LIFE STRESS AND INDUSTRIAL ACCIDENTS

THESIS

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Charles T. Huddleston, B. A.
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Traditional personality research on accident behavior has produced conflicting opinions as to the traits that describe the "accident-prone" personality type. Other research has shown that psychosocial life stress, while partially determining the temporal onset of a variety of illnesses, may also be a factor contributing to increased accident liability. This study examined the role of temporary and stress-producing life changes in groups of accident-free and accident-involved industrial employees. The accident sample was found to have significantly higher stress over baseline during the period of accident involvement, but generally lower pre-accident levels than the non-accident sample. A cause-effect analysis of the data from within the accident-involved sample proved inconclusive. Several implications for future research and managerial actions to alleviate stress were also discussed.

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LIFE STRESS AND INDUSTRIAL ACCIDENTS

In order to reduce the incidence of dangerous and costly industrial accidents, one must first develop through research explanatory concepts that are useful to both psychologists and the industrial planner. Any successful means of identifying characteristics of the environment and of the individual worker that contribute to increased accident liability would be of considerable practical value. By implementing principles that are discovered as a result of such inquiries it would be possible to provide for safer and more profitable business operations as well as advance desirable social goals.

Slight and Cook (1974) reviewed selected physical and psychological factors that affect the worker's safety and health on the job. By examining the existing relevant literature on the subject the authors were able to identify and critically evaluate several areas that have been of primary interest to researchers. Specifically considered were the physical attributes of age, sex, and work capacity, psychological attributes such as personality differences and resistance to stress, and temporary states induced by the use of drugs, overworking, and fatigue. The above areas, each being of major theoretical importance, were evaluated in light of their differential contributions toward the understanding of the industrial accident problem.

While all of the above mentioned attributes are in need of further systematic research, some appear to be more or less viable areas of inquiry. Age, sex, and physical work capacity attributes are obviously important variables contributing to accident liability, yet, as presently measured, show diminishing promise for the discovery of new and useful explanatory concepts. Slight and Cook point out that in these areas of research many of the correlates with occupational safety and health are already known. Perhaps the most promising future investigative areas relevant to these physical attributes are (a) the interactive relationships between age and job experience, (b) sexual differences and the physical-emotional adjustments to work environments, and (c) variations in physical work capacity across age and sex differences.

In contrast, psychological variables that affect one's health and safety in the work environment are of a more abstruse nature. These variables range "from characteristics with a physiological basis, such as individual sensory capacities, to characteristics which are purely conceptual in basis, such as personality and attitudes" (Slight and Cook, 1974, p. A-15). Because of the plurality of psychological variables that could bear a relationship to the accident phenomenon, researchers have somewhat limited their focus to two primary areas of concern. The first area, that of personality trait theory, has given us the "accident-prone"

personality type who is presumed to have an enduring affinity to accidental mishap (Rodstein, 1974). Others, however, have taken a more ecological viewpoint suggesting that accidents occur to those most temporally liable due to variations in personal and environmental stresses (Sachs, 1962).

A review of personality factors associated with accident involvement reveals that such studies generally measure emotional state with highly subjective indices that often preclude the drawing of inferences about a stable or enduring capacity for accident involvement. Also, fundamental to much of this research is the assumption that when the trait or traits are discovered and associated with accidents, it will be possible to differentiate these individuals from the rest of the group. By removing these people, accidents will hopefully decline, but as Henderson (1971), has pointed out,

> A great many traits have been proposed as going hand in hand with accident liability. Among them, aggressiveness, impulsiveness, maladjustment, antagonism toward authority, immaturity, inconsiderateness and hostility. Again however, other studies have pointed the finger of increased accident liability at those who are timid, indecisive, helpless and depressed. An amalgam of all these characteristics could not possibly describe a single individual (p. 911).

Recent statistical evidence in support of Henderson's position exists, suggesting that personality variables bear a

smaller role in accident liability than previously thought. Selzer and Vinokur (1974) examined differences in the behaviors of general and alcoholic male drivers and the incidence of traffic accidents. Classification of these drivers by demographic, personality, social maladjustment, life change, and subjective stress variables led them to conclude that only life change and subjective stress were significantly related to traffic accidents. These researchers further emphasized the relative importance of stress variables over those other variables that had previously been the focus of many behavioral scientists.

The idea that stress can have disruptive effects on man's typical physical and psychological functioning is not a new one. The term "stress" was initially introduced into the life sciences by endocrinologist Hans Selye in 1936, and was later developed in full theoretical form in 1950 (Appley & Trumbull, 1967). Selyes' formulation, entitled the "General Adaptation Syndrome", viewed stress as a non-specific response of the body to any demand made upon it. He further differentiated the causative agents, or "stressors" from the non-specific responses to these agents, or "stress". Selyes' conceptualizations were used frequently by behavioral scientists following his address to the American Psychological Association in 1955. Stress has subsequently been imprecisely defined and conceptually weakened on numerous occasions, as discussed by Slight and Cook (1974), and McLean (1972). As

a result of these mutations, "stress" now often implies a broad spectrum of agents and internal reactions that are difficult to subject to scientific experimentation.

Responding to this definition deficiency, many research workers have felt it necessary to operationalize what they mean by stress and thereby examine particular stress conditions. By measuring the behavioral effects of these different stressors, they hoped to determine a population of stressors important for consideration in applied situations. A range of these stress situations can be readily illustrated, from simulated aircraft crash landings (Berkun, 1962), to loss of employment (Kasl, 1970), to numerous undefined conditions leading to psychosis (Board et al., 1956).

It is Hinkle's (1957) definition of stress that is perhaps the most meaningful for psychological research. Stated briefly, stress exists when one is forced to adapt to changes in his psychosocial environment. Rahe (1964) has formulated this relationship between psychosocial change and physiological adaptation:

> Psychophysiological studies indicate that naturally occurring and experimentally induced life situations which threaten the security of the individual and evoke attempts at adaptive behavior, also evoke significant alterations in the function of most bodily tissues, organs, and systems. When sustained, these changes in function, in addition to engendering disturbing

> symptoms and tissue damage, often enhance the body's vulnerability or susceptibility to the noxious effects of a wide spectrum of etiological agents (p. 42).

For the purposes of this study, psychological stress will be conceptualized as the behaviors that result from increased adaptational demands placed upon an individual when he experiences changes in his psychosocial environment. By this definition then, a person experiencing little or no change in life events across a given period of time would likewise encounter fewer adaptive demands and would, therefore, have a low stress level. On the other hand, a relatively high level of stress would be experienced if one encountered strong adaptive demands to ever-changing life events.

Physiological reactions to the degree of psychosocial change one experiences have been the subject of many novel studies conducted over the last 25 years. A great deal of this research has been concerned with the psychosomatic component of disease in general, as reviewed by Dohrenwend and Dohrenwend (1974), Holmes and Masuda (1972), and again by Holmes and Masuda (1973).

In the initial stages of this research, investigators noted that accompanying the case histories of many patients there was a change in the number of life events preceding the onset of disease. These researchers were interested in determining why a person became sick at one time and not

another. Because of their clinical observations, they felt that many illnesses could, in part, be predicted from a person's psychosocial life conditions. Techniques were then developed to assess a patient's preceding life changes, and through extensive survey efforts they noted certain regularities. They found that any given individual will experience, across time, a number of peaks and valleys that represent increases and decreases in experienced life changes. Further examination of the data revealed that 93% of all major health changes came within two years after experiencing a yearly cluster of high life changes, and as the total number of life changes increased, the probability of experiencing health changes increased dramatically.

Predictive studies have also been conducted by these researchers to determine the validity of their techniques. Rahe (1970) assessed life changes of 2500 naval personnel about to undertake an extended cruise. Of those who were classified high-risk on the basis of life change questionnaire scores for the preceding 6-month period, on-board health data showed that they experienced 90% more first illnesses than did the low-risk group in the first month and consistently reported more illnesses in subsequent months. Following the cruise, the high-risk group also continued to report one-third more illnesses. Other studies have been conducted linking the occurrence of mounting life change to tuberculosis, skin disease, hernia, beginning of pregnancy,

sudden cardiac failure and death, myocardial infarction, fractures, incarceration in a federal penitentiary, onset of leukemia in children, lower grade point averages, risk of injury in college football players, and severity of illness experienced (Holmes & Masuda, 1973).

Hans Selye (1964), in addressing the Presidents' Council on Occupational Safety and Health, pointed out to the plenary session the role that stress could play in the etiology of accidental mishap. Selye felt that, as there is a great deal of evidence in support of a General Adaptation Syndrome, there might also similarly exist a syndrome of accident involvement. He stated, "I should like to hope that my remarks will help to direct attention also to the urgent need for organized support of research on stress in relation to accidents" (p. 624). This point was earlier emphasized by LeShan and Brame (1953), who, in discussing accident research techniques, pointed out that "we have little clear understanding of the difference between a disease and an accident" (p. 80).

Some studies have been conducted that suggest a relationship between accidents and illnesses. Hinkle and Plummer (1952) were interested in the relationship between life stress and industrial absenteeism in a large population of female telephone operators. Their results demonstrated that in the high-absence sample (7.5% of the employees), individuals had experienced stressful life situations, were responsible for a greater number of reported illnesses, and experienced a

frequent number of major and minor injuries as compared to a comparable low-absence group. In a later study (Hinkle & Wolff, 1957), these researchers reported a significant positive correlation between the number of accidents experienced and episodes of illness. These results, although they are not conclusive, do suggest that industrial accidents and illnesses are commonly related to experienced life stress.

Slight and Cook (1974), have presented a useful framework for catagorizing the literature on the effects of life stress in occupational safety and health. The sequence of events in the stress-illness relationship begins with (a) the accumulation of stress agents that (b) elicit certain physiological reactions within the individual that (c) force bodily adaptation, that when sustained cause (d) a lowered ability of the organism to resist, thereby (e) increasing his susceptibility to illness. The stress-accident relationship similarily parallels this sequence in that (a) a buildup of life stress (increased change in one's psychosocial environment) occurs that (b) forces certain behavioral reactions that, (c) increases personal disorganization, (d) affecting one's ability to attend to what is at hand, (e) precipitating an accident. These reviewers point out that "not all of the literature is concerned with every link in these chains" (p. H-5).

Some representative studies concerned with various aspects of the stress-accident sequence are presented below.

Wong and Hobbs (1949), examining high and low industrial accident groups on a number of parameters, found that the high-accident individuals reported more broken homes, juvenile court contacts, truancy, irregular work, marital problems, and firings from jobs. Rogg (1961), presenting tabular data from interviews with individuals within three days of personal involvement in an accident, found that 44% reported having some sort of psychological problem prior to having an accident. High-accident squadrons are reported to contain more pilots worried about flying, bereavement, wives, and love life than low-accident squadrons (Aitken, 1969).

Studies of stress shortly prior to accident involvement reveal that definite emotional stresses or various forms of acute disturbance were experienced by 20 and 27 percent, respectively, of those who were involved in traffic accidents causing a fatality, or who incurred serious hand injuries (Selzer, Rogers & Kern, 1968; Knorr & Edgerton, 1971).

Other work in this area has demonstrated that individuals, while under stress, suffer deficiencies in perceptual functioning (Deese & Lazarus, 1952), elevated blood pressure (Kasl & Cobb, 1970), and elevated morbidity indicators such as serum uric acid and cholesterol (Kasl & Cobb, 1968). The above studies strongly suggest that these individuals might also be more susceptible to the occurrance of an accident. Seemingly, an accident could be a result of a disequilibrium in various bodily functions and behavioral coping mechanisms,

that is triggered by a mounting number of changes in one's psychosocial environment. Sachs (1962) has outlined this reaction as an inadequacy in the handling of the stresses of everyday life. She states:

> They become preoccupied while driving or while working with complex and dangerous machinery—preoccupied with problems of health, home, work, and money—and they may be disturbed by frustration and failure, acute illness, catastrophe, marriage, sterility, or fear of death. As a result, they are less alert to environmental hazards and less able to utilize effectively the knowledge, judgment, and skills they may have previously utilized for safety (p. 527).

The first goal of this study is to examine psychosocial stress as reported by industrial employees. It is expected that accident-involved individuals experience greater psychosocial stress prior to and during periods of accident involvement than employees with no accident history.

A second goal of this study is to determine if there is evidence to suggest that a causal relationship exists between the prior experience of life stress and subsequent accident involvement.

Method

Subjects

A total of 76 male employees of a petroleum servicing company was used in this study. Two groups of men were

selected on the basis of chronological age, number of months in service with the company, and prior job-related accident history (see Table 1).

Table 1

Subject Characteristics

Characteristics	Group A		Group NA		Average Difference
	M	SD	M	SD	
Age (in years)	28.3	5.11	27.0	2.34	±1.10
Tenure (in months)	22.6	14.46	21.4	12.87	±1.07

Group A consisted of 38 individuals who had each been involved, during the past three-year period, in either one or more job-related motor vehicle accidents, or who had sustained two or more personal injuries on company time.

Group NA consisted of 38 individuals having no record of job-related accidents, who were of comparable age and job experience to individuals in Group A. These data (along with individual state traffic citation records for Group A) were obtained from the company safety records.

Measure

All subjects were administered a modified version of the Schedule of Recent Experiences (SRE). The SRE is a

paper-and-pencil questionnaire that documents significant changes in an individual's life over the previous three-year period, by asking the respondent to indicate when and how many times a change occurred in various aspects of his life. Areas to which the subject responds refer to religious, social, economic, community, family, personal, occupational, residential, and health experience. For a complete description of this questionnaire, refer to Holmes and Masuda (1973).

Modifications were made for various practical reasons and included the use of hand scoring, the simplification of instructions, and the deletion of a complete section of various identifying and demographic information. Three of the 42 items pertaining to present educational pursuits and pregnancy status were also omitted, as all subjects were working male employees (see Appendix A).

The SRE utilizes a method of weighting an individual's response to any given item by its appropriate Life Change Unit (LCU). These LCU's were derived by techniques described elsewhere (Holmes & Masuda, 1973). Essentially, an LCU indicates the amount of social readjustment required to accommodate to a particular life event. The SRE items range from 11 LCU (minor violation of the law) to 100 LCU (death of a spouse). These LCU's provide one means based on normative weights to describe quantitative differences between the group stress levels in question. The mechanics of scoring consist of multiplying each life change indicated

by its LCU, and then summing LCU's for each of four previous time periods (0-6 months, 7-12 months, 1-2 years, and 2-3 years preceding the test administration).

Another method of scoring the SRE was also utilized to provide an ipsative measurement (ISM) of the relative strength of stress fluctuations within the individual. The mechanics of this involve converting LCU sores for both groups combined into z scores within each of the four time periods, and then expressing each individual's four scores as deviations from his derived z score mean. This procedure produces scores that, first, reflect his standing in relation to the group (z's), and, second, reflect how his own four scores deviate from his individually established mean standing in the group. For example, consider an individual with LCU scores of 200, 200, 200, 200 in the four time periods respectively, and further assume that a score of 200 is equal to .5 z in the first time period, .5 z in the second, 2.0 z in the third, and .5 z in the fourth. By taking his mean z and subtracting it from each individual z score, his profile now becomes -.375, -.375, 1.125, and -.375. While the LCU scoring would lead one to conclude that his stress level was constant, the normative-ipsative technique adjusts for fluctuations from his average standing as defined by the group.

Procedure

All subjects were administered the questionnaire at their various work locations in Texas, Oklahoma, Louisiana,

and New Mexico, on company time. Subjects were advised that they were participating in a company survey designed to assess characteristics of employees' background experiences for employees of different seniority dates. The employees were kept uninformed as to the actual nature of the study in order to avoid contamination in the recall of life events. Subjects were debriefed in the form of a newsletter that outlined their contribution to the company's safety research program.

Results

Comparisons between accident and non-accident group stress levels for three periods preceding, and the period in which a member of group A experienced an accident, were made using the *t* test for correlated (matched) groups. Scores were obtained for a person in Group A's accident period, and compared with his matched partner's score in the same time period. Scores for preceding time intervals were obtained in like fashion and classified as preceding periods P-1, P-2, and P-3, in relation to the period (0-6 months, 7-12 months, 1-2 years) in which the accident occurred. A pair's preceding scores would be included as observations P-3, P-2 and P-1, if the accident group's accident period was within the previous six months; as observations P-1 and P-2 if the accident period was 7-12 months prior, or as an observation at P-1 if the accident period was one to two years prior to the test administration.

Table 2

LCU Stress Scores of the Accident (A) and Non-accident (NA) Samples for Three Periods Prior to and During Sample A's Accident Period

Period	N	Group A		Group NA		t	p
		M	SD	M	SD		
P-3	14	148.7	131.5	237.1	145.7	-1.31	.21
P-2	33	176.0	125.5	261.4	173.1	-2.13	.04
P-1	38	185.1	122.4	210.8	179.8	- .78	.43
D	38	162.5	128.5	147.9	139.6	.54	.58

Two separate comparisons of these data were made, utilizing LCU (see Table 2) and ISM (see Table 3) scoring formats.

Table 3

ISM Stress Scores of the Accident (A) and Non-accident (NA) Samples for Three Periods Prior to and During Sample A's Accident Period

Period	N	Group A		Group NA		t	p
		M	SD	M	SD		
P-3	14	-.30	.87	-.08	.79	- .67	.49
P-2	33	-.15	.77	.04	1.01	- .75	.64
P-1	38	.08	.74	.03	.90	.25	.79
D	38	.20	.94	-.21	.76	2.16	.03

While the NA sample reported higher average LCU in all three of the periods preceding the accident period, Sample A demonstrated higher (non-significant) LCU's during the accident period. These differences reached a significant level only at P-2, with the NA sample reporting higher LCU.

Stress, as measured by the ISM method, reveals a somewhat different pattern than that obtained by normative LCU. Sample A continued to demonstrate lower stress at periods P-3 and P-2. These results indicate that, while both samples reported about the same ISM stress at P-1, the accident sample showed higher stress during the accident period.

Analysis of stress scores within Sample A, with accident data in subsequent and preceding periods, was accomplished through the use of cross-lag correlations. With cross-lag correlations, it is possible to examine the direction of a relationship extra-experimentally. Assuming that a "cause" must precede an "effect", the correlations between an effect (accidents) and a prior cause (antecedent stress) should be larger than the correlations between an effect and a cause that comes after it (subsequent stress). In this way, the difference between the correlations of a prior vs. a subsequent "cause" may be used to determine if there is a probable basis to support interpretations of stress-accident directionality.

Such computations were made for all temporally lagged periods where stress preceded accidents (S-A), where accidents

preceded stress (A-S), and where the two variables were measured simultaneously (SA). Time-lags examined consisted of 4-3 correlations (2-3 yrs to 1-2 yrs); 3-2 correlations (1-2 yrs to 7-12 mos); and 2-1 correlations from (6-12 mos to 0-6 mos). Longitudinal correlations (r_{bis} with the accident data dichotomized) are presented on the following page in Table 4.

The first heading in this table indicates the relationship between life stress and on-the-job accidents. In this category, S-A correlations ranged from +.13 to +.26, indicating a consistent low positive relationship, while A-S correlations ranged from -.06 to -.43. Negative correlations between accidents and later stress at 2-1 are significantly larger than correlations between stress and later accidents. Correlations between stress and traffic citations range from -.30 to +.26 for the S-A sequence, and from -.33 to +.22 for the A-S sequence. The direction of the correlations with traffic citation data varies widely and indicates an unstable and somewhat uninterpretable pattern.

The third category indicates the relationship between stress and the combined accident variables. S-A correlations range from -.21 to +.37, with A-S correlations falling within a range from -.05 to -.24. In this instance, positive correlations between stress and later accidents at 2-1 were significantly larger than those obtained for accidents and later stress.

Table 4

Cross-lag Correlations between Life Stress and Accidents

Periods	Correlational Sequence				Difference Between Correlations	
	Stress-Accident		Accident-Stress			
	LCU	ISM	LCU	ISM	LCU	ISM
On-the-job Accidents						
4-3	.196	.261	...	...	...	...
3-2	.138	.148	-.105	-.064	...	...
2-1	.147	.132	-.425**	-.435**	**	**
Traffic Citations						
4-3	-.068	-.305	-.110	-.090	...	...
3-2	.203	.261	-.074	-.339*	*	*
2-1	...	...	.182	.229	...	...
Combined On-the-job Accidents and Traffic Citations						
4-3	-.047	-.218	-.141	-.115	...	...
3-2	.293	.283	-.055	-.246	...	...
2-1	.348*	.373*	-.175	-.199	*	*

*($p < .05$)

**($p < .01$)

Simultaneous correlations between stress and accident variables are presented in Table 5. These correlations reveal much of the same pattern as in lagged correlations, for both the traffic citation data (-.15 to +.25), and for the composite data (-.17 to +.33). Simultaneous correlations

Table 5

Simultaneous Correlations between Life Stress and Accidents

Period	On-the-job Accidents		Traffic Citations		Combined Data	
	LCU	ISM	LCU	ISM	LCU	ISM
4	...	...	.203	.257	.281	.339*
3	.147	.198	.075	-.150	-.007	-.172
2	.180	.202	-.074	-.027	-.013	-.016
1	.435*	.425*	...	...	.060	.053

*($p < .05$)

between stress and on-the-job accidents, however, were all positive (+.14 to +.43), and exhibited the strongest degree of relatedness for LCU measurements at 0-6 months.

Discussion

The fundamental purpose of this study was to investigate the relationship of psychosocial life stress to the occurrence of job-related accidents. The findings indicate that individuals who become involved in industrial

accidents also report higher stress (ISM), during this period, than their non-accident counterparts. The expectation that these individuals should also experience higher stress in previous periods was disconfirmed by both the LCU and ISM results. On the contrary, the non-accident sample reported consistently higher LCU, and equivalent or higher ISM, in all of the previous periods. These findings, while failing to confirm the presence of chronic or long-term stress build-up prior to accident involvement, are in general agreement with previously cited studies reporting acute stress and psychological disturbances shortly prior to accident involvement. The significance of the present findings lies in the observation that psychosocial stresses do carry over into the work setting during a period of accident involvement.

A second aim of this study was to longitudinally examine these variables within sample A, in order to determine the plausibility of a stress-accident causal hypothesis. The differences between lagged correlations for on-the-job accident criteria failed to support this S-A hypothesis. Furthermore, the obtained negative A-S correlations suggest that the occurrence of a job-related accident is subsequently followed by a reduction in stress.

Inconsistent correlations with the traffic citation criteria offer little or no support for S-A causation. Perhaps the intuitive assumption that one's driving record accurately reflects the tendency to be reckless and accident

prone is just as inconsistent. A person's driving record may thus indicate inordinate amounts of time engaged in operating a motor vehicle, and likewise reflect merely an increase in risk exposure. Correlations between the combination of traffic and accident data and stress afforded no distinct advantage in this study, toward an interpretation of stress-accident causality. In short, the longitudinal correlations obtained in this study did not support either the S-A, or the A-S causal hypothesis.

Although clear-cut evidence of causality was not obtained within the A sample for the time intervals examined, evidence of a concurrent relationship between the two variables was obtained. From these findings, however, several issues are raised, including (a) the degree of change in one's life that must be experienced before one becomes "at risk" of an accident, (b) whether a buildup of life stress alone is sufficient to cause an increased liklihood of an accident or whether the relationship is moderated by the presence of environmental risk, and (c) what can be done to alleviate stress.

With regard to the first issue, a possible solution may depend on future research directed at defining the limits within which individuals are capable of withstanding temporary stress-inducing situations. Stress "tolerance" as conceptualized in this study (ISM scores) was based on the assumption that when individuals depart from their average stress level they are in effect approaching the parameters of normally

endured stress for their particular lifestyle. The estimates of stress tolerance as used in this study, however, were fairly crude. These estimates best serve to illustrate the fact that, while individuals may report a large number of life changes within a given period of time, they may not necessarily indicate that one also sustains a high level of subjective stress. Divergence from one's average level of life change experience, then, could be taken as an indication of decreasing stress tolerance.

The second issue is fundamental to a serious consideration of research findings in this area. It seems that in order to clearly establish variables that affect individual accident liability, it is also necessary to identify and classify various job environments as to the amount of subjective and objective risk that is present. If this were done, knowledge of the causal influence of various factors contributing to accident liability would become more appreciable.

Lastly, the nature of stress arising from off-the-job sources is not directly controllable by management. This being the case, management is somewhat constrained in the kinds of programs it can implement to ameliorate stress. It may be possible, however, to reduce negative reactions to this type of stress by encouraging the open communication of stress that is perceived or regarded as detrimental to job performance, identify high-risk "stressees" and relocate

them to low-risk accident environments, provide for conventional sick leave to include provisions for "stress" leave, encourage the use of "relaxation techniques" to reduce stress associated with job demands, and discourage employees from taking on tasks that they suspect they might not complete satisfactorily.

Stress is a condition most likely when physical or psychological problems force one's mind and body to maintain a somewhat constant and high level of alert. The best treatment for stress may be one that allows the individual to identify its source and to effectively deal with it. Future research of the kind suggested by this study should aid in this effort.

Appendix A

SCHEDULE OF RECENT EXPERIENCES (SRE)

The following questions are designed to estimate the amount of change occurring in your life over the previous three years. Answer each question as accurately as possible.

Instructions Part I: Think back on the item event and decide if it happened to you and when it happened.

Item Number

1. Place an (X) by the appropriate time periods when there has been either a lot more or a lot less trouble with the boss.

   last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

   _____ _____ _____ _____ _____

2. Place an (X) by the appropriate time periods when there was a major change in sleeping habits (sleeping a lot more or a lot less, or change in part of day when asleep).

   last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

   _____ _____ _____ _____ _____

3. Place an (X) by the appropriate time periods when there was a major change in eating habits (a lot more or a lot less food intake, or very different meal hours or surroundings).

   last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

   _____ _____ _____ _____ _____

4. Place an (X) by the appropriate time periods when there was a revision in your personal habits (dress, manner, associations, etc.).

   last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

   _____ _____ _____ _____ _____

5. Place an (X) by the appropriate time periods when there was a major change in your usual type and/or amount of recreation.

   last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

   _____ _____ _____ _____ _____

6. Place an (X) by the appropriate time periods when there was a major change in your social activities (e.g., clubs, dancing, movies, visiting, etc.).

   last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

   _____ _____ _____ _____ _____

7. Place an (X) by the appropriate time periods when there was a major change in church activities (e.g., a lot more or a lot less than usual).

last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

_____ _____ _____ _____ _____

8. Place an (X) by the appropriate time periods when there was a major change in number of family-get-togethers (e.g., a lot more or a lot less than usual).

last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

_____ _____ _____ _____ _____

9. Place an (X) by the appropriate time periods when you had a major change in financial state (e.g., a lot worse off or a lot better off than usual).

last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

_____ _____ _____ _____ _____

10. Place an (X) by the appropriate time periods when you had in-law troubles.

last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

_____ _____ _____ _____ _____

11. Place an (X) by the appropriate time periods when you had a major change in the number of arguments with spouse (e.g., either a lot more or a lot less than usual regarding child-rearing, personal habits, etc.).

last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

_____ _____ _____ _____ _____

12. Place an (X) by the appropriate time periods when you had sexual difficulties.

last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.; does not apply

_____ _____ _____ _____ _____

Instructions Part II: For these questions mark an (X) through the number of times that an item event happened in each of the appropriate time periods.

Item Number

13. Put an (X) through the number of times in each appropriate time period that you experienced major personal injury or illness.

last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.

0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4

14. Put an (X) through the number of times in each appropriate time period that you have lost a close family member (other than spouse) by death.

last 6 mos.; 6 - 12 mos.; 1 - 2 yrs.; 2 - 3 yrs.

0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4

15. Put an (X) through the number of times in each appropriate time period that you have experienced the death of spouse.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

16. Place an (X) through the number of times in each appropriate time period that you have experienced the death of a close friend.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

17. Place an (X) through the number of times in each appropriate time period that you have gained a new family member (e.g., through birth, adoption, oldster moving in, etc.).

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

18. Place an (X) through the number of times in each appropriate time period that there has been a major change in the health or behavior of a family member.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

19. Place an (X) through the number of times in each appropriate time period that you have had a change in residence.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

20. Place an (X) through the number of times in each appropriate time period that you have experienced detention in jail or other institution.

last 6 mos.;	6 -12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

21. Place an (X) through the number of times in each appropriate time period that you have been found guilty of minor violations of the law (e.g., traffic tickets, jay walking, disturbing the peace, etc.).

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

22. Place an (X) through the number of times in each appropriate time period that you have undergone a major business readjustment (e.g., merger, reorganization, bankruptcy, etc.).

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

23. Place an (X) through the number of times in each appropriate time period that you married.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

24. Place an (X) through the number of times in each appropriate time period that you were divorced.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

25. Place an (X) through the number of times in each appropriate time period that you had marital separation from your mate.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

26. Place an (X) through the number of times in each appropriate time period that you had an outstanding personal achievement.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

27. Place an (X) through the number of times in each appropriate time period that you had a son or daughter leaving home (e.g., marriage, attending college, etc.).

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

28. Place an (X) through the number of times in each appropriate time period that you have experienced retirement from work.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

29. Place an (X) through the number of times in each appropriate time period that there was a major change in working hours or conditions.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

30. Place an (X) through the number of times in each appropriate time period that you had a major change in responsibilities at work (e.g., promotion, demotion, lateral transfer).

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

31. Place an (X) through the number of times in each appropriate time period that you have been fired from work.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

32. Place an (X) through the number of times in each appropriate time period that there was a major change in living conditions (building a new home, remodeling, deterioration of home or neighborhood).

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

33. Place an (X) through the number of times in each appropriate time period that your wife began or ceased working outside the home.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

34. Place an (X) through the number of times in each appropriate time period that you took on a mortgage greater than $10,000 (e.g., purchasing a home, business, etc.).

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

35. Place an (X) through the number of times in each appropriate time period that you took on a mortgage or loan less than $10,000 (e.g., purchasing a car, T.V., freezer, etc.).

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

36. Place an (X) through the number of times in each appropriate time period that you experienced a foreclosure on a mortgage or loan.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

37. Place an (X) through the number of times in each appropriate time period that you have taken a vacation.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

38. Place an (X) through the number of times in each appropriate time period that you have changed to a different line of work.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

39. Place an (X) through the number of times in each appropriate time period that you had a marital reconciliation with your mate.

last 6 mos.;	6 - 12 mos.;	1 - 2 yrs.;	2 - 3 yrs.
0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4

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