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JOB STRESS ISSUES IN THE LIBRARY OF CONGRESS/EPA HEADQUARTERS INDOOR AIR QUALITY AND WORK ENVIRONMENT STUDY

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The symptoms and health complaints associated with poor indoor air quality are often vague and nonspecific (e.g., eye irritation, dry throat, headache, fatigue, sinus congestion, shortness of breath, dizziness, nausea, etc.). These problems are generally attributed to a variety of sources, including smoking, off-gassing from structural components of the building and contents, biological contamination, office and mechanical equipment, and outside air pollutants that enter the building. NIOSH surveys suggest that these symptoms also may be caused or exacerbated by a variety of stressful job conditions (2). To date, however, little attention has been devoted to examining the contribution of stress to indoor air quality health complaints.

This paper examines the concept of stress, provides a rational for including measures of job stress in indoor air quality investigations, and discusses the specific measures included in the Library of Congress/EPA study. The data presented, however, do not allow conclusions regarding the contribution of stress to reported health complaints.

JOB STRESS

Occupational stress, as a field of inquiry examining job conditions and their health consequences, is a relatively new research domain. While there are many conflicting definitions of stress, job stress can be viewed as a situation in which some working condition (termed a stressor) interacts with the worker and results in an acute disruption of homeostasis. These acute reactions or disruptions (often called strains), if prolonged, are thought to lead to a variety of illnesses (5). (A model of this process is shown in Figure 1.)

JOB STRAIN

In general, three types of strain are recognized: Psychological (e.g., anxiety, depression, irritability, fatigue, difficulty in concentrating, job dissatisfaction); physiological (e.g., headache, increased muscle tension, heart rate, and blood pressure); and behavioral (e.g., sleep problems, lethargy, poor work performance, absenteeism). The striking similarity between many of these effects of stress and the nonspecific symptoms associated with poor air quality clearly creates difficulty in identifying their causal agents. It is conceivable that workers

(9). That is, they may either produce symptoms directly or they may exacerbate the overall demands placed upon employees and thus lower tolerance to other stressors. As a possible example of the latter, outbreaks of what has been called "mass psychogenic illness" (involving the rapid spread of a variety of symptoms including nausea, eye irritation, fainting, headaches, and dizziness) have been found to occur in the presence of both heavy task demands (e.g., heavy workload) and adverse environmental conditions which seem to provide the triggering mechanism (e.g., strange odor).

MODERATING FACTORS

There are a number of personal and situational characteristics that seem to lead to differences in the way individuals exposed to the same work context react. These "moderators" include individual factors, non-work factors and buffer factors. Included under the category of Individual Factors are characteristics such as age, job tenure, personality traits (e.g. self-esteem) which may determine how an individual will perceive and/or react to a particular job situation. Various non-work stressors such as interpersonal, marital, financial, and child rearing demands can serve to exacerbate existing job stressors to promote acute stress reactions, and are thus included under the category of Non-Work Factors. Finally, a number of factors are known to weaken the stressor-acute reaction link. Such factors are generally referred to as stress buffers and include individual stress coping skills and social support from supervisor, co-workers, friends, or family.

STRESS MEASURES IN THE LOC/EPA HEADQUARTERS BUILDINGS SURVEYS

The study objectives of this extensive investigation (as described in other papers in this session) required both a questionnaire survey of employees and environmental monitoring. The survey was intended to provide information about employees' health symptoms and comfort concerns, as well as information about possible risk factors. Since lengthy questionnaires tend to have low response rates, an instrument requiring no more than a 30-minute administration period was developed. The selection of stress factors for inclusion in the study was therefore greatly influenced by the need for economy in the questionnaire.

Conditioned by the need for economy, two other considerations guided the selection of stress factors for the questionnaire. First, major stressors thought to be present at the study sites needed to be represented. Secondly, where possible, stressors were chosen on the basis of existing data linking them to strain outcomes. Following the selection of stressors for inclusion in the study, specific measures were chosen. The choice of particular measures was guided by the following criteria:

1. Items or scales should be used which do not explicitly confound the description of stressors with strains.
2. Preference should be given to multi-item scales which have demonstrated acceptable reliability and validity.

3. Given the lack of confounding and acceptable psychometric properties, scales should be chosen which have been used most extensively in prior research.

The conditions and measures ultimately included in the study are described below. Their relative contribution to reported symptoms of indoor air quality are currently being analyzed and will be described in forthcoming publications.

1. Role Conflict and Ambiguity. Role conflict occurs when expectations regarding job activities or behaviors are in conflict, whereas role ambiguity refers to a lack of certainty regarding expected job activities or behaviors. Because both conditions are quite commonly encountered in modern organizations, and because they are shown in the literature to be linked to a variety of strain (5), they were included in the present investigation.

The scales chosen to measure these stressors were developed by Caplan et al. (3) and consist of a total of 7 items asking about clarity and conflicts in job expectations. As predictors of strain, they have been found to correlate positively with anxiety, fatigue, and discomfort. The conflict scale uses a 4-point, fully-anchored response format ranging form "never" to "very often," whereas the ambiguity scale uses a 5-point scale ranging from "rarely" to "very often."

An examination of responses to items on these scales suggests that work roles at the LOC and EPA buildings are generally well defined. For example, nearly 87% of the LOC respondents and 73% of the EPA respondents reported that they are "fairly often" or "very often" clear on what their job responsibilities are. Nearly 66% of the LOC and 60% of the EPA respondents indicated that they "rarely or never" get conflicting orders.

2. Job Control. In the occupational health arena, the concept that worker influence over aspects of working conditions is integral to health has become almost ubiquitous. Concern over loss of control by workers has been heightened with the increasing computerization of work processes. The scale used to measure this stressor consists of four items, using 5-point response formats ranging from "very little" to "very much." The items assess the amount of influence a worker has over diverse aspects of the work organization and the working environment. The items were chosen from a longer scale (4) based upon their factor loadings. While this shortened version of the scale has not been used previously, the unabridged version has been found to be a good predictor of psychological and physiological indicators of strain (4).

Responses to several items suggest that LOC and EPA employees perceive low levels of control in several job arenas. 50% of the LOC employees and 37% of the EPA employees, for example, reported "very little" or "little" influence over policies in their work group. Similarly, 52% of the LOC employees and 25% of the EPA employees reported "very little" or "little" influence over the

design or layout or their workstation.

3. Quantitative Workload. Workload is one the most extensively-researched stressors found in the occupational stress literature, and has been consistently linked to a variety of health outcomes (3). The specific measure chosen for inclusion in the study was developed originally by Quinn (8) and consists of four items assessing requirements to work "very fast" and "hard." Five-point response formats ranging from "rarely" to "very often" are used.

Responses to these items suggest that workloads at both organizations may be high. 57% of the LOC and 61% of the EPA workers, respectively, reported that they are "fairly often" or "very often" required to work very hard.

4. Underutilization of Abilities. This construct refers to the extent to which workers are required to use their skills and knowledge in accomplishing their tasks. Its inclusion in the present study stems from suggestions of reduced demands for skilled workers with the growth of service and information processing sectors of the economy (1). The scale chosen to measure this construct was originally developed by Caplan et al. (3). It consists of 3 items, relating to use of previous experience and training in the present job, each using a 5-point response scale ranging from "rarely" to "very often."

Many employees in both the LOC and EPA felt that their skills were underutilized. For example, nearly 29% of LOC respondents and 24% of the EPA respondents indicated that they only "rarely" or "occasionally" got a chance to do the things they do best.

5. Ergonomic Stressors. Since most LOC and EPA employees are engaged in office work, a limited number of questions were included to assess office ergonomics. In particular, questions were asked concerning lighting and workstation comfort.

21% of the LOC employees and 11% of the EPA employees respectively reported glare "often" or "always" at their workstation. Almost two-thirds of respondents, however, reported that their chair (61% LOC, 67% EPA) and workstations (69% LOC, 71% EPA) are "reasonably comfortable."

6. Nonwork Demands. While the purpose of the measures described above is to assess occupational stressors, it was deemed important to devote some space to the assessment of nonwork demands. A short (six-item) checklist was developed (based on previous NIOSH work) for inclusion in the study. Included here were factors such as having children at home, major responsibility for child care, and care for an elderly person.

40% of the LOC employees and 45% of the EPA workers had children at home, while 24% of the LOC and 25% EPA respondent had major responsibility for child care. 6% of workers from both organizations regularly cared for an elderly person.

7. Job Satisfaction. As perceived job stressors are often found

to be related to job satisfaction, a measure of global satisfaction was included in the study. The particular scale chosen was developed by Quinn and Shepard (8) and contains four items focusing on general satisfaction and willingness of the respondent to accept or recommend a similar job if the opportunity presents itself.

Responses to items in this scale suggest that workers at both the LOC and EPA are generally satisfied with their jobs. For example, only 16% of the LOC employees and 14% of the EPA employees reported that they were either "not too" or "not at all" satisfied with their jobs.

SUMMARY

Using established benchmarks, the presence of stressful working conditions was assessed in the context of IAQ investigations at both the LOC and select EPA facilities. Preliminary analyses suggest potentially problematic levels of perceived control, skill utilization, and workload. Overlap of these measures with industrial hygiene indices, in terms of explaining health outcomes, will be examined in future analyses.

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