LOCUS OF CONTROL AND FREQUENCY OF OCCUPATIONAL INJURY

A THESIS

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CHAPTER I

INTRODUCTION

The occurrence of occupational injury within American industry has a significant impact on involved individuals. The injured worker suffers pain and discomfort as a result of the accident. Also, there may be a subsequent decline in personal income as a result of the injury. These first two factors become more significant should the injury cause permanent disability. The corporation where the individual is employed suffers a loss of production and a possible decrease in profits. Also, the firm is responsible for compensation to the injured worker.

To reduce the occurrence of occupational injury and to provide a safer, hazard-free work environment, laws which govern on the job safety and health have been legislated by state and federal governments. Additionally, federal and state agencies have specified rules and regulations which are concerned with the provision of safety in the workplace. Finally, non-governmental organizations concerned with safety have published guidelines for industry.

The provision of a safe environment for the client has long been recognized as one of the primary goals of nursing intervention. Regardless of the setting, safety for the individual in his health care domain is one of the first considerations of the nurse. The nature of the intervention may vary depending upon the setting; however, the intent to provide for the safety of the client remains constant.

Consideration for safety is of utmost importance to the nurse in the occupational setting. One of the major objectives of an occupational health program is to protect employees from health hazards arising from occupational processes or the environment. The occupational health nurse must be constantly alert for ways and means of providing a safe workplace, and reducing the incidence of occupational injury.

Despite the emphasis on safety and health by the government, non-governmental safety organizations, and occupational health programs, it is the individual worker who must internalize the concepts of accident prevention for himself. The individual worker must visualize the need for on the job safety and personally accept the goals of an accident prevention program before such a program can be effective in reducing the incidence

of occupational injury. In short, the individual must believe that he has control of his destiny in the area of occupational injury in order to prevent accidents on the job.

Perception of control of one's environment is reflected in an individual's locus of control. The construct of locus of control developed out of social learning theory (Rotter 1954). Over one thousand studies have been conducted since 1954 which have derived their hypotheses from social learning theory. Of these studies, the vast majority have investigated the construct of locus of control.

Individuals who believe that what happens to them in life stems from their own behavior and/or control are classified as internally controlled. Others who feel their lives are beyond their own control and are determined by fate, chance, or powerful others are termed externally controlled (Rotter 1966).

Existing research suggests that internally controlled individuals are more likely to control their environments, but the extent to which internals manipulate their environment to prevent occupational injury is subject to speculation. This study investigated the

relationship between locus of control of an individual and his frequency of occupational injury in an industrial firm.

Statement of Problem

The problem of this study was to determine the relationship between locus of control and frequency of occupational injury among employees in a manufacturing firm.

Statement of Purposes

The purposes of this study were to determine:

1. The locus of control of individual employees within a manufacturing firm

2. The frequency of occupational injury of these employees in the manufacturing firm

3. If a relationship existed between locus of control and frequency of occupational injury among employees in the manufacturing firm

Background and Significance

The impact of occupational injury on the American economy is significant. On the average, one in every eleven workers in the private economy experienced a job related injury or illness in 1977 (U.S. Department of Labor 1978).

There were almost 5.3 million work related injuries in 1977 which was an increase of nearly 300,000 from the 510 million level of 1976. The number of injuries involving lost worktime increased to 2.1 million. Injuries which did not result in lost worktime numbered 3.1 million. Approximately 35.2 million workdays were lost due to work-related injuries during 1977, the equivalent of a full year's work for about 140,000 workers. As a measure of severity, the incidence rate of lost workdays per 100 full-time workers was 60.0 in 1977. Nearly 95 percent of all lost time injuries resulted in time away from the worksite and in almost three out of every ten of these lost workday injuries, the duration was fifteen or more days away from work (U.S. Department of Labor 1978).

The overall incidence rate of occupational injuries in 1977 was 9.0 per 100 full-time employees. In manufacturing, the average was 12.6 per 100 full-time employees, while in fabricated metal products the rate was 18.5 (U.S. Department of Labor 1978). The total cost of work accidents in 1977 was over $18.0 billion. This statistic includes lost wages, medical expenses, insurance administration costs, fire losses, and indirect costs arising out of work accidents (National Safety Council 1978).

Safety programs have been established by corporations in order to influence the individual worker's safety behavior on the job. In 1970, the Occupational Safety and Health Act was passed by Congress ". . . to assure so far as possible every working man and woman in the Nation safe and healthful working conditions. . ." (Occupational Safety and Health Act, 91 Stat. 1590, 1970). As evidence that accidents can be controlled, from 1970 to 1977 work-related fatalities declined from 14,000 to 4,760 though more persons were employed in 1977 than in 1970 (U.S. Department of Labor 1978).

The concepts of behavior potential, expectancy, and reinforcement value are basic to Rotter's Social Learning Theory of Personality (Rotter 1954). The theory was developed by Rotter in collaboration with his students and other colleagues in an attempt to account for human behavior in relatively complex social situations.

Reinforcement, reward, or gratification is universally accepted as vital in the acquisition and performance of skills and knowledge. However, the way in which these rewards or reinforcements are perceived may vary from person to person. Rotter (1966) has said:

> One of the determinants of this reaction is the degree to which the individual perceives that the reward follows from, or is contingent upon, his

> own behavior or attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own actions (p. 1).

When a reinforcement or reward is perceived by an individual as subsequent to some action of his own, but not being totally dependent upon his actions, it is perceived as the result of luck, chance, fate, or unpredictable. When the event is interpreted in this manner by an individual, the belief is labeled external control. On the other hand, if the individual perceives that the event is a result of his own behavior or his own characteristics, the belief is labeled internal control (Rotter 1966). Substantial research on different populations has validated the scale in a variety of field and experimental situations (Lefcourt 1976; Rotter 1972).

The existing research suggests that the internally controlled individual would be more likely to attempt to control his environment. For example, Seeman and Evans (1962) demonstrated that patients in a tuberculosis hospital who scored toward the internal end of the continuum knew more about their physical condition, were better informed about the nature of tuberculosis, and were seen by hospital personnel as being more informed, better patients than were externals. Gore and Rotter

(1963) have shown that scores on the Internal-External Scale relate directly to social action taking behavior. Williams and Nickels (1969) found, contrary to their hypothesis, that externality and accident proneness varied together in a population of college students.

These and subsequent studies provide strong support for the hypothesis that the individual who has a strong belief that he can control his own destiny is likely to attempt to control his environment. Thus, the question which forms the foundation for this study is whether the internally controlled individual would be more likely to manipulate his environment to prevent occupational injury than the externally controlled individual.

Hypothesis

The null hypothesis was tested:

There is no significant relationship between the locus of control of blue-collar workers in a manufacturing firm and the frequency of occupational injury within this group.

Definition of Terms

The following terms were defined:

Blue-collar worker--designating industrial workers, who are distinct from white-collar industrial workers

External control--belief by an individual that his reinforcements stem from luck, fate, or powerful others (Rotter 1966, p. 1)

Internal control--belief by an individual that his reinforcements stem from his own behavior or control (Rotter 1966, p. 1)

Locus of control--the continuum of personality traits from internally controlled to externally controlled as measured by the Rotter I-E Scale (Rotter 1966, p. 10)

Occupational injury--any injury such as a cut, fracture, sprain, or amputation which results from a work accident

Limitations

Limitations which were accepted are the following:

The extent of knowledge of safety information of the participants was not assessed

The recording of occupational injury in the health record may not have been accurate and complete

The sample was limited to only those who were willing to participate

Individuals may have responded to the I-E Scale in a socially acceptably manner

Delimitations

The delimitations were:

Only blue-collar workers were included in the study

The participants were between 18 and 65 years of age

The participants had been on the job for a period of one year or longer as of January 1, 1978

The frequency of occupational injury was computed for the calendar year 1978

Assumptions

Assumptions were the following:

An individual's locus of control is stable with respect to time

Human behavior is goal-directed and determined by the interrelationship of expectancy, reinforcement value, and the psychological situation (Rotter, Chance, and Phares 1972)

Summary

Chapter I has presented an introductory description of the study, designed to explore the relationship between locus of control and frequency of occupational injury among industrial workers. The concepts of occupational injury and locus of control are examined in Chapter II which presents a comprehensive review of the literature. The procedure for collection and treatment of data is addressed in Chapter III. The setting of the study as well as the population from which the sample was taken are discussed along with the tools utilized to measure locus of control and occupational injury. The method of data collection is also presented. Chapter IV is an analysis of the data, and Chapter V includes the summary, conclusions, implications, and recommendations for further study.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The concepts of occupational injury and locus of control are examined in this chapter. The terms "occupational injury" and "accident" are defined. The status of accident research is presented. Causative factors associated with accidents and accident behavior are addressed.

There have been few scientific studies concerned with accident research. Kiefer (1973) observed that much of the lack of emphasis in this area could be attributed to public attitudes. Chief among these attitudes is the belief that accidents result from bad luck and are inevitable. Haddon (1975) cited the lack of funding for research as one of the primary reasons for the small number of scientific research studies in the safety/accident area. Due to the paucity of research concerning these concepts (safety/accident), this review will include some references from more than ten years in the past.

The section concerned with locus of control reviews the background of the construct and research in the following areas: information seeking and

utilization, attempts to control the environment, achievement, decision making, problem solving, and reaction to threat.

Occupational Injury and Accidents

Occupational injury, according to the U.S. Department of Labor (1978), is "any injury such as a cut, fracture, sprain, or amputation which results from a work accident" (p. 2). The focus of this definition is the term "accident."

Webster's New World Dictionary (1970) presented the primary definition of accident as follows: "A happening that is not expected, foreseen, or intended" (p. 8). This definition conveys the idea which Haddon, among others, cited as the cause of the lag in accident research. According to Haddon, Suchman, and Klein (1964), accidents seem to be commonly regarded by the general public and even by many researchers as resulting from causes that are basically different from those that lead to disease and everyday events. Haddon, Suchman, and Klein (1964) also stated that "luck," "chance," or "fate" are culturally acceptable explanations of accidents, despite the fact that such terms are no longer used to explain the cause of disease.

Accidents are frequently defined as the occurrence of unexpected physical or chemical damage to living or nonliving structures. Thus, "cuts, chemical burns of the skin and broken equipment are all regarded as accidents" (Haddon, Suchman, and Klein 1964, p. 3). Heinrich (1931), considered to be the father of industrial safety, defined accident as "an unplanned and uncontrolled event in which the action or reaction of an object, substance, person, or radiation results in personal injury" (p. 14).

Suchman (1964) stated that research on accidents must begin with an attempt to define more clearly which events shall be called accidents. He posited that no single definition would cover all the events of interest to the student of accidents and that much would depend upon the objectives of the researcher.

In the view of medicine and public health, accidents are listed among the various diseases as a cause of death. Accidents are viewed as causes of injury. The accent is upon the results of the event as determining whether or not that event will be called an accident. The same event, such as an automobile accident, will be called an accident if it results in an injury, but not called an accident if the individual drives away without any bodily harm. Hence, the medical emphasis lies in

preventing, reducing, or treating injury. Accidents, from a medical perspective, are of interest only as causes of injury or death (Suchman 1964).

According to Suchman (1964), other points of view in addition to those of a medical orientation are possible. The field of law would probably be more interested in the cause than the consequences of the accident. Here the emphasis is upon the unanticipated factor in the definition of accident. A legal analysis might attempt to determine to what extent an individual should be held responsible for the sequence of events leading to the accident.

Status of Accident Research

For more than half their lives, the people of the United States and many other Western countries are more likely to die from accidents than from any other cause. Even in the world as a whole, accidents as a cause of death are now outranked only by cancer and cardiovascular disease (Lowrance 1976). Despite the strong parallels between accidents and disease in terms of causation and prevention, sharp differences exist between them in terms of research efforts. Haddon (1973) stated that in disease a vast program of research is underway involving

professionals from many disciplines working in excellently equipped laboratories and amply supported by public and private funds.

Kiefer (1973) observed that much of the answer to why the lack of emphasis in prevention of accidents lies in public attitudes. Among these attitudes is the belief that accidents are chiefly the result of bad luck and are inevitable. He further noted that the public's attitudes toward accidents are evidenced by the small efforts and interest in safety as compared to the dollars and emotion dedicated to research in heart disease and cancer.

Goverment support of research is generally a reliable index of activity in an area of investigation. The Chief of the Research Grants Section, Division of Accident Prevention, U.S. Public Health Service estimated:

> . . . that more than 300 times as much money is currently being spent in the United States on medical research as on accident prevention research, despite the fact that accidents are the leading cause of death among those aged 1-34, and the cause of more than 45 million injuries annually (Haddon 1973, p. 4).

Haddon (1973) observed that the small amount of research underway was performed by dedicated but often irrelevantly trained professionals whose daily work has brought them face to face with the accident problem.

Causative Factors

Causative factors associated with accidents are of concern to researchers. Writings on the topic are divided along Heinrich's (1931) division of accident causation. These divisions are unsafe acts and unsafe conditions.

Halsey (1961) stated that the basic causative factor of accidents was human kind. He felt that accidents are caused by what people do or do not do in consideration of physical, psychological, physiological situations. He observed that acceptance of this idea would foster the destruction of the belief that accidents are the result of uncontrollable events.

McLean (1967) noted that 90 percent of accidents are caused by human failure--poor mental health, alcoholism, stress, or attitudes. Hale (1972) found that youth and inexperience often are related in accident causation with the highest percentage of accidents occurring in people aged 16-25. Barber and Donovan (1971) specified that accidents, whether the direct result of unsafe acts of workers or by the presence of hazardous conditions, may be attributed either to worker groups or to management.

Hale and Hale (1972) reviewed the accident literature and identified 355 studies concerned with human error and the human element as a cause of accidents. In the preface of his text on safety management, Peterson (1975) suggested that substantial breakthroughs in safety records would not be achieved until the fundamental cause of accidents, the errors made by human beings, was eliminated. Tye (1977) observed that over 80 percent of accidents could be directly attributed to human error and that very few of them have anything to do with machinery.

Writing on unsafe conditions, Bernacki (1976) observed that environmental factors in accident causation are easier to control because personal habits do not have to be changed, but they are usually costly. He also asserted that efforts to modify or alter personal habits are less expensive, but frequently result in failure because a lifetime of patterned responses is not easily changed.

Publications (Baker 1975; Haddon 1974; Wigglesworth 1976) on accident prevention are consistent with the conceptual framework originally proposed by Haddon in 1961. Measures designed to improve the "faulty" environment have significantly greater value than measures designed

to improve "faulty" behavior (Wigglesworth 1978). Active safety behavior involving human effort must depend upon consistent participant behavior. Passive safety programs, on the other hand, alter the environment and, thereby, have the potential of affecting safety despite the behavior of the human being involved (Haddon 1974).

Accident Behavior

Research has been accomplished on personal factors and behavior of all kinds related to accidents. However, due to a lack of resources and the general social attitude toward accidents, the research is limited in both quantity and quality. The following review presents accident behavior research from 1954.

Whitfield (1954) tabulated the accident rate among British coal miners. The accident records of over 3,300 miners in six different industries were evaluated. The evidence suggested that the accident rates decreased with age and that those under 20 years of age had the highest rate. He assumed that the younger men failed to appreciate the demands of a given situation, to perceive a hazard, or to decide upon an appropriate response.

King (1955) examined the age distribution of agricultural workers who had sustained accidents. The health

records were analyzed by the researchers. The findings suggested that there was a change with age in the nature of the accident. Older men had a higher proportion of falls from heights or from machines or being hit by falling objects. King (1955) postulated that this change with age in the nature of the accident was due to the older person's failing to respond quickly enough in dangerous or hazardous conditions.

Westerlund (1958) conducted a study to ascertain the antecedents of work accidents. He compared the total circumstances of the victims of one hundred work accidents with a control group of manufacturing workers who had suffered no accidents. Health and accident reports were reviewed. Accidents were associated with workers new to their jobs, working in an environment with which they were unfamiliar, or with the aid of tools not officially intended for that purpose. They were also associated with failure to carry out the fully planned programs of training and instruction. The conclusion of this study was that training for both skill and safety was the most promising way of reducing accidents.

In another study of the antecedents of industrial accidents, Hirschfield and Behan (1963) analyzed the accident reports of more than three hundred steel workers.

The study found that physical injury was the result of a psychological process in almost every instance. The findings suggested that a marked state of anxiety, depression, and conflict had occurred in the worker prior to the accident.

Surry (1968) cited a study by Rockwell in 1967. Rockwell examined risk-taking behavior in a controlled laboratory setting. A person's judgment of risk was found not to be related to the hazard as measured by his performance capabilities. The results indicated that skilled workers took less risk than unskilled, younger persons took higher risks, and females took considerably less risks than males. These laboratory tests showed no correlation between risk taking and various psychological or biological measures, though the risk taker tended to be a person with a high anxiety level, high sociability, and low emotional stability.

Guilford (1973) tested the hypothesis that accident incidence in one environment bears a positive relationship to accidents in other settings. Two hundred and twenty-six subjects performed standardized household tasks under observation in a kitchen laboratory. The accidents incurred by the subjects were tallied and compared with automobile accidents and violations incurred

by the subjects for the previous four years. Significant (p. 05) correlations were found between automobile accidents, automobile violations, and kitchen accidents/ incidents. These intercorrelations served to confirm the hypothesis that accident incidence in one environment bears a positive relationship to accident incidence in other settings.

Akman, Brooks, and Gordon (1972) scrutinized accident rate tables in order to develop a model of work injuries and fatalities on the state level in California. They found that younger male workers had a greater susceptibility to injuries than older male workers. Also, there appeared to be a steady decline in the probability of work injury with increasing age over the working lifetime.

Raytheon Service Co. (1972) examined the relationship between plant noise and certain medical problems, accidents, and absentee entries in the records of five hundred workers situated in noisy plant areas (at or above 95 decibels) over a five year period. The tallies, especially for the larger and noisier or the two plants from which records were drawn, showed that those exposed to high noise levels had clearly greater numbers of somatic complaints, diagnosed medical problems, discrete

absences, total days absent, and job-related accidents than those not so exposed.

Bramwell et al. (1975) were concerned about the perception of life events and injury. A selected sample of 82 college football players was chosen to participate. A tool which measured the perception of life events was administered to the subjects and results compared with injury. The data indicated that the risk of an injury to a football player increases in direct relationship to the accumulation of challenging life events under study. The relationship between risk of injury and challenging life events was supported for both one and two years prior to participation.

Cimino (1975) catalogued information on health and safety in the solid waste industry in a longitudinal study. The health records of workers in the New York City solid waste industry were analyzed. The data indicated that manual labor involved with driving and loading accounted for 90 percent of injuries. Thirty-two percent of injuries were incurred by individuals who were performing functions to which they were not specifically assigned. Cimino (1975) extended the notion that this statistic may reflect the hazards associated with the performance of unfamiliar duties.

McGuire (1976) presented a review of the research which has shown that, in general, the individual who has accidents is emotionally less mature, less responsible, more asocial/antisocial, and not as well adjusted as the accident-free person. He/she tends to have a more disturbed history, such as an unhappy childhood, delinquency, family disruption, and uneven work record. Many characteristics of the person who has accidents were found to be age-related, and, among "normal people" tended to be modified as they mature.

Similar findings were reported by Rouleau (1975). The author described the characteristics of people who appear to be predisposed to having accidents and noted that they are more inclined to be impulsive, tolerate less tension, and handle their aggressions less well.

Graham, Davis, and Miller (1977) evaluated chain saw injuries in an attempt to discover the causes of these injuries. The accident reports of 23 subjects were included. The researchers found that inexperience of the operators was the greatest contributor to accident causation.

Levine et al. (1977) hypothesized that life change experiences could be correlated with the occurrence of future accidents. The selected sample of 134 industrial

workers was administered the Life Change Units tool. Over the course of one year, recent life change events were found to significantly correlate with future incidents of body trauma.

Pestonjee, Singh, and Ahmid (1977) were interested in employee morale and industrial accidents. Four hundred seventy-six workers in a manufacturing plant were divided into experimental and control groups. Morale and accident rates were compared. The accident group was found to have a lower sense of participation in the organization. The authors suggested that changes in employees' attitudes toward the job will reduce the accident rate more effectively than a modification in the work environment.

Ballou and Buchan (1978) investigated the relationship between gender and accident etiology in the precision manufacturing industry of the state of Colorado. The state accident board records were analyzed by the researchers to provide the data. The authors found that gender is not a major factor in accident etiology. The data indicated that inadequate employee training and poor conditions contribute more to accident etiology. The evidence revealed that half the victims were in their first year of work.

Neither empirical or theoretical support was found for the biorhythm model in a study by Persinger, Cook, and

James (1978). According to the model, accidents are more likely to occur during the "critical days" of three sinewave-like cycles. Analysis of four hundred mining accidents from two separate industries demonstrated that the number of employees who were involved with accidents on their individual critical days did not differ significantly from chance expectancy.

Tasto (1978) speculated on the relationship between rotating shift work and accidents. Researchers studied health and safety files of over 1,200 nurses and 1,200 food processors who were divided equally among the four types of shifts; day, afternoon, night, and rotating. The data affirmed that people who rotate shifts have significantly more accidents than those who work permanent shifts.

This review of accident behavior has presented the research on personal factors of various kinds that are related to accidents. Individual researchers have studied accident causation from either of two perspectives, the human factor or the environment.

Locus of Control

The review of locus of control literature is aimed toward an evaluation of locus of control which relates to

behavior in the area of occupational injury. The topics addressed are: information seeking and utilization, attempts to control the environment, achievement, decision-making and problem-solving, and reaction to threat.

The preceding discussion of occupational injury and accident behavior is founded, in part, on the premise that human beings are responsible for accidents and the injuries which result from them. In other words, the individual worker controls his destiny in the area of work accidents. The idea that one can affect a change in one's environment can be correlated with the concept of locus of control (Rotter 1966).

The construct of locus of control is an outgrowth of research by Rotter on a social learning theory (SLT) of personality (1954). Control, which may either be internal or external, was derived from the concept of expectancy within social learning theory.

Consideration of expectancies is a basic part of social learning theory. The occurrence of a certain behavior by a person is determined not only by the importance of the goals, but also by the anticipation or expectancy that these goals can be achieved. These

expectations are founded on previous experience and can be measured (Rotter, Chance, and Phares 1972).

According to social learning theory, an individual's behavior is guided by the belief that behavior will lead to goal attainment. Reinforcement resulting from goal achievement is also an important determinant of behavior. The importance of a given expectancy will depend upon prior experiences with certain behaviors and their results. Past success in a situation will lead to an expectancy that such behavior will be effective in the future. Conversely, negative reinforcement will decrease expectancies that a behavior will achieve a specified goal (Phares 1976).

That reinforcement or reward is crucial to the acquisition and performance of skills and knowledge is an accepted law of learning. However, some persons regard an event as reinforcement or reward while others may perceive the event differently (Rotter 1966). Rotter (1966) has said:

> One of the determinants of this reaction is the degree to which the individual perceives that the reward follows from, or is contingent upon, his own behavior or attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own actions (Rotter 1966, p. 1).

Those who perceive an event as dependent on their own behavior characteristics are described as having a belief in internal control. When the reinforcement is interpreted by the individual as being the result of luck, chance, fate, as under the control of powerful others, or as unpredictable, the belief is labeled as external control (Rotter 1966).

Studies regarding locus of control have been numerous. Major literature reviews have been published by Lefcourt (1966); Rotter (1966), Rotter, Chance, and Phares (1972); Lefcourt (1976), and Phares (1976).

Information Seeking and Utilization

Research has tended to support the hypothesis that internally oriented individuals demonstrate more initiative effort, and success in controlling their environments through the acquisition and utilization of relevant information than do externally oriented individuals. For example, Seeman and Evans (1962) studied hospitalized tuberculosis patients and assumed patients wanted to return to health--that wellness was valued. They found that internally controlled patients, as classified by Rotter's Internal-External Scale, were more knowledgeable about their disease and that staff considered them to be

more highly informed than were externally controlled patients. Seeman (1963) also asserted that internally controlled prison inmates knew more about achieving parole than did those who were externally controlled. Thus, the striving for knowledge to gain some degree of control over one's life situation is more commonly attributed to those with internal control. This finding has been confirmed in later studies (Davis and Phares 1967; Phares 1968; MacDonald 1973).

Other support for Seeman's (1963) earlier studies was provided by Lowery (1974) who scrutinized disease related learning and disease control in diabetics. She learned that internally controlled diabetics knew significantly more about their disease than did those who were externally controlled. Her data also indicated a strong relationship between locus of control and length of illness. Lowery (1974) concluded that locus of control was important in diabetic learning and control.

Davis and Phares (1967) tested the hypothesis that internally oriented persons are superior to externally oriented persons in information-seeking and utilization. These researchers analyzed the effect of locus of control on the behavior of students preparing to influence the attitudes of others. College students in a beginning

psychology class were administered a series of tests including the locus of control scale. The subjects were then instructed regarding the assigned task of influencing the attitudes of others. The results showed that internally oriented students sought more information about the people they were expected to influence than did the externally oriented students. The findings implied that those who are internally controlled will attempt to actively control their environment by obtaining the requisite information which will enable them to do so.

Phares (1968) conducted a study which was designed to show that internally controlled individuals were more successful than externally controlled individuals in the use of information. Internals and externals were compared in their abilities to use information gained from the same source for decision making. He found that internals were more likely to use information than externals who had the same information source. Phares (1968) suggested that his findings showed that internals should have greater potential for controlling their environments.

Miller (1970) raised the question as to the difference between internally controlled and externally controlled persons and their willingness to engage in information seeking. He divided subjects at random into

either high or low threat groups as determined by an artificial psychological measure. The subjects were then placed in experimental threat situations. The researcher found that no matter whether the threat was high or low, the internally controlled subjects more readily sought information about the situation in order to combat the threats.

Another study which included patients as subjects also supported Seeman's (1963) findings. Johnson and Levanthal (1971) found that internal-external control was related to an individual's ability to influence post-surgical care in a hospital. In examining response processes in adaptation to surgery, locus of control was evaluated in regard to patient's ability to control their environment. Internals were found to be more successful in controlling their environment as reflected by their obtaining more doses of analgesics and by the length of their post-operative hospital stay.

Williams and Stack (1972) studied Black students and the effect of locus of control on their information-seeking behavior. The investigators claimed that internal subjects asked significantly more questions to determine information necessary for an anticipated task than did external subjects. From these findings, the researchers

held that the amount of information-seeking was predictable on the basis of locus of control.

Ducette and Wolk (1973) hypothesized that, in situations where information can be found, internals are better able to obtain information from their environment and then use this information to solve a problem. They used a simple problem-solving task in which the experimenter provided a non-verbal cue to suggest a solution to the problem. The results indicated that internally controlled subjects required fewer trials to discover the rule for successful problem solving. This finding extended the notion that internally controlled individuals were more successful in extracting information from the environment and determining its usefulness for problem solution.

The purpose of a study conducted by Wallston, Maides, and Wallston (1976) was to test the proposition that subjects who held internal locus of control beliefs and who also highly valued health would choose to expose themselves to more information about a given health condition. Forty-four male and forty-four female college students volunteered for the study in order to aid a proposed free hypertension clinic. The subjects completed a booklet of instruments that ascertained background

information, the Internal-External Scale, and a measure of the relative value that they placed on health. Next, after reading a mildly threatening message about the dangers of hypertension, and then taking a difficult knowledge test designed to reinforce the feeling of inadequate knowledge, the subjects were asked to choose from among a list of pamphlet titles related to hypertension. The findings were consistent with the hypothesis that high health value internally oriented subjects chose more pamphlets than all other types of subjects.

Control of Environment

Several studies have held that internally controlled individuals attempt to control their environments more than externally controlled. Smokers and non-smokers and their reactions to the Surgeon General's report on the effects of smoking were evaluated by James, Woodruff, and Werner (1965). Their findings implied that once habituated to smoking, externally oriented individuals held a significantly more fatalistic view of the harmful effects of smoking than internally oriented individuals. Internally oriented women were much more affected by the report than externally oriented women, while many more internally controlled men gave up smoking than did externally controlled men.

Three studies have been conducted which evaluated the experimenter's influence in a social setting. Phares (1965) performed an experiment with 179 male and 256 female college students. As hypothesized, internally controlled experimenters were able to induce significantly greater change in expressed subject attitudes than were externally controlled experimenters. In a similar study by Doctor (1972), the anticipated experimenter effects were nonsignificant. Felton (1971) investigated the relationship that internally controlled experimenters would perceive control and place high value on reinforcement available. Felton (1971) discovered that after subjects participated in a task, they performed consistently more in the direction of the experimenter's expectations when the task criterion response was highly ambiguous than when it was less ambiguous. Therefore, not only may the Internal-External control of the experimenter influence the outcome of a task, but the nature of the task itself.

In a study of locus of control versus environmental control, Julian, Lichtman, and Ryckman (1968) instructed a group of blindfolded subjects to choose a position on which to stand in a dart-throwing exercise. The data revealed that significantly more internally controlled subjects than externally controlled subjects chose a

closer position from which they had greater control of their performance.

Schneider (1968) administered internal-external and activity preference scales to male and female subjects. The hypothesized relationship between perceived external control and chance preferences was strongly supported for males but not for females. Schneider (1972) then conducted two additional studies which utilized a separate scale of activities for each sex. The results of these studies showed that when there was congruence between sex of the subject and sexual identity associated with a given activity, those with perceived internal control tended to prefer skill activities over chance to a greater extent than did those with perceived external control.

Jones and Schrauger (1968) investigated internal-external control and interpersonal evaluation. Their research showed that externally oriented individuals reciprocated in their evaluations of others more than did internally oriented individuals. The researchers concluded that those who were internally controlled viewed the evaluations they sent others as influencing the social outcomes of the situations.

Academic Motivation and Achievement Motivation

The relationship between locus of control and academic achievement and achievement motivation has received investigative emphasis in recent years. Academic achievement is related to the achievement associated with work in industry and could be related to safety behavior.

Liverant and Scodel (1960) contrasted locus of control with decision-making under risk conditions. Subjects were asked to bet on the outcome of thirty trials of dice throwing as well as to give their objective probabilities for success. Internally oriented individuals chose significantly more intermediate bets and significantly fewer low probability bets than externally oriented individuals. Significantly more internally controlled subjects as compared to externally controlled subjects never selected an extreme high or low probability bet, and the amount of money wagered on safe versus risky bets was significantly greater for internally controlled subjects. There was also a tendency for the internally oriented participant to be less variable in choice of alternatives.

Rotter and Mulry (1965) assessed the relationship between decision-time and locus of control. They discovered that internally oriented subjects as measured by the I-E Scale took longer to decide in a matching task when the task was defined as skill controlled than when it was defined as chance controlled. The opposite was found to be the case for externally controlled individuals.

Phares (1968) claimed no significant difference was found between internally oriented subjects and externally oriented subjects with regard to learning of information. Internally controlled participants did, however, utilize information acquired much better than externally controlled participants who learned the information to the same level of proficiency.

Lefcourt, Lewis, and Silverman (1968) predicted that internally oriented subjects would show more attention to, and more task-relevant cognition in a skill-determined than chance-determined task, while the reverse would be shown for externally oriented subjects. The researchers found that internally controlled subjects did appear to be biased toward accepting skill directions and rejecting chance ones. Therefore, when that bias was included in the data analysis, the predicted differences in values of the task were obtained.

In studies of elementary and high school students, McGhee and Crandall (1968) measured the children's perceptions of their successes and failures in school. Despite the fact that levels of correlation did not always reach significance, internally controlled children in both studies consistently attained higher academic performance scores on course grades and achievement tests.

Hjelle (1970) achieved only minimal support for the prediction that internally controlled college students would obtain significantly higher quality grade averages than their externally controlled counterparts. Hjelle (1970) contended two possible reasons for the lack of relationship discovered. First, there may have been an overabundance of college students who had arrived at an external view of the world as a defense against failure, but who were originally highly competitive. Thus, the externally oriented students would still maintain a strong achievement motivation in clearly structured competitive situations. Secondly, the internal-external dimension was probably not generalizable across all situations.

A study of ascribed causes and achievement motivation was conducted by Weiner et al. (1972). The results of their study extended the notion that those who perceived their failure as due to lack of effort or bad luck did

not decrease their expectancies for success as markedly as those who did not believe that not trying hard or hard luck were responsible for their failures.

Ducette and Wolk (1972) studied 138 high school students as respondents in a study of the subjects' perceptions of their own performance on course examinations and an extra-sensory perception (ESP) experiment. Internally controlled subjects were found to be more sensitive to environmental stimuli. Internally oriented subjects differed from externally oriented subjects on all three processes measured. Internally oriented individuals extracted and recalled information better and used it more efficiently than those who were externally oriented.

Messer (1972) evaluated academic performance of 78 fourth graders. The results indicated that internally oriented students had higher grades and higher achievement test scores than externally oriented students, even when I.Q. and cognitive impulsivity were controlled.

Drovetz (1974) looked at the function of locus of control in explaining success or failure. The results of the study implied that internally oriented persons perceived their abilities as bounded; in other words, their ability to control outcomes was within certain limits that

varied with the task. Similarly, externally oriented persons perceived that factors such as chance influence on outcomes were also bounded. Only when the bounds were exceeded did externals attribute outcomes to primarily internal factors.

Utilizing a Rotter based locus of control scale, Duke and Nowicki (1974) compared results from the ANSIE, I-E Scale (1966), and achievement scores. The authors found that ANSIE internality of males related to achievement, but not for females or males with the Rotter scale. Externality on the ANSIE was significantly related to achievement for females which, the investigator concluded, was consistent with a cultural role interpretation.

The major focus of an investigation by Phares and Lamiell (1975) was the way in which internally oriented individuals and externally oriented individuals respond to others depicted as being in need of assistance. The researchers questioned whether internally oriented persons would authorize less help and respond less sympathetically to others requesting assistance than would externally oriented persons. Subjects were asked to rate given case histories on scales regarding helping, financial assistance, understanding, and sympathy. The results demonstrated that internally oriented subjects were significantly less prone

to regard other people in need as deserving. Externally oriented subjects were more likely to give help, money, understanding, and sympathy. The authors concluded that internally controlled subjects viewed themselves as more responsible for their plight than did externally controlled subjects.

Reaction to Threat

When an industrial worker is faced with an unsafe or injury-producing situation, the occurrence will likely be viewed as a threat. Some research has been accomplished which compares locus of control and reaction to threat.

Phares, Ritchie, and Davis (1968) analyzed locus of control and reaction to threat in regard to the following hypotheses:

> . . . when confronted by threatening material which presents a challenge to one's views of himself, an external will react with less anxiety than will an internal.
>
> . . . when both adverse and positive material is presented, the external will forget less of the adverse material than will the internal, while there will be no differences between the two groups as regards the retention of the positive material.
>
> . . . when presented an opportunity to take overt remedial action as regards personal shortcomings, internals will show a greater tendency to do so than will externals (Phares, Ritchie, and Davis 1968, p. 403).

The first hypothesis was unsupported by the data. Internally oriented subjects did not report greater anxiety in response to threat than externally oriented subjects. Externally controlled participants recalled a greater amount of material as predicted by the second hypothesis. Internally controlled participants did indicate greater willingness to confront problems.

Locus of control and anxiety were examined in relation to success or failure on an experimental task (Siegel and Mayfield 1973). Subjects were given two sequences of trials on a task for which there was no correct response. After both sequences, subjects were arbitrarily informed that they were successful or had failed. An anxiety measure was then administered. Results indicated that external subjects who had failed were lower in anxiety than external subjects who had succeeded, internal subjects who failed, and internal subjects who had succeeded. The authors concluded that external beliefs may provide for greater flexibility in dealing with anxiety from threat.

Summary

This chapter presented the current state of literature regarding the two major variables of concern in this

study, occupational injury or accident behavior and locus of control. Non-uniform and a basic lack of research was noted in the area of occupational injury. Current opinion seemed to be divided as to cause and/or emphasis regarding prevention of accidents. Some experts would endorse extensive behavior modification programs to control the human factor in accident etiology. Other knowledgeable persons would undertake vigorous environmental alterations in order to reduce the incidence of occupational injury.

Locus of control was shown to be a variable which has received much attention in the research literature of recent years. Studies were examined which related locus of control to certain aspects of accident behavior. In general, there was support for the proposition that internally oriented individuals demonstrate more initiative, efforts, and success in controlling their environment than do externally oriented individuals.

CHAPTER III

PROCEDURE FOR COLLECTION OF DATA

This chapter presents the methodology used in the investigation of the relationship between locus of control and occupational injury. Included are a description of the setting and the population for the study. The research tools and procedure for the collection and treatment of the data also are described.

Prior to beginning the study, approval was obtained from the Texas Woman's University Human Research Review Committee (Appendix C). Approval also was secured from the manufacturing firm where data were gathered (Appendix D). Prior to participation, each individual received an oral explanation of the study, including potential risks and benefits, and the procedure for data collection. Subjects were assured that they were free to participate or to refuse or to withdraw at any time. Willingness to participate and informed consent was shown by the individual's signature on the consent form (Appendix E).

Setting

The data for this investigation were collected in a small manufacturing firm in a metropolitan area in the southwestern part of the United States. The firm had approximately 4,000 employees, and engaged in the manufacture of equipment for the petroleum industry.

Population and Sample

The population for this study consisted of both male and female blue-collar industrial workers. Additional criteria for the selection of subjects included that participants be between the ages of 18 and 65 years of age, and have been employed for a period of one year or longer as of January 1, 1978.

A non-probability sample was selected from this population and, for the purpose of this study, consisted of those workers who volunteered to participate. For statistical analysis, the number of subjects was 30.

Tool

A paper-and-pencil instrument was administered to collect data for this study. The instrument consisted of a participant data sheet (Appendix B) and the Rotter Internal-External Scale (Appendix A).

A participant data sheet was utilized to obtain demographic data from each respondent. This sheet requested such information as age, sex, number of years employed, educational level, race or national origin, and the type of work performed.

The Internal-External Scale was used to measure the locus of control of each subject. The scale consisted of a forced-choice format of twenty-three question pairs plus six filler items (Appendix A). Internal statements were paired with external statements. One was the value assigned for each external statement selected. The possible range of scores was from zero (most internal) to 23 (most external).

The I-E Scale is considered to be a reliable and valid tool. An internal consistency coefficient (Kuder-Richardson) of .70 was obtained from a sample of 400 college students (Rotter 1966). For two subgroups of Rotter's (1966) sample test-retest reliability coefficients were computed, with a value of .72 for sixty college students, after one month. After two months, an r of .55 was obtained for 117 college students.

Over 50 percent of the internal-external locus of control investigations have employed the Rotter Scale. Literature has indicated that there are individual

differences in perception about one's control over one's destiny and that the Rotter Scale is sensitive to these differences. Detailed literature reviews were available (Joe 1971; Lefcourt 1966, 1976; Minton 1967; Rotter 1966, 1972). Cross-validation studies have examined the correlation of scores of the internal-external scale with other testing instruments.

Collection of Data

Data were collected in the Health Service Unit of the manufacturing firm. Individuals were approached as they arrived in the unit and an explanation of the study was provided. The Rotter Scale was administered. The health record of the prospective participants was then assessed to determine if individuals met the qualifications for participation. The qualifications were the following: blue-collar worker; between the ages of 18 and 65; employed one year or longer as of January 1, 1978.

An oral explanation of the study, including potential risks and benefits and the procedure for data collection, was given to the individuals. An offer was made to answer questions about the study. Anonymity was assured as only the researcher had access to the

compilation of individual data. Each individual was informed that names would not appear in the final report, and that only statistical data would be utilized. The individuals were then asked to sign the consent form which was witnessed by another individual who was designated by the subject.

Individuals who agreed to participate, completed the Participant Data Sheet and the Internal-External Scale in privacy. Completion of the Scale required approximately 15 to 20 minutes. Subjects' scores on the Internal-External Scale were paired with frequency of occupational injury. Subjects' names on the data sheets were used by the researcher to locate the subjects' health records to ascertain the frequency of occupational injury for each subject during 1978.

The answer sheet was hand scored, with the score being the total number of external items endorsed. A score of 11 or below equated with an internal locus of control, and a score of 12 or above equated with an external locus of control. The number of visits to the Health Service Unit for occupational injury was recorded on a tally sheet.

Treatment of Data

In order to determine the existence of a relationship between the independent variable, locus of control, and the dependent variable, occupational injury, the data were analyzed by use of the Spearman Rank Correlation Coefficient. Significance was assigned at the $p < .05$ level.

Summary

Occupational injury is a major expense for American industry (National Safety Council 1978). Guidelines for the control of occupational injury have been developed by the Occupational Safety and Health Administration in an attempt to provide a safe environment for the worker (Occupational Safety and Health Act, 91 Stat., 1590, 1970). Part of on-the-job safety depends upon the individual and his internalizing the goals of an accident prevention program. Perception of goals or reinforcements are basic to determining an individual's locus of control. This study was designed to investigate the relationship between locus of control and the frequency of occupational injury in a manufacturing firm.

CHAPTER IV

ANALYSIS OF DATA

A study was conducted to explore the relationship between locus of control and frequency of occupational injury among blue-collar workers in a manufacturing firm. The Rotter Internal-External Scale was used to measure locus of control. Frequency of occupational injury was tallied from the workers' individual occupational health record.

Demographic variables which were controlled in the selection of the sample were that participants be blue-collar workers between 18 and 65 years of age with a minimum of one year on the job prior to January 1, 1978. Demographic variables not controlled consisted of sex, race or national origin, amount of education, and type of work performed. Demographic data were collected to describe the sample.

This chapter presents an analysis of the data. Tables are used for the purpose of showing the data. The statistical evaluation of the data is presented, followed by a summary of the findings.

Description of the Sample

Thirty-five individuals volunteered to participate in the study. Five of this group were eliminated as they did not meet the criterion of having been employed for one year prior to January 1, 1978.

Although females were not prevented from participating in the study, the sample of 30 workers was entirely male. Divided according to race, 24 workers (80 percent) were White and 4 workers (13 percent) of the sample were Black. The Mexican-American population group was represented by one subject, 3 percent of the sample. One subject was American Indian (3 percent). The education level of the subjects ranged from less than eighth grade education to some college. No subjects had graduated college. One of the subjects (3 percent) had attended less than eighth grade, 5 subjects (7 percent) had some high school, 17 (57 percent) were high school graduates, and 7 (23 percent) had some college. Twenty-seven (90 percent) were machinists, 1 worker (3 percent) was a welder, and 2 subjects (7 percent) were grinders. Demographic data are shown in Table 1.

The mean age of the 30 subjects in the study was 36.3 years, with a standard deviation of 8.3 years. The range of ages was from 22 to 57 years. The mean number

TABLE 1

DISTRIBUTION OF SELECTED SUBJECT CHARACTERISTICS (N=30)

Characteristic	Number	Percent
Sex		
Male	30	100
Female	0	0
Race		
White	24	80
Black	4	13
Mexican American	1	3
American Indian	1	3
Education		
Eighth grade or less	1	3
Some high school	5	17
High School graduate	17	57
Some college	7	23
College graduate	0	0
Type of Work		
Machinist	27	90
Welder	1	3
Grinder	2	7

of years employed in the manufacturing firm was 6.6 years, with a standard deviation of 2.9 years. The years employed ranged from 2.5 to 17 years.

Statistical Analysis

The hypothesis which was tested in this study was: There is no significant relationship between the locus of control of blue-collar workers in a manufacturing firm and

the frequency of occupational injury within this group. The Rotter (1966) Internal-External Scale was the instrument used to measure the locus of control of the sample group (Appendix A). The scale consisted of a forced-choice format of 23 question pairs plus 6 filler items. Internal statements were paired with external statements. A value of one was assigned for each external statement selected. The possible range of scores was from zero (most internal) to 23 (most external). A score of 11 or below was equated with an internal locus of control, and a score of 12 or above was equated with an external locus of control. The individual frequency of occupational injury was tallied from the occupational health records of the workers for the year 1978.

Twenty subjects (66.7 percent) scored 11 or below and were classified as internally controlled. Ten subjects (33.3 percent) scored 12 or higher and were classified as externally controlled. The frequency distribution of internal and external locus of control scores is shown in Table 2.

The means, standard deviations, and ranges for internally oriented scores, externally oriented scores, and occupational injury for each group were computed.

TABLE 2

FREQUENCY DISTRIBUTION OF
INTERNAL-EXTERNAL
CONTROL SCORES
(N=30)

Locus of Control	Number	Percent
Internally Controlled (11 or below)	20	66.7
Externally Controlled (12 or above)	10	33.3

The mean of the internal locus of control scores was 6.9, standard deviation 2.3, range 1 to 11. The mean of occupational injury for the internal subjects was 1.25, standard deviation 2.8, range 0 to 11. The mean of the external locus of control scores was 15.3, standard deviation 2.0, range 12 to 19. The mean of occupational injury for the external group was .21, standard deviation 3.25, range 0 to 7.

The statistical measure used to test the relationship between locus of control and frequency of occupational injury in this study was the Spearman rank correlation coefficient. Scores on the Internal-External Scale were ranked from lowest to highest, most internal to most external. The individual worker's frequency of occupational

injury was ranked in the same direction, small to large frequency.

In order to reach significance at the .05 level, the critical value of r_S for a sample size of N = 30 was .306. The r_S for the sample in this study was .334. Therefore, the hypothesis that there is no significant relationship between the locus of control of blue-collar workers in a manufacturing firm and the frequency of occupational injury within this group was not accepted. The description of the sample according to Internal-External scores and frequency of occupational injury is presented in Table 3. The rank correlation coefficient for this sample is also shown in Table 3.

TABLE 3

LOCUS OF CONTROL OCCUPATIONAL INJURY AND RANK ORDER CORRELATION (N=30)

Variable	Mean	Standard Deviation	Range	Rank Order Correlation
I-O Scores	6.90	2.3	1-11	
Occupational Injury	1.25	1.65	0-11	
E-O Scores	15.30	2.0	12-19	
Occupational Injury	2.10	1.9	0-7	.334*

I-O = Internally Oriented
E-O = Externally Oriented
P = < .05

Discussion of Data

The findings of the study indicated that locus of control and frequency of occupational injury were positively related. This finding is in agreement with the results of several prior studies which reviewed the relationship between locus of control and other behavioral variables.

In his original presentation of the construct of internal versus external control of reinforcement, Rotter (1966) hypothesized that the most important kind of data to assess the validity of the construct involved the attempt of people to better their life conditions by controlling their environment. Beginning with the initial study of hospitalized tuberculosis patients conducted by Seeman and Evans (1962) and followed by Seeman (1963), Gore and Rotter (1963), Strickland (1965), Wallston, Maides, and Wallston (1976), and Phares and Lamiell (1975), the findings lend strong support to the hypothesis that one can affect the environment through one's behavior. MacDonald (1971) asserted that internally controlled individuals believe that they can, while externally controlled individuals believe that they cannot, attain control of their environment.

Summary

This chapter has presented a demographic description of the sample. The frequency of occupational injury was analyzed by internal orientation and external orientation and shown by means, standard deviation, and range. The relationship between locus of control and frequency of occupational injury, calculated by use of the Spearman rank correlation coefficient, was found to be .334, significant at the .05 level. The null hypothesis that there is no significant difference between locus of control and frequency of occupational injury among blue-collar workers was not accepted.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This descriptive study was designed to analyze the relationship between locus of control of blue-collar workers and their frequencies of occupational injury. This chapter summarizes the study and discusses conclusions, implications, and recommendations.

Summary

The problem of this study was to determine the relationship between locus of control and frequency of occupational injury among employees in a manufacturing firm. The purposes were to determine the locus of control of individual employees within a manufacturing firm, to determine the frequency of occupational injury of these employees, and to determine if a relationship existed between locus of control and frequency of occupational injury.

The instrument utilized to measure the locus of control was the Rotter (1966) Internal-External Scale (Appendix A). The questionnaire was pretested with a group of four blue-collar workers who met the criteria

for the study. The individual frequency of occupational injury was tallied from the occupational health records of the workers for the year 1978.

The Internal-External Scale was administered to a sample of 35 workers who volunteered to participate in the study. The hypothesis tested was: There is no significant relationship between locus of control of blue-collar workers in a manufacturing firm and the frequency of occupational injury within this group. The Spearman rank correlation coefficient was used to determine if there was a significant relationship between locus of control and frequency of occupational injury. The correlation was assigned the .05 level of significance. The demographic data were used to describe the sample.

The hypothesis that there is no significant difference between locus of control and frequency of occupational injury among blue-collar workers was not accepted. Comparison of the means of the demographic data revealed that the mean of occupational injury for the internal group was less than the mean of the external group.

Conclusion

The results of this study were consistent with the results of prior research related to locus of control and control of the environment. Individuals who perceive that

their reinforcements stem from their own behavior or control have fewer numbers of occupational injuries than those individuals who believe their reinforcements stem from luck, fate, or powerful others.

Implications

The findings of this study have implications for nurses in practice, and in research. In nursing practice, there should be realization that knowledge of worker behavior alone is insufficient to prevent occupational injury. Behavioral objectives need to be included and cognizance must be taken of the working environment in planning educational approaches. Safety could be enhanced through knowledge about the locus of control of workers. Then, safety education could be planned on an individual basis according to whether the worker was internally or externally controlled.

Nurse researchers should design and evaluate programs to enhance worker safety and the prevention of accidents. To date, research in the area of job safety has been carried out by researchers in the fields of public health and the behavioral sciences. Nurse researchers should join in the multidisciplinary approach to this problem.

Recommendations

The following recommendations for further research were suggested:

1. The study should be replicated in a different geographical locality with a larger sample to enhance the generalizability

2. A situation-specific measure of expectancies regarding locus of control should be developed for prediction of accident behavior

3. A longitudinal study of locus of control and occupational injury should be conducted to assess the stability of perceived control over time

APPENDIX A

INSTRUCTIONS FOR THE QUESTIONNAIRE

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you are concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no right or wrong answers.

Your answers to the items on this inventory are to be recorded on a separate answer sheet which is loosely inserted in the booklet. REMOVE THIS ANSWER SHEET NOW. Print your name and any other information requested by the examiner on the answer sheet, then finish reading these directions.

Please answer these items carefully, but do not spend too much time on any one item. Be sure to find an answer for every choice. Find the number of the item on the answer sheet and circle either the a or b which you choose as the statement more true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you are concerned. Also, try to respond to each item independently when making your choice; do not be influenced by your previous choices.

Remember: Select that alternative which you personally believe to be more true.

Questions

I more strongly believe that:

1. a. Children get into trouble because their parents punish them too much.

   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.

   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.

   b. They will always be wars, no matter how hard people try to prevent them.

4. a. In the long run, people get the respect they deserve in this world.

   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.

   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks one cannot be an effective leader.

   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try, some people just don't like you.

   b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.

   b. It is one's experiences in life which determine what they're like.

9. a. I have often found that what is going to happen will happen.

   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student, there is rarely if ever such a thing as an unfair test.

    b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

    b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.

b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.

b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.

b. There is some good in everybody.

15. a. In my case, getting what I want has little or nothing to do with luck.

b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be boss often depends on who was lucky enough to be in the right place first.

b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

b. By taking an active part in political and social affairs, the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.

b. There really is no such thing as "luck."

19. a. One should always be willing to admit mistakes.

b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.

b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good ones.

b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.

b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.

b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.

b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.

b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. a. People are lonely because they don't try to be friendly.

b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There's too much emphasis on athletics in high school.

b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.

b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.

b. In the long run the people are responsible for bad government on a national as well as on a local level.

ROTTER INTERNAL-EXTERNAL LOCUS OF CONTROL SCALE KEY

1. filler item
2. A
3. B
4. B
5. B
6. A
7. A
8. filler item
9. A
10. B
11. B
12. B
13. B
14. filler item
15. B
16. A
17. A
18. A
19. filler item
20. A
21. A
22. B
23. A
24. filler item
25. A
26. B
27. filler item
28. B
29. A

Score is the number of external item responses chosen. The higher the score, the more external the locus of control.

APPENDIX B

PARTICIPANT DATA SHEET

Name:_____ Age:_____

Sex:_____ Highest Educational Level:_____

Race or National Origin:_____

Number of Years Employed at Otis:_____

What Kind of Work Do You Do?_____

_____

ANSWER SHEET

1.	a b	16.	a b
2.	a b	17.	a b
3.	a b	18.	a b
4.	a b	19.	a b
5.	a b	20.	a b
6.	a b	21.	a b
7.	a b	22.	a b
8.	a b	23.	a b
9.	a b	24.	a b
10.	a b	25.	a b
11.	a b	26.	a b
12.	a b	27.	a b
13.	a b	28.	a b
14.	a b	29.	a b
15.	a b		

APPENDIX C

TEXAS WOMAN'S UNIVERSITY

Human Research Committee

Name of Investigator: Terrance Broadway Center: Dallas

Address: 1710 E. Northgate Apt. 1018 Date: June 29, 1979

Irving, Texas 75062

Dear Mr. Broadway:

Your study entitled Locus of Control and Frequency of Occupational Injury. has been reviewed by a committee of the Human Research Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education and Welfare regulations require that written consents must be obtained from all human subjects in your studies. These forms must be kept on file by you.

Furthermore, should your project change, another review by the Committee is required, according to DHEW regulations.

Sincerely,

Estelle D. Kurtz

Chairman, Human Research
Review Committee

at Dallas.

APPENDIX D

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

DALLAS CENTER
1810 Inwood Road
Dallas, Texas 75235

HOUSTON CENTER
1130 M.D. Anderson Blvd.
Houston, Texas 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE Otis Engineering Corporation

GRANTS TO Terrance M. Broadway, R.N.

a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University the privilege of its facilities in order to study the following problem: Locus of Control and Frequency of Occupational Injury.

The conditions mutually agreed upon are as follows:

1. The agency (may) (~~may not~~) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (~~may not~~) be identified in the final report.
3. The agency (~~wants~~) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (~~unwilling~~) to allow the completed report to be circulated through interlibrary loan.
5. Other: _____

Date 6-30-79

R. H. Hamm Jr.
Signature of Agency Personnel

Terrance M. Broadway
Signature of student

Jean Stair
Signature of Faculty Advisor

*Fill out and sign three copies to be distributed as follows: Original - Student; first copy - agency; second copy - T.W.U. College of Nursing.

APPENDIX E

CONSENT FORM

TEXAS WOMAN'S UNIVERSITY

Consent to Act as a Subject for Research and Investigation:

I have received an oral description of this study, including a fair explanation of the procedures and their purpose, any associated discomforts or risks, and a description of the possible benefits. An offer has been made to me to answer all questions about the study. I understand that my name will not be used in any release of the data and that I am free to withdraw at any time. Please be advised that there is no medical treatment or compensation for physical injuries incurred as the result of participating in this research.

_____ _____

Signature Date

_____ _____

Witness Date

Certification by Person Explaining the Study:

This is to certify that I have fully informed and explained to the above named person a description of the listed elements of informed consent.

_____ _____

Signature Date

_____

Position

_____ _____

Witness Date

APPENDIX F

RAW DATA

Worker Number	Age	Sex	Race	Education Years Completed	Years Employed	I-E Score	Occupational Injuries
01	35	M	W	12	5	1	0
02	32	M	AI	12	11.25	2	0
03	39	M	W	12	8	3	0
04	57	M	W	11	5	4	2
05	48	M	W	12	4.08	5	0
06*	34	M	W	13	2	5	3
07	43	M	W	12	4.5	5	0
08	46	M	W	12	7	6	0
09*	30	M	W	12	2	7	0
10	37	M	W	10	3.5	7	0
11	24	M	W	12	4.5	7	0
12	30	M	W	12	3.5	7	4
13	27	M	W	12	8	8	0
14*	52	M	W	12	1.5	8	1
15	22	M	W	13.5	2.5	8	2
16	56	M	W	6	17	8	0
17	45	M	W	12	15	9	0
18	40	M	W	11	4	9	2
19	25	M	B	15.5	4.5	9	11
20	23	M	W	12	5	10	0
21	40	M	W	12	5	10	3
22*	38	M	W	9	2	10	0
23	35	M	B	14	4.67	10	1
24	34	M	W	13	4	11	0
25	38	M	W	12	17	12	1
26	40	M	W	11	10	13	5
27	25	M	W	12	4	13	1
28	23	M	W	12	5.3	14	7
29	27	M	B	14	4.5	15	0
30	26	M	W	15.5	4.5	15	2

RAW DATA (continued)

Worker Number	Age	Sex	Race	Education Years Completed	Years Employed	I-E Score	Occupational Injuries
31	41	M	B	12	11	16	0
32	49	M	W	12	6	17	0
33	31	M	MA	9	5	19	4
34	50	M	W	13	5	19	1
35*	24	M	W	14	2	9	0

* = Not included
W = White
B = Black
AI= American Indian
MA= Mexican American

REFERENCES CITED

Akman, A.; Brooks, M.; and Gordon, J. 1972. Use of work injury rate tables in estimating work injuries. American Journal of Public Health. 62:917-923.

Baker, S. P. 1975. Determinants of injury and opportunities for intervention. American Journal of Epidemiology. 101:98-102.

Ballou, R., and Buchan, R. J. 1978. Study of gender and accident etiology. Occupational Health and Safety. 47:54-58.

Barber, D. H., and Donovan, R. E. 1971. Industrial safety. In Handbook of Industrial Engineering and Management, pp. 500-542. Edited by W. G. Ireson and E. R. Grant. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Bramwell, S.; Masuda, M.; Wayne, N.; and Holmes, T. 1975. Psychosocial factors in athletic injuries. Journal of Human Stress. 1:68-74.

Cimino, J. 1975. Health and safety in the solid waste industry. American Journal of Public Health. 65: 38-46.

Davis, W. L., and Phares, E. J. 1967. Internal-external control as a determinant of information-seeking in a social influence situation. Journal of Personality. 35:547-561.

Doctor, R. M. 1971. Locus of control of reinforcement and responsiveness to social influence. Journal of Personality. 39:542-551.

Ducette, J., and Wolk, S. 1973. Cognitive and motivational correlates of generalized expectancies for control. Journal of Personality and Social Psychology. 26:420-426.

Felton, G. S. 1971. The experimenter expectancy effect examined as a function of task ambiguity and internal-external control. Journal of Experimental Research in Personality. 5:286-294.

Gore, P. M., and Rotter, J. B. 1963. A personality correlate of social action. Journal of Personality. 31:58-64.

Graham, G.; Davis, M.; and Miller, R. 1977. Chain saw injuries. American Family Physician. 16:89-91.

Guilford, J. S. 1973. Prediction of accidents in a standardized home environment. Journal of Applied Psychology. 57:306-313.

Guralnik, David, ed. 1970. Webster New World Dictionary of the American Language. New York: World Publishing Co.

Haddon, W., Jr.; Suchman, E. A.; and Klein, D. 1964. Accident research: methods and approaches. New York: Harper and Row, Publishers.

Haddon, W., Jr. 1973. Exploring the options. In Research Direction Toward the Reduction of Injury. DHEW Publication No. (NIH) 73-124:38-59.

_____. 1974. Strategies in preventive medicine: passive versus active approaches to reducing human wastage. Journal of Trauma. 4:353-354.

Hale, A. R. 1972. A review of the industrial accident literature. In Report to the Committee of Safety and Health at Work, p. 15. Birmingham, England: The National Institute of Industrial Psychology.

Hale, A. R., and Hale, G. A. 1972. A review of accident research literature. In Industrial Safety Handbook. Edited by William Handley. London: McGraw-Hill Book Co.

Halsey, M., ed. 1961. Accident prevention. New York: McGraw-Hill Book Co.

Heinrich, H. W. 1931. Industrial accident prevention. New York: McGraw-Hill Book Co.

Hirschfield, A., and Behan, R. 1963. The accident process. Journal of the American Medical Association. 186:1062-1078.

Hjelle, L. A. 1970. Internal-external control as a determinant of academic achievement. Psychological Reports. 26:326.

James, W.; Woodruff, A.; and Werner, W. 1965. Effect of internal and external control upon changes in smoking behavior. Journal of Consulting Psychology. 29:127-129.

Joe, V. C. 1971. Review of the internal-external control construct as a personality variable. Psychology Reports. 28:619-640.

Johnson, J. E., and Levanthal, H. 1971. Contribution of emotional and instrumental response processes in adaptation to surgery. Journal of Personality and Social Psychology. 20:55-64.

Jones, S., and Schrauger, J. 1968. Locus of control and interpersonal evaluations. Journal of Consulting and Clinical Psychology. 32:664-668.

Julian, J.; Lichtman, C.; and Ryckman, R. 1968. Internal-external control and the need to control. Journal of Social Psychology. 76:43-48.

Kiefer, N. 1973. Accidents, the foremost problem in preventive medicine. Preventive Medicine. 2:106-122.

King, F. 1955. An analysis of some agricultural accidents. Occupational Psychology. 29:122-127.

Lefcourt, H. M. 1966. Internal versus external control of reinforcement: a review. Psychological Bulletin. 65:206-220.

_____. 1976. Locus of control: current trends in theory and research. New York: John Wiley and Sons.

Lefcourt, H. M.; Lewis, L.; and Silverman, J. 1968. Internal versus external control of reinforcement and attention in a decision making task. Journal of Personality. 36:663-682.

Levine, J.; McHugh, W.; Lee, J.; and Rahe, R. 1977. Life change experience versus future accidents. Military Medicine. 142:469-471.

Liverant, S., and Scodel, A. B. 1960. Internal and external control as determinants of decision making under conditions of risk. Psychological Reports. 7:59-67.

Lowery, B. W. 1974. Disease related learning and disease control in diabetics as a function of locus of control. Doctoral dissertation, Temple University, 1974. Dissertation Abstract International. 35: 3582A (University Microfilm No. 74-28, 203).

Lowrance, W. W. 1976. Of acceptable risk science and the determination of safety. Los Altos, Ca.: Wm. Kaufmann, Inc.

MacDonald, A. P. 1973. Measures of internal-external control. In Measures of Social Psychological Attitudes. Edited by J. P. Robinson and P. R. Shaver. Ann Arbor: Institute for Social Research, University of Michigan.

MaGhee, P., and Crandall, V. 1968. Beliefs in internal-external control of reinforcement and academic performance. Child Development. 39:91-102.

McGuire, Frederick L. 1976. Personality factors in highway accidents. Human Factors. 18:433-442.

McLean, A. A., ed. 1967. To work is human. New York: The Macmillan Co.

Messer, S. B. 1972. The relation of internal-external control to academic performance. Child Development. 43:1456-1462.

Miller, J. J. 1970. Internal-external locus of control and sex differences in relation to susceptibility, situational anxiety, information-seeking/confronting behavior, recall of items, and response preference in high and low threat conditions. (Doctoral dissertation, West Virginia University, 1970). Dissertation Abstracts International. 31: 2498A. (University of Microfilms No. 70-22, 592).

Minton, H. L. 1967. Power as a personality construct. In Progress in Experimental Personality Research, 4, pp. 229-267. Edited by B. A. Maher. New York: Academic Press.

National Safety Council. 1977. Accident Facts. Chicago: National Safety Council.

Persinger, M.; Cooke, W.; and James, J. 1978. No evidence for relationship between biorhythms and industrial accidents. Perceptual Motor Skills. 46:423-426.

Pestonjee, D.; Singh, A.; and Ahmid, N. 1977. Employees' morale and industrial accidents. Indian Journal of Social Work. 38:79-85.

Petersen, Dan. 1975. Safety management: a human approach. Englewood Cliffs, N.J.: Aloray Publishers.

Phares, E. J. 1965. Internal-external control as a determinant of amount of social influence exerted. Journal of Personality and Social Psychology. 2: 642-647.

_____. 1968. Differential utilization of information as a function of internal-external control. Journal of Personality. 36:649-662.

_____. 1976. Locus of control in personality. Morristown, N. J.: General Learning Press.

Phares, E.; Ritchie, D.; and Davis, W. 1968. Internal-external control and reaction to threat. Journal of Personality and Social Psychology. 10:402-405.

Phares, E., and Lamiell, J. 1975. Internal-external control, interpersonal judgment of others in need, and attribution of responsibility. Journal of Personality. 43:23-38.

Raytheon Service Co. 1972. Industrial noise, medical absence, and accident records. Cincinnati: National Institute for Occupational Safety and Health.

Rockwell, T. 1968. Risk-taking behavior among skilled and unskilled workers. In Industrial Accident Research. Edited by J. Surry. Toronto: University of Toronto Press.

Rotter, J. B. 1954. Social learning and clinical psychology. New York: Prentice-Hall, Inc.

_____. 1966. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs. 80 (1, Whole No. 609).

Rotter, J. B.; Chance, J.; and Phares, E. J., eds. 1972. Applications of a social learning theory of personality. New York: Holt, Rinehart, and Winston.

Rotter, J. B., and Mulry, R. C. 1965. Internal versus external control of reinforcement and decision time. Journal of Personality and Social Psychology. 2:598-604.

Rouleau, Yves. 1975. Psychiatric observations on accidents. Vie Medicale. 4:1294-1296.

Schneider, J. 1968. Skill versus chance activity preference and locus of control. Journal of Consulting and Clinical Psychology. 32:333-337.

_____. 1972. Relationship between locus of control and activity preferences: effects of masculinity, activity, and skill. Journal of Consulting and Clinical Psychology. 38:225-230.

Seeman, M., and Evans, J. W. 1962. Alienation and learning in a hospital setting. American Sociological Review. 27:772-783.

Seeman, M. 1963. Alienation and social learning in a reformatory. American Journal of Sociology. 69: 270-284.

Siegel, J. M., and Mayfield, R. 1973. Internal-external control and anxiety following success and failure. Psychological Reports. 32:1189-1190.

Siegel, S. 1956. Nonparametric statistics for the behavioral sciences. New York: McGraw-Hill Co.

Suchman, E. A. 1964. A conceptual analysis of the accident phenomenon. Social Problems. 3:241-253.

Tasto, L. 1978. Rotating shift work causes many problems. Occupational Health and Safety. 47:21-26.

Tye, J. Communicating the safety message. In Industrial Safety Handbook. Edited by William Handley. London: McGraw-Hill Book Co.

U.S. Congress. Occupational safety and health act of 1970. Publication 91-596, 91st Session, 1970. H.R. 1590.

U.S. Department of Labor. Office of Information. 1978. Bureau of labor statistics report on occupational injuries and illnesses for 1977. Washington, D.C.: U.S. Government Printing Office.

Wallston, K. A.; Maides, S.; and Wallston, B. S. 1976. Health related information seeking as a function of health related locus of control and health value. Journal of Research in Personality. 10: 215-222.

Weiner, B.; Heckhausen, H.; Meyer, W. U.; and Cook, R. E. 1972. Causal ascriptions and achievement motivation: a conceptual analysis of effort and reanalysis of locus of control. Journal of Personality and Social Psychology. 21:239-248.

Westerlund, G. A. 1958. A global investigation of data for a group with accidents and representative control group in a Swedish iron and steel works. Stockholm, Sweden: School of Economics.

Whitfield, J. N. 1954. Individual differences in accident susceptibility among coal miners. British Journal of Industrial Medicine. 2: 431-438.

Wigglesworth, E. C. 1976. Occupational injuries: an exploratory analysis of successful Australian strategies. Medical Journal of Australia. 1: 335-339.

_____. 1978. Legislation and injury control. Medical Science and Law. 18:191-199.

Williams, J. G., and Stock, J. J. 1972. Internal-external control as a situational variable in determining information-seeking by Negro students. Journal of Consulting and Clinical Psychology. 39:187-193.

SELECTED BIBLIOGRAPHY

Books

Baker, S. P. 1973. Injury control. In Preventive Medicine and Public Health. Edited by P. E. Sartwell. New York: Appleton-Century-Crofts, Inc.

Ferry, T. S., and Weaver, D. A., eds. Directions in safety: a selection of safety readings. Springfield: Charles C. Thomas.

Fletcher, J. A. 1974. The people environment: total loss control. Toronto: Hunter Rose Co.

Fox, J.; Hall, C.; and Elveback, L. 1970. Epidemiology: man and disease. New York: Macmillan and Co.

Haddon, W. 1967. The prevention of accidents. In Preventive Medicine, pp. 291-621. Edited by D. Clark and B. MacMahon. New York: Little, Brown, and Co.

Peek, T. P. 1974. Occupational safety and health: a guide to information services. Detroit: Gale Research Co.

Simonde, R., and Grimaldi, J. 1963. Safety management. Homewood, Illinois: Richard Irwin, Inc.

Turabian, Kate L. 1973. A manual for writers, 4th ed. Chicago: University of Chicago Press.

Journal Articles

Abramowitz, S. I. 1973. Internal-external control and social-political activism: a test of the dimensionality of Rotter's internal-external scale. Journal of Consulting and Clinical Psychology. 40:196-201.

Baker, S. P. 1975. Social problems and injury. American Journal of Public Health. 65:184-185.

Ballif, B. L. 1976. A multi-dimensional model of human motivation. Synopsis of an address at the Annual Convention of the Texas Personnel and Guidance Association.

Berman, D. M. 1977. Why work skills: a brief history of occupational safety and health in the United States. International Journal of Health Services. 7:1-18.

Bernocki, E. J. 1976. Accident proneness or accident liability: which model for industry? Connecticut Medicine. 40:535-538.

Blanchard, E., and Scarboro, M. 1972. Locus of control, political attitudes, and voting behavior in a college-age population. Psychological Reports. 30:529-530.

Brown, J. C., and Strickland, B. R. 1972. Belief in internal-external control of reinforcement and participation in college activities. Journal of Consulting and Clinical Psychology. 38:148.

Brown, M. R. 1975. The quality of the work environment. American Journal of Nursing. 75:1755-1760.

Coburn, D. 1978. Work and general psychological and physical well-being. International Journal of Health Sciences. 10:437-457.

Cohen, A. 1976. The influence of a company hearing conservation program on extra-auditory problems in workers. Journal of Safety. 8:146-162.

Desai, K. G. 1976. Accident prevention. Indian Journal of Social Work. 37:307-311.

Duke, M. P., and Nowicki, S. 1974. Locus of control and achievement--the confirmation of a theoretical expectation. Journal of Psychology. 87:263-267.

Goldstein, D. H. 1975. Occupational safety and health. American Journal of Nursing. 75:1769-1774.

Gootnick, A. T. 1974. Locus of control and political participation of college students: a comparison of unidimensional approaches. Journal of Consulting and Clinical Psychology. 42:54-58.

Howard, J. M. 1977. The history of occupational injuries in the United States. Journal of Trauma. 17:411-418.

McLean, A. A. 1978. Long range planning in occupational medicine. Journal of Occupational Medicine. 20: 359-364.

Rosen, B., and Solling, R. 1971. Political participation as a function of internal-external locus of control. Psychological Reports. 29:880-882.

Rotter, J. B. 1975. Some problems and misconceptions related to the construct of internal versus external control of reinforcement. Journal of Consulting and Clinical Psychology. 43:56-67.

Schaffer, M. H. 1976. An evaluation of epidemiologic studies related to accident prevention. Journal of Safety Research. 8:19-22.

Srull, T. K., and Karabenick, S. A. 1975. Effects of personality-situation locus of control congruence. Journal of Personality and Social Psychology. 32: 617-628.

Taylor, D. 1976. Accidents, risks, and models of explanation. Human Factors. 18:371-380.

Thomas, L. E. 1970. The I-E scale, idealogical base, and political participation. Journal of Participation. 38:273-286.

Thurber, S. 1972. Defensive externality and academic achievement by women. Psychological Reports. 30:454.

Wallston, B. S.; Wallston, K. A.; Kaplan, S. D.; and Maides, S. 1976. Development of the health locus of control (HLC) scale. Journal of Consulting and Clinical Psychology. 44:580-586.