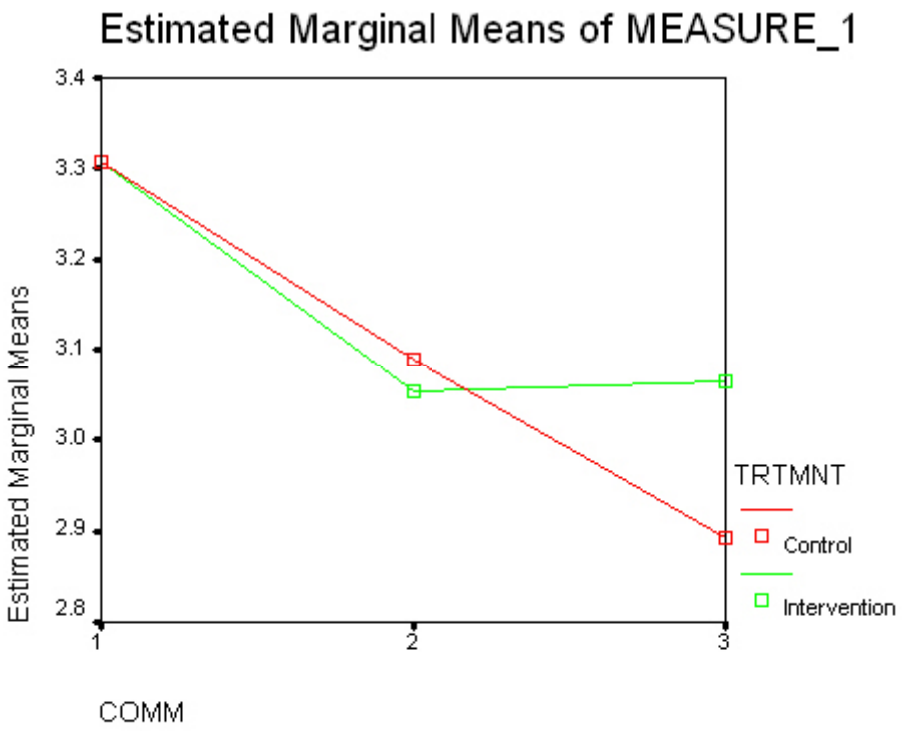
All variables except those with *italicized* labels were 2nd-order latent variables. Given that they were operationalized with responses to single items, the exceptions were treated as 1st-order indicator

FIGURE 4: Theoretical Model of Healthy Work Organization as Tested in Study 1



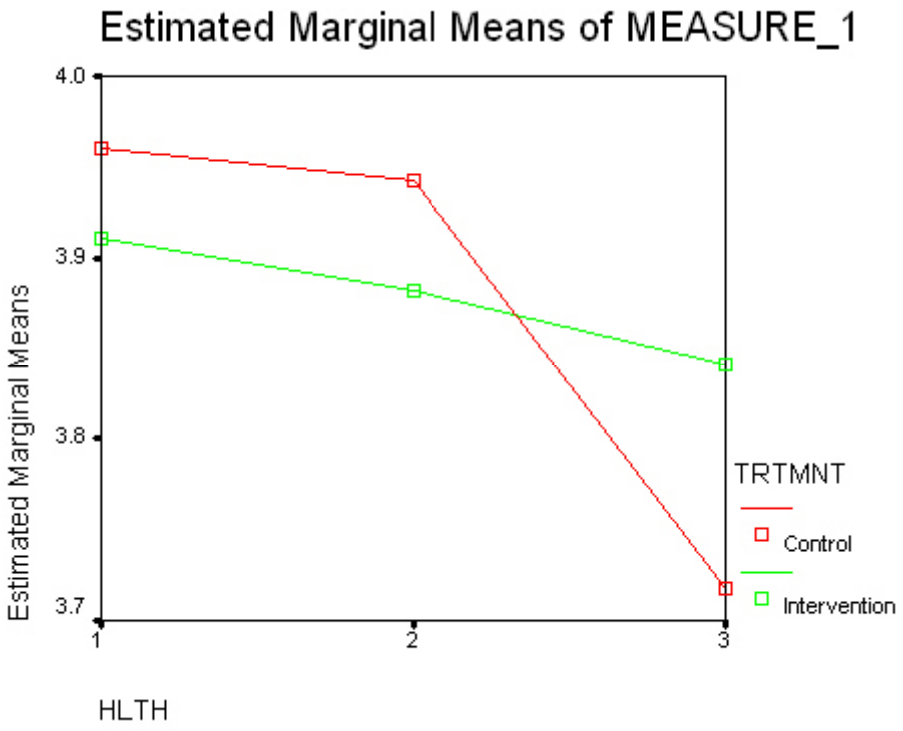
All variables except those with *italicized* labels were 2nd-order latent variables. Given that they were operationalized with responses to single items, the exceptions were treated as 1st-order indicator variables in the analysis.

FIGURE 5: Revised Theoretical Model of Healthy Work Organization



COMM

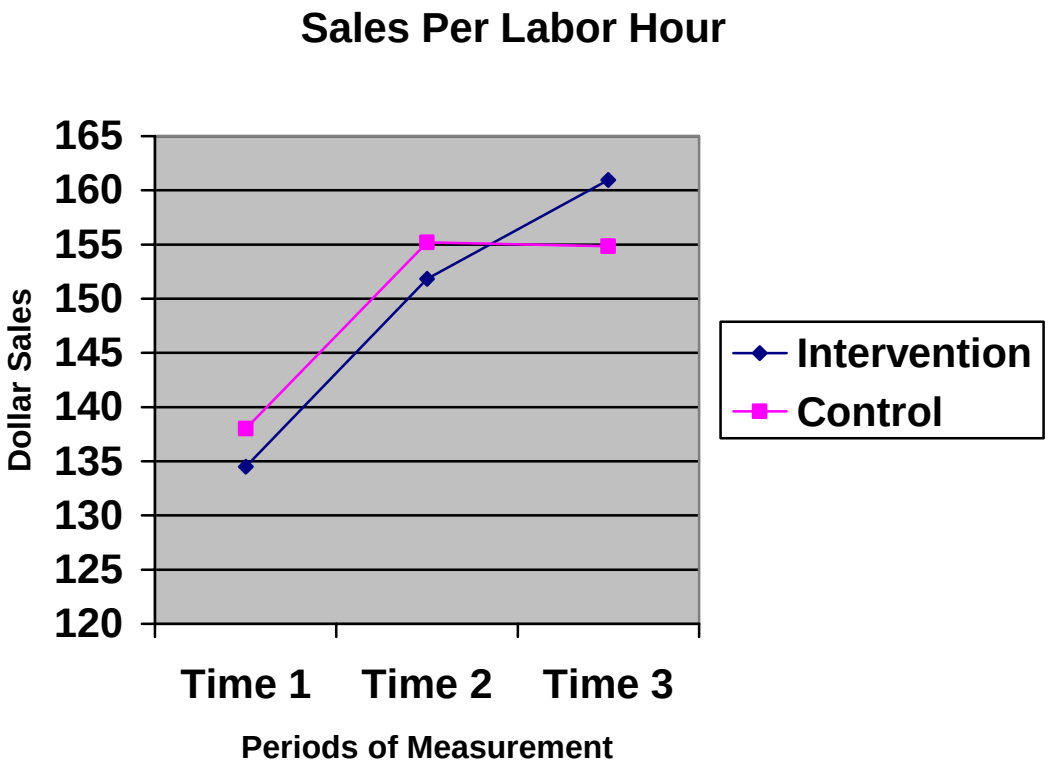
Communication



HLTH

Workplace Safety and Health

Figure 6a-b. Graphs of Treatment x Time Interactions for Organizational Climate Dimensions ($p<.05$ or better)



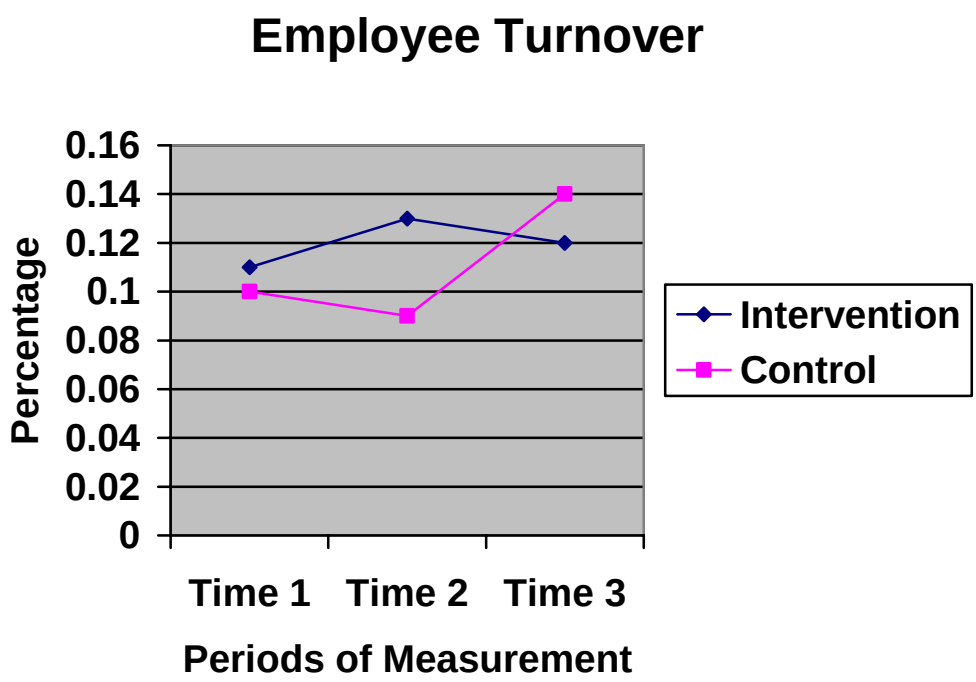
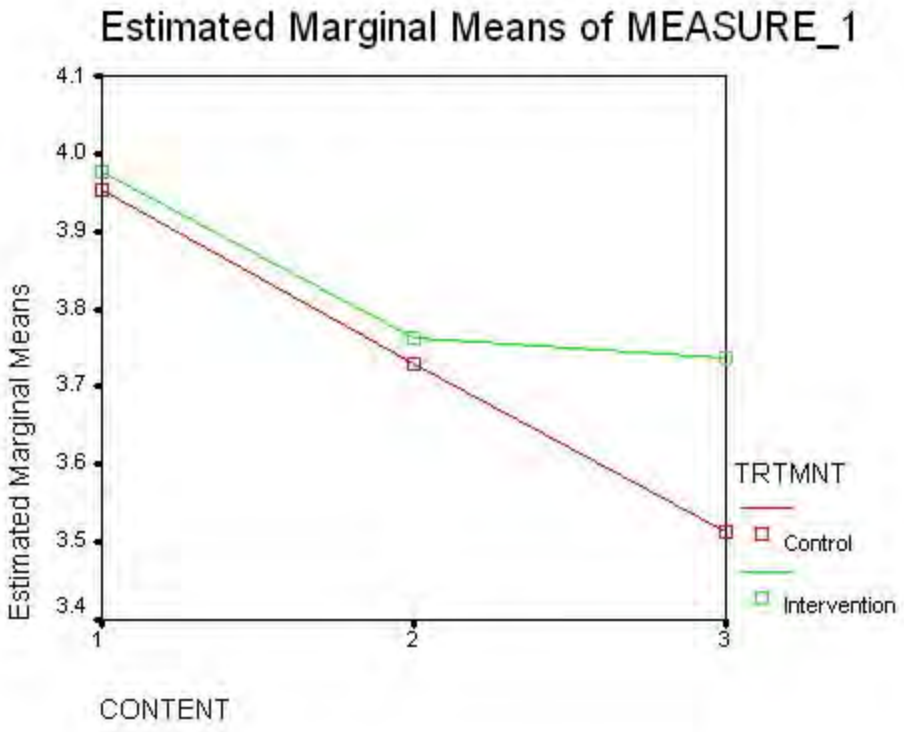
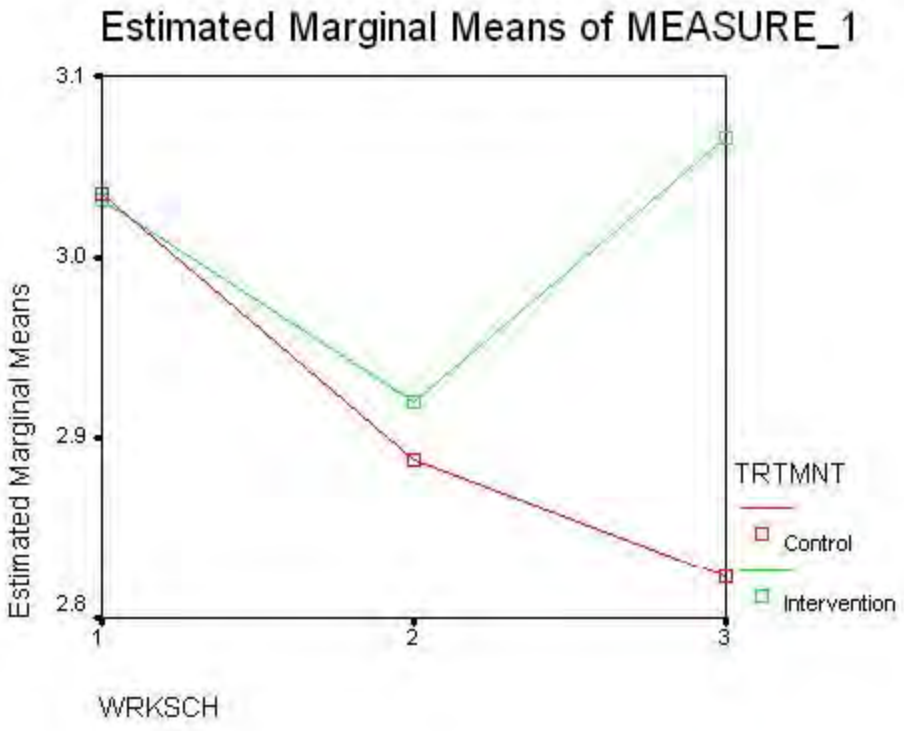


Figure 7a-b. Graphs of Treatment x Time Interactions for Financial Performance Measures ($p<.05$ or better)

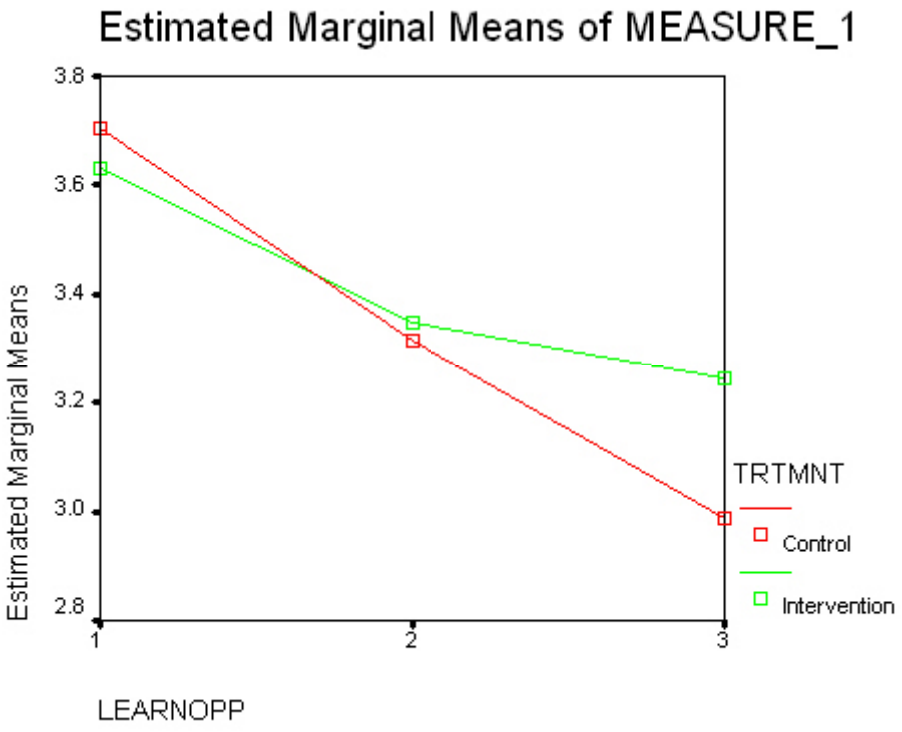


Job Content

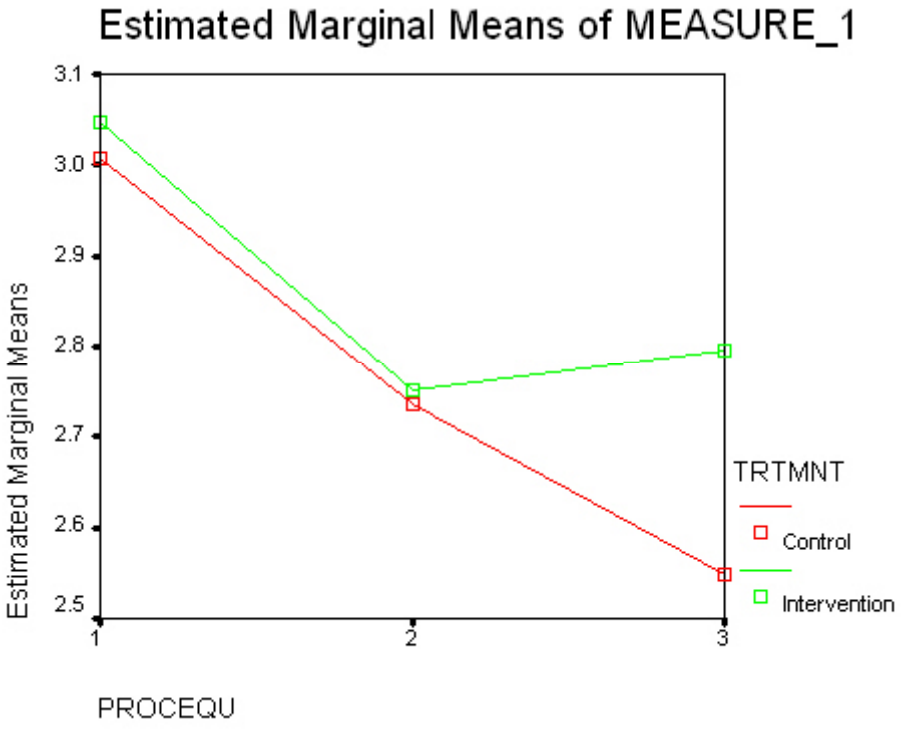


Work Schedule

Figure 8a-b. Graphs of Treatment x Time Interactions for Job Design Dimensions ($p<.05$ or better)

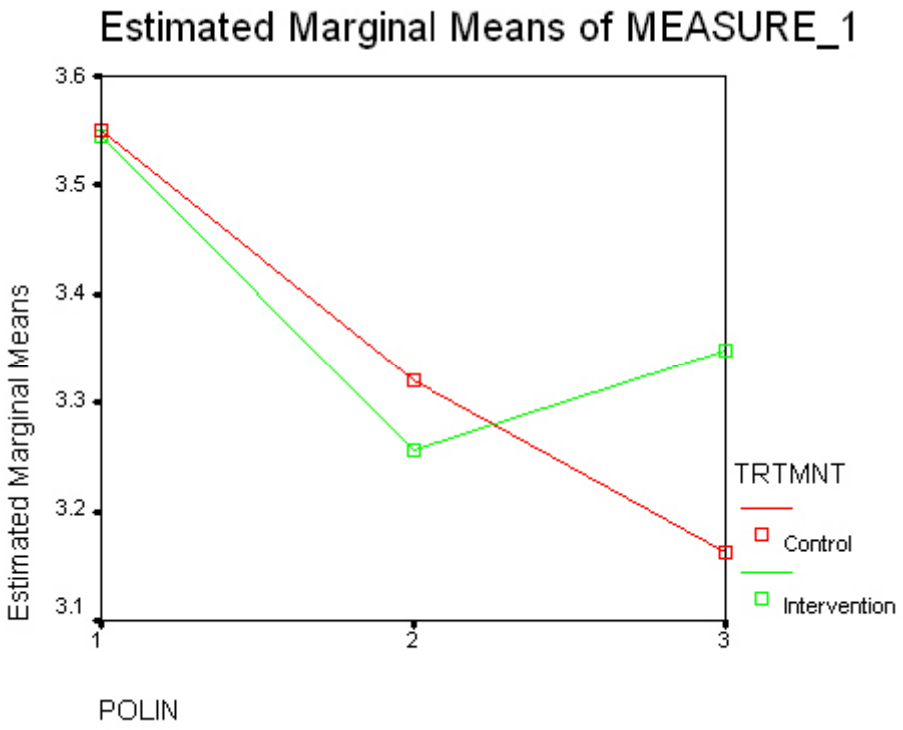


Learning Opportunities

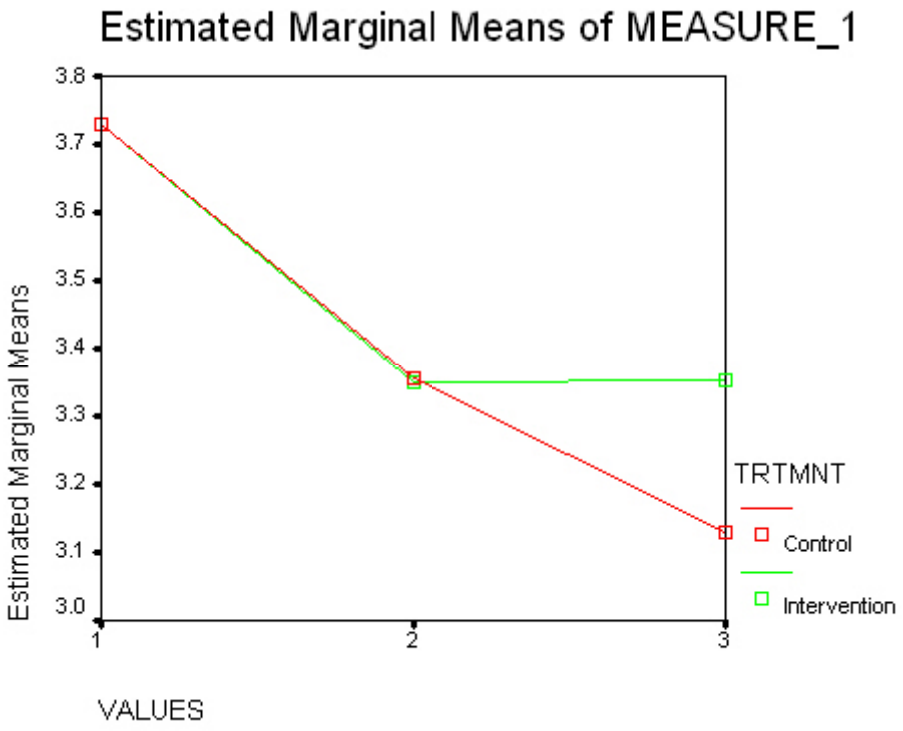


Procedural Equity

Figure 9a-b. Graphs of Treatment x Time Interactions for Job Future Dimensions (p<.05 or better)



Involvement Policies



Organizational Values

Figure 10a-b. Graphs of Treatment x Time Interactions for Core Organizational Attribute Dimensions ($p<.05$ or better)

Team Process: Performance

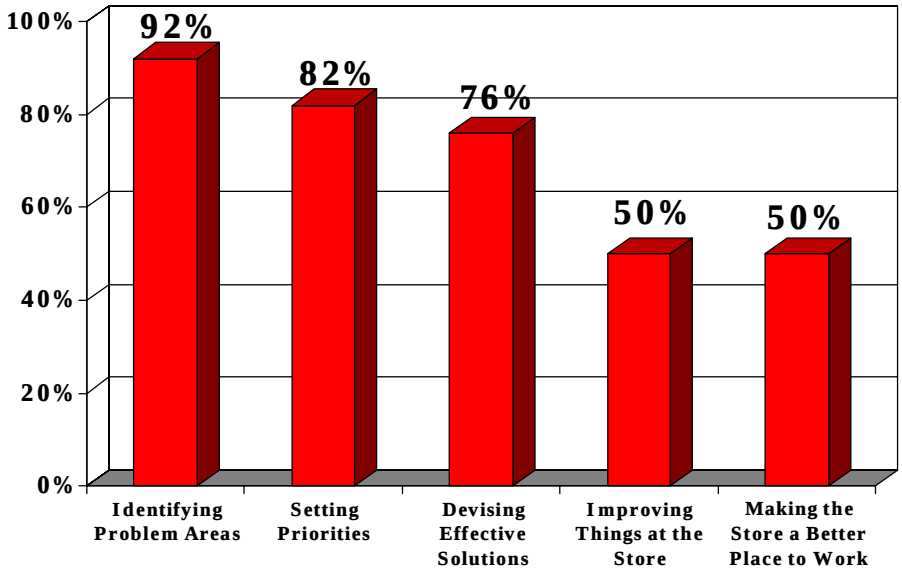


Figure 11. Process Evaluation: Perceived Effectiveness of the Problem-Solving Teams

Team Process: Personal Gains

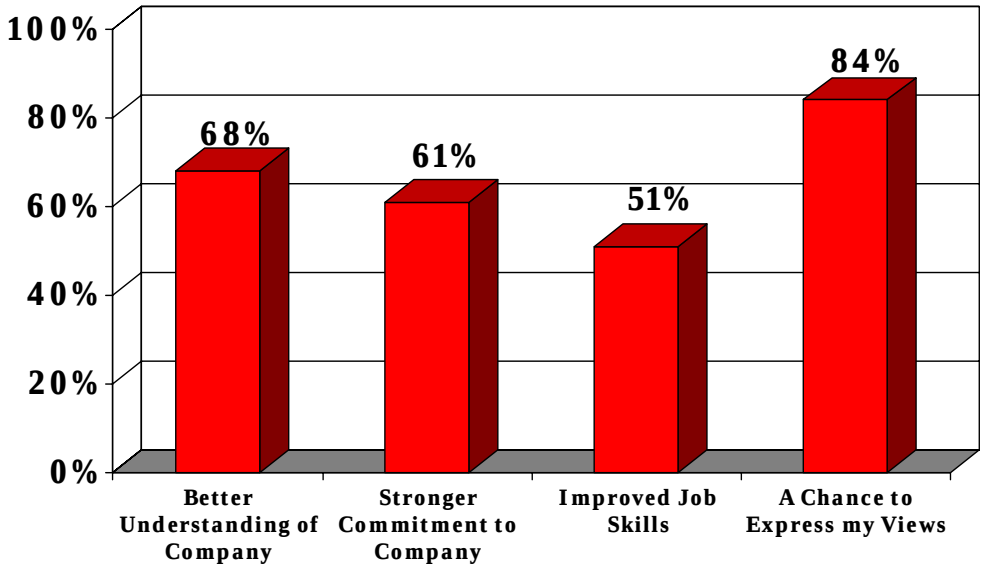


Figure 12. Process Evaluation: Perceived Benefits to Team Members

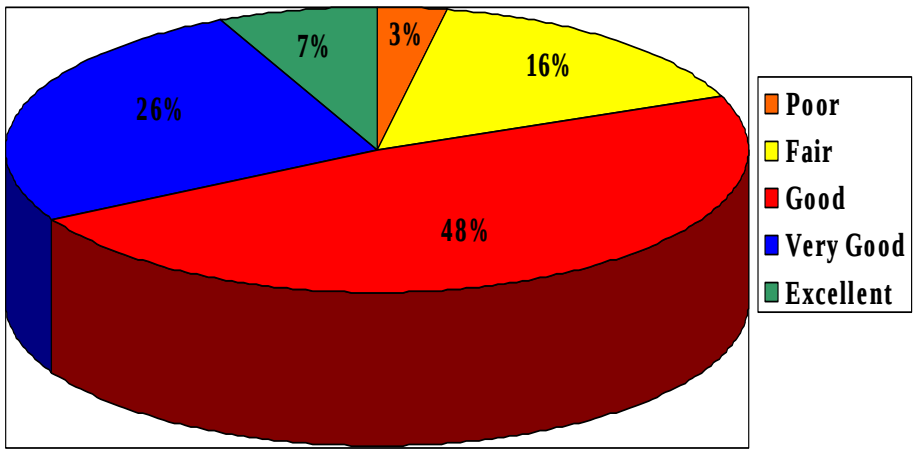


Figure 13. Process Evaluation: Overall Judgments of Team Success

Memorandum

Date: January 20, 2004

From: Michael J. Galvin, Ph.D., Program Official
Office of Extramural Programs, NIOSH, E-74

Subject: Final Report Submitted for Entry into NTIS for Grant 5R01OH003737-03.

To: William D. Bennett
Data Systems Team, Information Resources Branch, EID, NIOSH, P03/C18

The attached final report has been received from the principal investigator on the subject NIOSH grant. If this document is forwarded to the National Technical Information Service, please let us know when a document number is known so that we can inform anyone who inquires about this final report.

Any publications that are included with this report are highlighted on the list below.

Attachment
cc: Sherri Diana, EID, P03/C13

List of Publications

Riordan CM, Vandenberg RJ: Employee Involvement and Organizational Effectiveness: An Organizational System Perspective. Journal of Management, in press, 2001

DeJoy, D.M., Wilson, M.G., & Griffin-Blake, C.S. (2000). Healthy work organization. In: W. Karwowski (Ed.), International encycloQedia of ergonomics and human factors. London: Taylor- Francis.

Vandenberg, R.J., Park, K.O., DeJoy, D.M., Wilson, M.G., & Griffin.;Blake, C. S. (2002). The healthy work organization model: Expanding the view of individual health and well-being in the workplace. Invited chapter: P. Perrewe & D. Ganster (eds.), Research in OccuQational Stress and Well-Being -Volume 2 (pp. 57-115). New York: JAI Press/Elsevier Science.

DeJoy, D.M., & Wilson, M.G. (2003). Organizational health promotion: Broadening the horizon ofworkplace health promotion. American Journal of Health Promotion. 17. 337-341.

DeJoy, D.M., Gershon, R.M.M., & Schaffer, B.S. (2003, March). Management/organizational influences on human error, safety performance, and program effectiveness. Proceedings of the Human Error and Occu~ational Safety Symposium (pp. 15- 32). Des Plaines, IL: American Society of Safety Engineers.

DeJoy, D.M., Schaffer, B.S., Wilson, M.G., Vandenberg, R.J., and Butts, M. (in press). Creating safer workplaces: Assessing the role and determinants of safety climate. Journal of

SafetY Research.

Wilson, M.G., DeJoy, D.M., Vandenberg, R.J., Richardson, H., & McGrath, A.L. Work characteristics and employee health and well-being: Test of a model of healthy work organization. Accepted pending revision: Journal of Organizational and OccuQational Psychology.

DeJoy, D.M., Gershon, R.M.M., & Schaffer, B.S. Management and organizational influences on safety: Effects of safety climate. Accepted pending revision, Professional Safety.

Lance CE, Vandenberg RJ: Confirmatory Factor Analysis. In: Frontiers of Industrial and Organizational Psychology: Advances in Measurement and Data Analysis, (eds. F Drasgov, N Schmitt), San Francisco: Josey-Bass, Vol. 1

Wilson MG, DeJoy DM, Magrath A: The Changing Landscape of Health Care: Making Health Care Organizations Healthy. In: Organizational Psychology and Health Care at the Start of A New Millennium, (eds. J De Jonge, P Vlerick, A Bussing, WB Schaufeli), Ranier Hampp Verlag, in press, 2001

Riordan CM, Richardson HA, Schaffer B, Vandenberg RJ: Aplha, Beta, and Gamma Change: A Review of Past Research with Recommendations for New Directions. In: Trends in Organizational Research, (eds. C Schrieshiem, L Neider), Menlo Park, CA: Sage, in press, 2001

Richardson HA, Vandenberg RJ, Blum TC, RomanPM: An Exaamination of the Boundary Conditions Circumscribing the Relationship Between Participative Decision-Making and Organizational Performance. Journal of Management, in press, 2001

DeJoy DM, Wilson MG, Griffin-Blake CS: Healthy Work Organization. In: International Encyclopedia of Ergonomics and Human Factors, (ed. W Karwowski), London: Talyor and Francis, in press, 2001

Schmidt WC, Welch L, Wilson MG: Individual and organizational Activities to Build Better Health. In: Healthy and Productive Work: An International Perspective, (eds. L Murphy, C Cooper), Cambridge: Talyor and francis, pp. 133-147, 2001

Title: Healthy Work Organization--intervention Effectiveness
Investigator: David M. Dejoy
Affiliation: Georgia Univ Resch Fdn Inc
City & State: Athens, GA
Telephone: (706) 542-4368
Award Number: 5R01OH003737-03
Start & End Date: 9/30/1999-9/29/2003
Total Project Cost: 636106
Program Area:
Key Words: effectiveness research, intervention, work organization

Final Report Abstract:

ABSTRACT

The overall goal of this research was to develop, implement, and evaluate a healthy work organization intervention. Research has examined various aspects of healthy work organization, but there have been very few tests of comprehensive models and virtually no attention to evaluating relevant interventions. This research was guided by three specific aims: I) to investigate changes in both employee health and financial performance as a function of the healthy work organization intervention; 2) to investigate how the intervention impacts organizational climate; and 3) to explore the impact of the intervention on the exogenous and endogenous components of our theoretical model of healthy work organization. Prior to evaluating the intervention, we developed a healthy work organization audit instrument and tested the theoretical model using structural equation modeling techniques.

The theoretical model developed for this research consists of six interrelated components: I) organizational core attributes, 2)job design 3) organizational climate, 4)job future, 5) psychological work adjustment, and 6) organizational effectiveness. The model advances the argument that organization-level action is critical to creating and maintaining the healthy organization. That is, well-designed jobs, supportive organizational climates, and positive career options exist largely as a function of the policies and actions pursued by the leaders of the organization. Organizational effectiveness was conceptualized to include health and well-being indicators as well as performance and financial measures.

With the cooperation of a large national retailer, baseline data were collected from employees in 21 stores during the first year of the project. Two districts (11 stores) were assigned to the intervention group, and two districts (10 stores) served as control sites. Treatment and control groups were configured by district to minimize intervention spillover and to simplify the logistics of intervention facilitation and data collection. Baseline surveys (organizational health audits) were conducted at al121 sites six months prior to the start of the intervention. This same survey was re-administered approximately 12 months later, and again at 24 months. The intervention process commenced six months after the baseline survey. The final samples consisted of 2207 employees at pretest, 1723 at post test, and 1510 at the second follow up, representing 53%, 44%, and

35%, of employees at each time frame. Store-level financial and HR data were collected from the company on a monthly basis throughout the project.

The intervention was designed to build capacity for employee participation and decision- making, and create a healthier work organization. The data-driven problem-solving intervention combined elements from total quality management (TQM), worker involvement, and community engagement. Employee problem-solving teams, called " ACTion Teams," were organized at each intervention store. The teams were charged with developing a tailored plan of action for addressing the issues or problems identified within the store. With assistance from trained facilitators, the ACTion teams developed their action plans using a five phase problem-solving process: familiarization, skill building, prioritization, action, and reaction. The level of facilitation was gradually reduced over time to help the teams become more independent and self -sustaining.

Using structural modeling techniques, the theoretical model demonstrated good fit overall and statistically significant associations among most of the hypothesized second-order latent variables. The only relationship not supported was between organizational climate and psychological work adjustment. Consequently, a second model was hypothesized with organizational climate providing the foundation for the job design and job future dimensions.

This model was supported in a post-hoc analysis using the first study data and validated in a second study on an entirely new sample.

Intervention effectiveness was assessed in terms of several sets of outcome measures: organizational climate, work behavior, employee health and well-being, and financial performance. Impacts on the exogenous and endogenous components of the theoretical model were also examined. All analyses were 2 (treatment) by 3 (time) repeated measures ANOV As, conducted at the store level ($n = 21$). Preliminary tests revealed no systematic differences between intervention and control store samples in terms of race, gender, age, job tenure, or education.

Pertinent to Aim 1, there were no intervention effects on any of the employee health and well-being measures. However, significant treatment x time interactions were obtained for two of the four financial measures: sales per labor hour and employee turnover. In both cases, the outcomes favored those stores receiving the intervention. There were no effects for comparable sales or average ticket.

Aim 2 hypothesized that intervention should operate by changing store climate. Consistent with this, significant interactions were found for the communication and workplace safety and health dimensions of organizational climate; the interaction for organizational support was marginally significant. The pattern of results suggest that the intervention provided a buffering or braking effect on the negative trends that were apparent in all stores.

Regarding Aim 3, significant treatment x time interactions were found for several dimensions of both job design and job future, again revealing beneficial intervention effects. Several additional job design and job future effects fell just short of significance. For psychological work adjustment, interactions approaching significance were obtained for job satisfaction, organizational commitment, and work stress. Finally, among the core organizational attributes, significant interactions, favoring the intervention, were obtained for involvement policies and organizational values.

In summary , the intervention worked as intended. The lack of stronger effects on the principal outcomes was at least partially due to the small number of stores (21 stores). But more importantly, this research took place during a time of unprecedented change and uncertainty for this corporation, including transitions of senior leadership, economic recession, severe competitive and market pressures, and major world events. Reflective of this, virtually all of the measures tracked declined substantially across the three measurement periods. The process evaluation showed that the team process was well-received, but some difficulties were encountered in sustaining and fully integrating the team process, and in making operational changes within the stores

Publications:

Riordan CM, Vandenberg RJ: Employee Involvement and Organizational Effectiveness: An Organizational System Perspective. Journal of Management, in press, 2001

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The University of Georgia

School of Health and Human Performance
Department of Health Promotion and Behavior

December 23, 2003

Ms. Sharil Harris
U.S. Centers for Disease Control and Prevention
1600 Clifton Road (E74)
Atlanta, GA 30333

Dear Ms. Harris

As instructed in the e-mail of 9-21-03, we are enclosing three copies of the technical report for our NIOSH/CDC grant (5 R01 OH 003737-03). A CD containing the report file is also being provided. My understanding is that the Financial Status Report and Equipment Inventory are being forwarded directly to CDC by the Grants and Contracts Office at the University of Georgia.

Please contact me should be any need for further information or assistance.

Thank you.

Sincerely,

David M. DeJoy, Professor and
Director of the Workplace Health Group

cc. Dr. Mark G. Wilson (w/o enclosures)
Dr. Karen Watkins (w/o enclosures)

300 River Road • Athens, Georgia 30602-6522 • Telephone (706) 542-3313 • Fax (706) 542-4956