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# Health Locus of Control Belief and Health Behavior in Patients with Job Related Injuries

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# HEALTH LOCUS OF CONTROL BELIEF AND HEALTH BEHAVIOR IN PATIENTS WITH JOB RELATED INJURIES

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Abstract

This study examines the relationship between an individual's health locus of control belief and four variables: previous job injury experience, the duration of work absence due to previous job injury, appointment keeping behavior, and the wage replacement ratio. Seventy-two subjects with job related injuries referred to an industrial physical therapist were administered the Multidimensional Health Locus of Control Scale (MHLC). There was an uneven distribution of subjects according to MHLC belief patterns with more subjects demonstrating a "pure internal" health locus of control belief. No significance ($p > .05$) was found between our four variables associated with a job injury and a high powerful others (PHLC) and chance (CHLC) locus of control beliefs. Not all the subjects had experienced a previous job injury and, therefore, had not developed learned expectancies regarding this type of situation. Their health locus of control belief may be a general measure whereas for those subjects with prior job injury experience, the health locus of control for this situation is likely to be a more specific construct. The researcher concludes that a worker's belief that the external factors of chance or a significant powerful other may not relate to experience with previous injury on the job, the duration of previous job injuries, financial factors associated with job injury and the stage of the injury.

# CHAPTER 1

## Introduction

Physical therapy for work-related injuries must be based on a complete assessment of both the patient's physical and mental conditions. The physical dimension of this assessment seems to be consistently and thoroughly addressed; however, all physical therapists may not systematically evaluate the psychological dimension. Recovery from an injury involves more than the status of the physical condition such as its severity, it also involves the patient's mental status including such factors as attitudes, beliefs and values (Baum, Taylor & Singer, 1984; Johnson, Leventhal & Dabbs, 1971).

Physical therapists should understand and be able to assess the psychological factors that may influence a patient's recovery. Often in clinical practice, the patient's recovery rate may not be consistent with that expected by the therapist. Consider, for example, the patient referred to physical therapy for a cervical muscle strain which he or she experienced on the job. After taking a thorough history and performing the physical evaluation, the therapist may conclude that there is a minor muscle problem and initiate a given treatment routine. Initially, the patient may respond as expected to the treatments. As the day approaches that he or she is to be cleared to return to work, the patient begins to complain of more discomfort. This discomfort may or may not be supported by objective examination. Subsequent conversations between the physical therapist and patient may reveal to the therapist some insight into what is affecting the

delayed recovery. One factor may be the dynamics of the work environment and the patient's attitude regarding this environment.

There have been many experiences in the author's clinical practice within an industrial environment that seem to indicate a definite relationship between a patient's recovery rate and his or her attitude concerning his or her job. There have been instances in which an employee undergoing physical therapy for a job related injury experiences a delay or interruption in the recovery process because there was a conflict between the employee and supervisor concerning how the injury occurred, or the employee feared reinjury upon returning to work. In situations like these, the physical therapist's early assessment of the injured worker's psychological state may have revealed the need to incorporate a specific strategy into the treatment regime to help assuage the patient's fears and insure that he or she is in a better physical condition than at the time of injury. The physical therapist may also be able to recommend and obtain physical changes in the workplace to make it safer, as well as work with the employee's supervisor to help resolve any conflicts. Early assessment of the psychological status of the patient may assist in a smooth progression of the recovery process with a less protracted length of absence from work. The length of time the injured worker is away from work influences productivity and health care costs. To be successful, rehabilitation should take into account all of these factors.

Several social psychological theories have been developed that attempt to explain how perceptions, attitudes, beliefs, and values relate to and influence behavior. One of these is founded in the

social learning theory (SLT) of personality and behavior which offers an evolving view of human behavior (Rotter, 1972). Social learning theory acknowledges its complex origins in the concept of reciprocal determinism (a field theory approach) where the person and the environment influence each other.

Social learning theory hypothesizes a unique theory of motivation where reinforcement has a less prominent role than that given by traditional learning theorists. Social learning theory focuses on the role of cognition in learning. Julian Rotter, an early social learning theorist, argued that the individual's expectancies for outcomes of behavior, rather than reinforcement, had a major impact on behavior (Rotter, 1972). Expectancy is viewed as the perception that a particular reinforcement will occur as a function of a specific behavior on the individuals part within a specific situation or related situations. In SLT, behavior directed towards the attainment of a goal or external reinforcement is believed to be predictable from knowledge of the individual's situation and his or her past learning experiences. These past learning experiences are the basis of the individual's expectancies for future reinforcement. The greater the expectancy held by the individual that a given behavior will result in the attainment of a goal in a situation, the more regularly that behavior will be exhibited in that situation or situations perceived to be related. Thus, individual behaviors emerge as a result of the individual's expectations for outcomes. These expectations are based on collective experiences in various life situations. Similar situations will give rise to similar and specific behaviors based on how the individual perceives his or her role in the

outcome and the value of that type of outcome in a given situation (Rotter, 1966). This perception is referred to as the locus of control belief.

A number of psychometric instruments have been developed to measure constructs that seem to influence health which have evolved from the SLT base. The Internal-External Locus of Control Scale is an instrument developed by Rotter (1966) to measure one's locus of control belief which he classified as internal or external. Internal locus of control belief (ILC) is an individual's belief that an outcome of an event is contingent upon one's own behavior or is largely controlled by some permanent characteristics of their own (Rotter, 1966). External locus of control belief (ELC) is when individuals believe that an outcome of an event follows some action of their own but is not entirely contingent upon their own actions (Rotter, 1966).

Later investigations have extended this general locus of control scale to make it more applicable to specific topic areas. One such extension was done by Wallston, Wallston, Kaplan & Maides (1976) who developed the Health Locus of Control Scale and, subsequently, the Multidimensional Health Locus of Control Scale (MHLC) in 1978 to measure locus of control in health related behavior (Wallston, Wallston, & DeVellis, 1978). The MHLC measures a person's belief that the source of reinforcements for health related behaviors is primarily internal (IHLC), a matter of chance (CHLC), or under the control of powerful others (PHLC) (Wallston, Wallston, and DeVellis, 1978).

When a job injury has occurred, the individual's particular health locus of control belief may play a part in the individual's

rate of recovery. Many persons disabled by job related injuries believe that overcoming the disability and returning to the pre-injury level of activity as nearly as possible are partially dependent on individual effort. Some injured workers begin the recovery process with this attitude and somewhere along the way appear to lose the desire for a quick recovery and return to normal activities or seem to leave recovery to fate or depend on the therapist to take the sole responsibility for affecting recovery.

The administration of the Workers Compensation (WC) system may influence the development of the behavior described above. The WC process is initiated once a job injury claim has been filed, usually when medical expenses or lost time from work is experienced. Individual states have various waiting periods after which all benefits, except medical, begin. In the Commonwealth of Virginia, from which the sample population of this study is taken, a worker injured on the job must be unable to work for seven calendar days before compensation will be allowed (Virginia Code). If the incapacity extends beyond seven days, compensation will commence on the eighth day. If the injured worker continues to be unable to work for a period greater than three weeks, the compensation will be allowed from the first day of incapacity. The claim processor representing the employer is responsible for the investigation and determination of the injury's compensability and benefits; and, eventually, closes the case at the appropriate time (Rasch, 1985).

The claims administration process is often lengthy and filled with delays (White, 1983). The employee may be out of work three weeks before receiving the first compensation check or find that the

claim was denied. The injured employee with previous experience with the WC process may expect these delays to occur and have other sources of income when unable to work, e.g., a spouse's income or disability insurance. Many injured workers believe that these delays are imposed intentionally by the insurance carrier or by their employer. Several patients receiving physical therapy for a job related injury in the clinic used for this study have explained missing an appointment, with a statement to the effect that, "If they wanted me to get better, they would give me some money to buy gas." A person with this belief may have a high PHLC or CHLC. As a result, this group of injured workers may exhibit behaviors such as failing to keep scheduled physical therapy appointments or show little cooperation in the treatment routine. The worker may believe that the longer the recovery, the longer he or she will be excused from work and the more compensation will be received.

The WC process itself may result in the injured worker having expectations concerning recovery that are inconsistent with the expectations of others, such as physical therapists and employers. The patient's previous experience with the WC process may assist in the development of behaviors that delay recovery. Such behaviors may include missing scheduled appointments or failing to follow through with the home program or other therapeutic suggestions. Not only do these behaviors impede the recovery process but they also delay the patient's ultimate return to work.

In the present WC system, the employer is liable for the entire period of disability and must pay the employee's medical expenses as well as make periodic payments to partially compensate the worker for

lost wages (Rasch, 1985; Worrall and Appel, 1985). To alleviate the employer of continued liability and compensate for any residual impairment, a lump sum settlement is often arranged after the injured worker has reached maximum improvement (Darling-Hammond & Kneisner, 1980; White, 1983). The injured worker exchanges the right to sue the employer for a guaranteed partial compensation of economic losses regardless of fault, receiving full medical expense coverage but only partial lost wages. More and more workers are seeking litigation in lieu of the WC provision of benefits (Darling-Hammond and Kneisner, 1980; White, 1983). As a result of the claim process, many incentives lie within the WC system that act to delay recovery and return to work.

Several economists have studied the relationship between WC claims and cash benefits. Worrall and Appel (1982) found that there was a significant increase in the percentage of WC claims as the replacement ratio (ratio of the indemnity benefit to preinjury wages) was increased. The indemnity benefit is the amount of compensation the claimant receives. Butler and Worrall (1983) found that, in persons with low back injuries who received temporary total disability payments, higher benefits increased the duration of the nonwork periods and higher preinjury wages decreased the duration of the period of absence from work. Butler and Worrall (1985) concluded that the less costly nonwork periods are to the employee, the longer the duration of the absence from work one could expect and observe (Worrall and Appel, 1985). The WC system was designed to provide incentives for workers with job injuries to return to work, but it also appears to provide built-in incentives not to return to work.

The injured worker may exhibit various health behaviors during the rehabilitation process that are the result of their locus of control belief in that situation. The behaviors may appear in response to previous experiences with the WC process, the nature of the physical condition, the economic impact of the condition, and factors related to the particular job or more general life experience. Behaviors that may be demonstrated might include: failure to comply with treatment routines, missed appointments and lack of cooperation, or hostility against parties involved in the recovery process. The MHLC scale, as a measure of the injured workers generalized health expectancy, may identify a relationship between locus of control and certain patterns of patient behavior during the rehabilitation process.

There are few reports which examine the relationship between one's health locus of control measure and factors related to the rehabilitation of a person with a job related injury. The present study examines the relationship between an injured worker's health locus of control measure, previous experience with a job injury and behaviors in keeping scheduled physical therapy appointments for the present job injury. Factors such as the duration of the person's present injury, preinjury wages and workers compensation payment amounts are investigated to determine if there is a relationship exhibited between them and the individual's health locus of control measure. Such research may help people such as insurance carriers, physicians, employees and physical therapists to better understand and clarify the worker's behavior and the expectancies within an industrial setting.

## Purpose and Research Questions

The purpose of this study was to examine the relationship between an injured worker's health locus of control measure, appointment keeping behavior and factors related to compensation and rehabilitation of such a patient. An additional purpose was to examine the relationship of the individual's previous experience with a job injury and of the current health locus of control measure.

The following questions address the issues identified in the purpose:

1. What is the frequency count of MHLC belief types, as measured by the MHLC, of patients referred to an industrial physical therapy clinic?

2. Do persons with high PHLC and CHLC scores have a greater frequency of previous job related injuries than those with low scores in the Powerful Others and Chance subscales of the MHLC?

3. What is the relationship between the length of time missed for previous job related injuries over the past three years and the subject's MHLC belief classification?

4. What is the relationship between the ratio of the number of physical therapy appointments missed and the number of physical therapy appointments scheduled for the present complaint for the duration of the treatment period or six weeks and the subject's MHLC belief classification?

5. Are the MHLC scores equally distributed across subjects in the acute and chronic classification?

6. What is the relationship between the wage replacement ratio and the subject's MHLC belief classification?

Operational Definition

For the purpose of this study, the following terms are used.

Multidimensional Health Locus of Control Scale - A measure of a person's belief that the source of reinforcements for health related behaviors is primarily internal (IHLC), a matter of chance (CHLC), or under the control of powerful others (PHLC) (Wallston, Wallston, and DeVellis, 1978).

MHLC Classification - A typology of persons based upon possible patterns of scores on the MHLC (Wallston & Wallston, 1982).

Internal Health Locus of Control - An individual's belief that one stays or becomes healthy or sick as a result of personal behavior (paraphrased from Wallston, Wallston & DeVellis, 1978 and Rotter, 1966).

Chance Health Locus of Control - An individual's belief that the factors that determine one's health are factors over which one has little control, i.e., luck, fate or chance (paraphrased from Wallston, Wallston & DeVellis, 1978 and Rotter, 1966).

Powerful Others Health Locus of Control - An individual's belief that health is not determined by one's own behavior but by some powerful other or surrounding force (paraphrased from Wallston, Wallston & DeVellis, 1978 and Rotter, 1966).

Job Related Injury - A physical trauma experienced by an individual in the course of the performance of the job or resulting from the physical environment with which the job is associated.

Industrial Physical Therapy Clinic - A physical therapy department located in a manufacturing center where the purpose is to

offer physical therapy services to the employees of a manufacturing company.

Acute - A physical complaint by a patient that exists for less than twenty-one days.

Chronic - A physical complaint by a patient that exists for twenty-one days or more.

Wage Replacement Ratio - The ratio of the amount of weekly temporary total disability payment to the weekly preinjury after tax wages.

Limitations

1. Because this study involved only one clinical environment, the results may not generalize to other clinical settings.

2. Since the subjects were aware that they were participating in a study, the results on the MHLC questionnaire may not accurately reflect what they actually believe regarding what factors control their health.

Assumptions

1. Health locus of control beliefs will be exhibited and, therefore, can be inferred from behaviors which include noncompliance with treatment and missed appointments.

2. Each item of the MHLC scale was answered independently and was not influenced by previous choices on other items.

Organization of Remaining Chapters

Chapter II contains a discussion of the theory underlying the locus of control concept, social learning theory, and reliability and validity of the instrument used to measure health locus of control beliefs, the Multidimensional Health Locus of Control Scale. A review

and critique of the literature regarding psychological factors that influences recovery and workers compensation is also presented. Chapter III reviews the method used for subject selection, procedures used to collect data, and the methods used for data analysis. In Chapter IV, the results of the study are presented. Chapter V presents a discussion of the results with implications and conclusions drawn from this study. A publishable article written according to the style manual of the American Physical Therapy Association is included as the last appendix.

# CHAPTER 2

## Review of the Literature

The first section of this literature review deals with the social and psychological factors that influence recovery from an injury. The subsequent sections discuss a theory of learning, social learning theory (SLT), and a construct of this theory, locus of control. The following sections review the various tests which have been developed to measure locus of control, highlighting those studies that provide information concerning the reliability and validity of the Multidimensional Health Locus of Control Scale (MHLC). The last sections provide a description of the Workers Compensation system and the research regarding its influence on the rate of recovery from a job related injury. A summary of the factors that may affect the rate of recovery from a job related injury completes the review.

### Psychological and Social Factors Influencing Recovery

The psychological and social perspectives the individual possesses are major factors affecting the recovery process in an injury or illness. The individual's self-perception, attitudes, beliefs and values are important elements of this process. Research by Johnston and Carpenter (1980) and Johnson, Leventhal and Dabbs (1971) measured anxiety in patients prior to undergoing surgery and showed that those patients with higher levels of anxiety were slower to achieve full recovery and experienced more complications during the post-operative period than those with lower levels of pre-surgery anxiety. Cronholm and Ivenson (as cited by Andersson and Berg, 1975)

noted three personality traits that have a major effect on the outcome of vocational rehabilitation. These traits were "(1) inadequate capacity for self evaluation of one's abilities, (2) passive dependence, and (3) susceptibility to stress." (p. 166). Levi (1964) in a study of 133 patients involved in vocational rehabilitation found that the outcome of the rehabilitation was influenced by a low level of education, psychological disturbances, prolonged unemployment and advanced age. Litman (1962) suggested a relationship between the patient's self-concept and the outcome of rehabilitation. Subjects with a positive self-concept in spite of their disability, achieved more successful rehabilitation than those with a negative self-concept.

Andersson and Berg (1975) studied 70 patients in a rehabilitation hospital to determine if there was a relationship between the outcome of medical rehabilitation and physical factors. The subjects were given an intelligence test, a personality inventory and a perceptual test. The outcome of the rehabilitation was measured by ratings of the staff and the patient. Several positive factors which influenced rehabilitation success were low age, good education, average intelligence and a high degree of self confidence, ego strength and no guilt feelings. The negative personality factor associated with less successful rehabilitation was passive dependence, i.e., lack of independence and dependence on other persons. Andersson and Berg concluded that the most pronounced factor was field dependence-independence. Those subjects found to be more field independent reached more successful rehabilitation than the field dependent subjects.

Economic concerns during recovery may delay or stimulate recovery and the amount of time missed from work for job injury. Brewin, Robson and Shapiro (1983) studied the social and psychological determinants involved in a decreased length of time missed from work for a group of male manual workers who had experienced an accident at work. To assess the influence of financial incentives on their rate of recovery, Brewin et al compared those subjects that were receiving state compensation only with those who received an additional supplement from their employer. Each subject's perceived responsibility for the accident, job satisfaction and marital status were obtained. Brewin et al found that the two major determinants affecting a decreased length of time missed from work were a person's feelings that his own actions were the major contributing factor in the accident's occurrence and the absence of an additional income supplement from the employer. Marital status and job satisfaction at the time of the accident were less important as contributors to the length of time missed from work. Nichols (1979) suggested that an injured worker's eventual return to work is a result of several interacting factors which serve as motivators. These motivators include one's need to achieve financial reward as compared to the financial support one receives while not working; the type of work one performs, whether or not it is satisfying, interesting or hard; pressures from one's family or friends which may push one toward or away from work; and the physical disability and the manner in which one has been taught to cope with it.

Thus, research suggests the following psychosocial variables may have a positive influence on recovery from physical injury: less

anxiety, capacity for self-evaluation of abilities, independence, positive self-concept, self-confidence, ego strength, and average intelligence. Additionally, an individual's belief that they contributed significantly to the accident's occurrence is associated with decreased time missed from work. The variable of independence was noted by several studies to be particularly important to recovery.

While the studies and theories reported are not specifically SLT based, some of the psychosocial variables they addressed are related to SLT concepts. Thus, an understanding of SLT may provide a framework for understanding the relationship among these psychosocial factors and the ways they may predictably influence recovery behavior. For example, the SLT constructs of the role of cognition in learning (i.e., expectancies for outcomes of behavior), accumulated life experiences, and the individual's perception of control of reinforcements may influence current levels of anxiety, self-concept and confidence. Knowing whether a person feels in control of reinforcements or expects successes may explain current levels of anxiety.

## Social Learning Theory

Many psychosocial variables associated with recovery from physical injury may be understood using SLT. Social learning theory (Rotter, 1972) provides a framework that expands on traditional learning principles and explains the complex process of how learning occurs. It gives prominence to the role of observational learning from social models and emphasizes the effects of repeated reciprocal environment interactions.

Social learning theory is a theory of human behavior that recognizes its complex origins in the concept of a field theory approach to personality which emphasizes the interaction of the person with their meaningful environment. This learning theory hypothesizes a unique theory of motivation where reinforcement has a less prominent role than that given by traditional learning theorists such as Pavlov, Skinner, Hull, Dollard and Miller (Pervis, 1984). Social learning theory focuses on the role of cognition in learning. Julian Rotter, an early social learning theorist, argued that the individual's expectancies for outcomes of behavior, rather than reinforcement, have a major impact on behavior. Expectancy is viewed as the subjective probability held by the individual that a particular reinforcement will occur as a function of a specific behavior on his or her part within a given situation or related situations (Rotter, 1972).

Social learning theory of personality and behavior attempts to explain how an individual's behavior in various situations is developed (Rotter, 1972, 1982). This theory of learning hypothesizes that an individual's behavior is the result of experiences in various life situations. Social learning theory assumes that behavior is learned and modified as a result of the individual's experience. One experience influences another, that is, personality has unity. Unity is defined here in terms of stability and interdependence. As the individual becomes more experienced, the personality becomes increasingly more stable. The individual selects new experiences and interpretations of reality on the basis of previous experiences and cognitions. This selectivity leads to increasing generality and stability of behavior. Social learning theory attempts to eliminate

the concept of causation in favor of a view that describes relevant past and present conditions.

Human behavior is said to be goal directed. The directional aspect of behavior is inferred from the effect of reinforcing conditions. This directional nature of behavior accounts for selective response to cues and for chosen behavior as a focus of SLT. The individual seeks to maximize positive reinforcements in any situation based on personal needs or goals.

A person's needs (goals) are learned or acquired. Early in life, these needs may arise from association of new experiences with reinforcement of reflex or instinctive behavior. Later needs are acquired as a means of satisfying earlier, learned needs. Learned behavior is goal directed, and new needs derive their importance for the individual from their associations with earlier needs. Social learning theory hypothesizes that early, acquired needs in humans are the result of satisfactions that are controlled by others. Initially, these others may be family or familial substitutes. Initial psychological needs are inborn and are satisfied basically by parents or parent substitutes. Later needs develop as the individual has more environmental experiences. In order for behavior to occur regularly in any given situation, the person using it must be presented the opportunity to call upon a prior reinforced behavior which was acquired as a result of previous learning experiences. This behavior might also come about through observation and imitation. The occurrence of a behavior in a person is said to be determined not only by the nature or importance of needs or reinforcement but also by the person's anticipation or expectancy that these needs will occur. Such

expectations are determined by previous experiences and can be quantified.

Behavior is also determined by situational considerations. The individual's expectancy that a given behavior will be followed by a particular reinforcement is dependent upon how he classifies the situation. The value of the reinforcements will vary depending upon the situation in which they occur. Thus, the individual may expect to be rewarded in one situation and not in another. Likewise, the degree of value placed on the reward may be high in one situation and relatively low in another. Various generalized expectations emerge as a result of the different situational experiences through which the individual progresses. Expectations generalize from a specific situation to a series of situations that are perceived as related. A reward acts to strengthen an expectancy that a behavior or event will be followed by that reward in the future. Once the expectancy builds, the failure of that reinforcement to occur will reduce or eliminate the expectancy in the future. The worker with previous experiences with a job injury may exhibit behaviors or hold expectations for recovery that are quite different from another worker who experiences their first significant job injury. In the SLT view, a major difference may be explained in terms of the worker's past experiences and how they perceive control within the particular situation.

## Perceived Control of Reinforcement

Perceived control is defined as a generalized expectancy for internal rather than external control of reinforcement based on one's analysis of previous success and failure experiences (Lefcourt, 1982). An individual's beliefs about how reinforcements are determined are

based upon the interpretation of the causes of the success and failure experiences.

Rotter (1966) studied generalized expectancies in terms of perceived control of reinforcement. He considered the effects of the reward or reinforcement on behavior in terms of the individual's perception of the part played in controlling the outcome or reward. Different people react to rewards differently in a given situation. One determinant of an individual's reaction is the degree to which the perception of the reward follows or is contingent upon their own behavior or attributes versus the degree to which they feel the reward is controlled by forces outside of personal action. Experience leads the person to perceive a relationship between individual behavior and the reward. This perception is referred to as the locus of control belief. When a reinforcement is perceived by the subject as following some action in particular but not being entirely contingent upon personal actions, it is labelled external control. This relationship may be viewed as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the forces surrounding the person. If a person believes that the event is contingent upon their own behavior or relatively permanent characteristics it is labelled internal control. The event leading to an external or internal preception of control may be positive or negative.

The locus of control belief may be a significant variable in the rate of recovery from injury in different individuals. The degree to which an injured worker attributes personal control during the recovery phase, according to SLT, will be the result of past

experiences with a job injury or other situations which are perceived to be related to the injury. The outcome may differ also depending on the injured workers particular locus of control orientation.

Much research has been undertaken to demonstrate the effects of perceived control in various situations. Findings have been obtained utilizing various research designs regarding perceived control and responses to aversive stimuli, performance, self reports and physiological responses.

The use of aversive stimuli in experiments with perceived control is abundant in the literature. Staub, Tursky and Schwartz in 1971 found that subjects who were allowed to administer and control the intensity of shock stimulation reported less discomfort at the higher levels of shock and endured stronger shocks than did paired subjects to whom shocks were administered passively. When all the subjects were given a second series of shock trials not under their control, the group which had previously experienced control lost their tolerance for the shocks and indured less shock than previously. No changes were found among the subjects who had not experienced control in the previous situation. Pervin (1963) concurred with Staub et al's findings noting that the subjects preferred predictable, self-controlled conditions. Corah and Boffa (1970) found that stress, which was measured by physiological changes, was reduced when the subjects could control the initiation and termination of an aversive stimulation. Glass, Singer, Leonard, Krantz, Cohen and Cummings (1973) looked at both the subjective ratings of painfulness of electric shocks and the after effects. They found these ratings decreased when the subjects believed that their behavior could reduce

the duration of the shock. Subsequent studies by Glass et al in 1973 found no changes in autonomic responses with perceived control manipulation.

Non-laboratory research with the locus of control variable provides useful information related to the proposed study. Many workers injured on the job experience periods away from work which may be viewed as periods of temporary unemployment. These periods of unemployment may range from a few days to years with many of the disabled persons never returning to their previous level of employment. One's locus of control orientation may change in the situation of unemployment. Lefcourt (1984) stated that individuals who value work as a means of gaining intrinsic and extrinsic rewards may become more externally controlled when they are unemployed. Reasons for this change in locus of control orientation may be the result of deprivation of the opportunity to use one's own effort and skill to secure personal job satisfaction and income; the inability to determine the cessation of one's employment; and the receipt of unemployment or welfare benefits. These circumstances led Lefcourt (1984) to hypothesize that unemployed persons could predictably become more external in their beliefs of control with the passage of time and have more external orientations than persons who are employed.

Research on locus of control orientation and the unemployed worker supported Lefcourt's (1984) hypothesis. Research by Searle, Braucht, and Miskimins (1974) found that of their sample of chronically unemployed warehouse workers there was a significantly greater number of external than internal locus of control believers. Chronically unemployed was defined as persons with a history of

vocational failure who showed no recent efforts to find employment. O'Brien and Kabanoff (1979, 1981) sampled employed and unemployed persons in an Australian city. Their research, utilizing Rotter's I-E Scale, indicated that the unemployed persons were more external than the employed workers. These unemployed workers were actively pursuing employment. Parnes and King (1977) looked at employment as a determinant of locus of control using a longitudinal study. They compared men who had lost their jobs within a two year period with a matched group of employed men. They did not find the two groups to be significantly different on the I-E Scale before the job loss occurred. Two years later the unemployed group was significantly more external. All of these studies support the hypothesis that unemployment may change an individual from an internal locus of control orientation to a more external orientation.

Measurement of Health Locus of Control

Rotter (1966) attempted to measure the two groups of locus of control perceptions with his instrument called the Internal-External Scale (I-E Scale). The items included in the I-E Scale were written to reflect the subjects' beliefs about how reinforcement is controlled. Earlier attempts to measure locus of control were first reported by Seeman and Evans in 1962 (Wallston & Wallston, 1981). The research by these two investigators used an earlier version of the Internal-External scale with tuberculosis patients. They found a significant difference in behavior related to information seeking about their condition between the internals and externals. The I-E Scale demonstrated validity for generalized expectancy for internal

and external control but was less valid when used to measure expectancy in more specific situations.

Wallston, Wallston, Kaplan and Maides (1976) modified Rotter's I-E Scale to develop a Health Locus of Control Scale (HLC) that could be used to measure specific expectancies regarding locus of control for prediction of health related behavior. Their scale used a six-point Likert-type format with 11 items written as generalized expectancies related to health. The scale was initially administered to 98 college students in a small university to provide normative data. As a result, alpha reliability of 0.72 of the eleven items was found indicating that the items in the scale were highly correlated with each other. Concurrent validity was evidenced by a 0.33 correlation, $p < .01$, with Rotter's I-E Scale for this sample. The HLC scale showed a 10% common variance with the I-E scale which was kept purposefully low to enhance the discriminate validity of the new scale, thus meeting the requirement that a new test not correlate too highly with measures from which it is supposed to differ (Wallston & Wallston, 1981).

Wallston et al administered the HLC Scale to a variety of subjects: college students, community residents and hypertensive outpatients (Wallston, Wallston, and DeVellis, 1978). The test-retest reliability of the scale was 0.71. They recognized that their HLC scale was an attempt to operationalize health related locus of control beliefs but, like the I-E scale, the HLC scale also was a generalized measure of expectancy as opposed to beliefs about specific behaviors. They concluded that the same logic that led to the development of the HLC scale could be applied to beliefs scales relevant to particular

conditions (e.g. hypertension, diabetes, obesity) and to particular behaviors (e.g. information seeking, medicine taking, and appointment keeping).

Wallston et al (1978) later began to question whether or not health locus of control was a bi-dimensional concept. Levenson (1973, 1975) questioned the bi-dimensionality of the I-E Scale, arguing that fate and chance expectations should be studied separately from powerful others when considering external control. She developed three eight-item Likert scales to measure three factors in locus of control: internal, chance and powerful others locus of control. Impressed by Levenson's work, Wallston, Wallston and DeVellis (1978) developed a new version of the HLC scales to measure three distinct dimensions: Internality (IHLC), Chance (CHLC), and Powerful Others (PHLC). The new scale was called the Multidimensional Health Locus of Control Scale (MHLC) (Lefcourt, 1982; Wallston and Wallston, 1981).

The MHLC has two equivalent forms (A & B) which can be used separately or combined. The two forms were created to be used for research designs requiring repeated administration of the test. Each form consists of three six-item scales utilizing the Likert format ranging from strongly disagree to strongly agree. The initial sample, considered to be a cross-section of the general population, included 115 subjects who were recruited at the Nashville Municipal Airport. The alpha reliabilities ranged from 0.67 to 0.77. When forms A & B were combined into 12-item scales, the alpha reliabilities ranged from 0.83 to 0.86. As an initial indication of predictive validity, correlations were computed between the subject's perceived health status and the MHLC scales. Health status correlated positively with

IHLC ($r$ = .403, $p$ < .010), negatively with the CHLC ($r$ = - .275, $p$ < .01) and did not correlate with the PHLC ($r$ = - .055). The concurrent and discriminant validity of the MHLC subscales were established by correlating these subscales with Levenson's Internal, Powerful Others, and Chance scales. The counterparts of each were found to be highly correlated.

Since its development the MHLC has been used in many research investigations. Hartke and Kunce (1982) investigated the validity of the concept of the multidimensional nature of the locus of control construct. They used a sample of 86 male medical patients, half were being treated for hypertension and the other half had miscellaneous medical problems. Form A of the MHLC was used. The scores of the subscales were correlated to determine the degree of their independence in the sample. For the total sample, the mean of the IHLC was 25.5 with a standard deviation of 4.5, for the PHLC the mean was 23.8 with a standard deviation of 5.6; and for the CHLC the mean was 17.8 with a standard deviation of 6.5. The IHLC correlated 0.24 ($p$ < .05) with the PHLC; IHLC correlated 0.02 (ns) with CHLC; and PHLC correlated 0.29 ($p$ < .01) with CHLC. Similar correlations were seen for the subgroups of hypertensive and miscellaneous medical patients. Factor analysis of the items of the MHLC subscales showed that 16 of the 18 items had their highest factor loading on those that corresponded to their appropriate subscale, thus offering the internal consistency of the subscales. Hartke & Kunce refined their test protocol to rescore the best four items of each subscale. The resulting intercorrelations were found to be low and statistically not significant. Hartke and Kunce concluded that their findings regarding

subscale score independence and subscale item groupings support the notion of locus of control as a multidimensional concept.

Research by Umlauf and Frank (1986) did not concur with the findings of Hartke and Kunce. Umlauf and Frank's study used Form A of the MHLC with 107 disabled patients in an inpatient rehabilitation center. The factor analysis of the items did not, in their study, confirm that the three subscales were separate, independent, orthogonal scales. Only one factor, internality, was similar to the original subscale. Umlauf and Frank concluded that the multidimensional subscales may provide clinically relevant data, but they are not always orthogonal or as robust statistically as Hartke & Kunce indicated. Umlauf & Frank suggested that it is possible that the factors may be related obliquely.

Coelho (1985) examined the psychometric properties of the MHLC with 146 chronic cigarette smokers (aged 20-67), who volunteered for treatment through a smoking cessation clinic. Results showed that the subjects' expectancies for health control were not distributed along the three independent domains as implied by Wallston et al (1978). Instead the health locus of control orientation was found to be bi-dimensional with the factors being Internal and Powerful Others. Alpha reliability showed that the instrument had internal consistency for the sample. The correlational results showed a relationship between the subscales that was different from Wallston et al (1978). Both PHLC and CHLC subscales related inversely with the IHLC subscale. IHLC correlated -.04 (ns) with PHLC; IHLC correlated -.39 ( $p < .01$) with CHLC, and PHLC correlated -.32 ( $p < .01$) with CHLC.

Coelho concluded that the type of population studied may not represent all smokers and even less likely the general population. The subjects were self-selected volunteers, and their relationship to the total population of cigarette smokers or aspiring quitters was undetermined. There was no guarantee that similar results would be achieved with other self-selected, non-volunteers, or unaided quitters. He suggested that it might be found that treatments tailored to the smoker's existing beliefs about personal control over health would facilitate maintenance of treatment gains and provide a more cost effective approach to intervention.

Russell and Ludenia (1983) examined the psychometric properties of the MHLC scale with 100 subjects who were treated at a Veterans Administration Medical Center Alcohol Dependence Treatment Unit. Each subject was assessed using the MMPI Form R and the MHLC (Forms A & B). Mean scores on the MMPI indicated that the subjects understood the nature of the testing situation and responded in a straightforward manner. Alpha reliabilities for each subscale using forms A or B ranged from 0.63 to 0.78 with a range for Forms A & B in combination being 0.80 to 0.85. The intercorrelation differed somewhat from Wallston et al (1978) in that the chance scale was statistically independent of both the Internal and Powerful Others. These two scales, Internal and Powerful Others, were positively correlated. Russell and Ludenia (1983) concluded that the MHLC did possess reliable and valid psychometric properties in their clinical population. The instrument showed an acceptable level of internal consistency and did appear to measure independent dimensions of locus of control through its three subscales. They also suggested that the

MHLC showed factor validity and that their study supported the utility of the MHLC for clinical and research purposes. These researchers were of the opinion that use of the MHLC scales to assess separate dimensions of health locus of control might help to clarify the complex interrelationships among health locus of control beliefs, health values, and health-related behavior.

Shipley (1981) used the MHLC as part of a follow-up protocol for 44 subjects who had completed smoking cessation treatments. Half of the subjects received follow-up letters regularly which were designed to support and assist the subjects in their efforts not to smoke. The basic smoking cessation treatment had produced an initial abstinence in 93% of the subjects. At six months, the letter and control groups' subjects had abstinence rates of 20% and 30%, respectively (ns). The letters had no maintenance effect by themselves. The IHLC and CHLC scales were the only variables that made a difference. High scorers on the internal scale were more often abstinent than the low scorers (47% vs 17% at three months, $p < .05$; 40% vs 13% at six months, $p < .10$). Subjects low in CHLC beliefs were often more abstinent than the high chance believers (47% vs 17% at three months, $p < .10$; 45% vs 9% at six months, $p < .05$). On the Powerful Others factor, there was a trend ($p < .10$) towards the predicted interaction at three months which was that subjects expressing beliefs in others' power over one's health should improve abstinence upon receiving letters from their leader. Correlations among the three HLC subscales were moderate (.25 to .37), from which Shipley concluded that the scales did measure different beliefs.

Letter receipt increased smoking compared to no letters among subjects not believing their health could be influenced by powerful others (51% vs 27% of baseline, $p < .05$). Shipley concluded that the MHLC was helpful in their follow-up process. It showed that internal and low chance HLC subjects benefited most from treatment and those with high powerful others scores reacted as predicted. The study provides some evidence of predictive validity of the MHLC.

Wallston (personal communication, March, 1983), in discussing what to do with the MHLC scores, offered several suggestions on how to analyze the data gathered. One method, which may clarify some of the differences in correlations found in previously reviewed studies, is the median splits methods. Median splits are performed for each of the three subscales to classify subjects into one of eight types depending on their pattern of being above (high) or below (low) the median of the scales. Of the eight types, three will represent pure internal, chance or powerful others types with the others containing a mixture of internality and externality. The typology has yet to be validated or confirmed by research but is proposed to suggest that a person's belief pattern may be described using these types (Wallston & Wallston, 1982). Figure 1 illustrates this MHLC typology.

In summary, much research has been undertaken that utilized the MHLC scale to measure health locus of control beliefs. These studies have presented evidence that the MHLC is a reliable, valid and internally consistent tool that may be used to measure health locus of control. There are few studies that have investigated appointment keeping behavior and none relating a specific behavior by an injured worker using the MHLC.

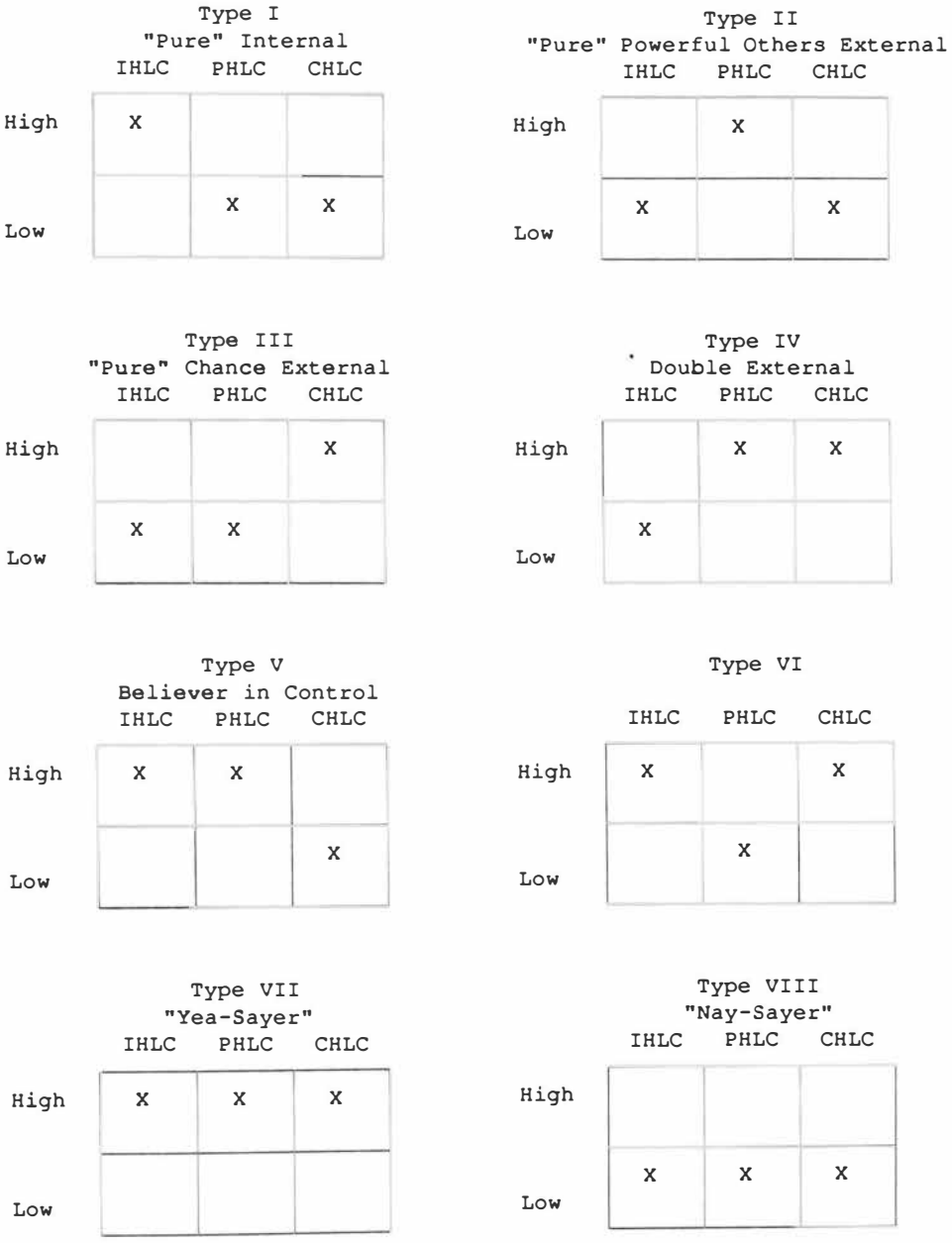


Fig. 1. A multidimensional health locus of control typology. (Wallston & Wallston, 1982)

Description of the Workers Compensation System

Several published works which describe the Workers Compensation (WC) system and the effects it has on the individual were reviewed. Texts by Darling-Hammond and Kneisner (1980); Rasch (1985); White (1983) and Worrall and Appel (1985) provided descriptive information about the WC system and process. WC laws vary by states, but there are basic provisions which are consistent with all states. The principle behind WC is that industrialization benefits everyone in society therefore associated costs are factored in as a cost of production which is passed on to the consumer. In the WC system, the employer is liable for work related injuries regardless of who is at fault. Under WC the injured worker exchanges his right to sue his employer for a guaranteed partial compensation for his economic losses and receives full coverage for all medical expenses incurred. Many workers are finding litigation successful under special circumstances. Survivor protection and rehabilitation are also provided.

The WC process is initiated once the job injury claim has been filed, usually when medical expenses or lost time from work is experienced. Individual states have various waiting periods after which all benefits, except medical, begin. In the Commonwealth of Virginia, a worker injured on the job must be unable to work for seven calendar days before compensation will be allowed (Virginia Code). If the incapacity lasts beyond seven days, compensation will begin on the eighth day. If the injured worker continues to be unable to work for a period greater than three weeks, the compensation will be allowed from the first day of incapacity. The claim processor, representing the employer, is responsible for the investigations and determination

of the injury's compensability and benefits, and eventually, closes the case at the appropriate time (Rasch, 1985).

The employer is liable over the period of time that the disability exists. During this period the employer pays the employee temporary total disability which is not taxable to replace a portion of the lost wages if he is unable to work. State laws specify a maximum weekly amount (usually defined as some percentage of the state's average weekly wage) which may result in higher paid workers receiving less than 66 2/3% of their average wage. There are other disability payment classifications: temporary partial, permanent total and permanent partial disabilities. Temporary partial disability is given to workers who temporarily cannot perform their own work, but can work in a less demanding and lower paying capacity. Permanent total disability is provided when the worker is unable to engage in any substantial remunerative activity. Under this classification, the worker is paid for life either in a lump sum or several payments over a specific number of weeks, months or years. These recipients are evaluated periodically by the WC agency and if their condition changes, the benefit status may change. Permanent partial disability compensates the individual for various impairments. The monetary benefits associated with a job related injury are influenced; therefore, by the duration and severity of the injury.

Workers Compensation and Recovery from Injury

The WC process has been shown to have a significant impact on the recovery and return to work by the injured worker. Rasch (1985) noted the influence of other considerations that made it more beneficial for the worker to stay away from work in terms of secondary

gain. Among these were the release from family responsibilities; attention and economics. The economic gain may be seen when the post injury income approximates or exceeds the pre-injury income, whether real or anticipated. Researchers have found that injuries and claims vary directly with benefits and inversely with wages. Worrall and Appel (1982) found that in 1000 medical claims there was a significant increase in the percentage of claims as the replacement ratio was increased. The replacement ratio is the ratio of benefits to pre-injury wages. Worrall and Butler (1983) found that higher benefits increased the duration of absence of workers with low back injuries who were receiving total temporary disability, while higher wages decreased the duration of the work absence. Worrall and Butler (1985) found that the less costly the work absence was to the employee, the longer the duration of the absence one expected and observed.

Johns (1981) studied the length of time missed from work for 182 patients with hand injuries. These injuries occurred at work (42%), in public places (35%) and at home (22%). The incidence of time off work for the whole group showed that 1/3 had no time off work, 1/3 were off work for up to six weeks. The whole sample included 40 claims for WC and two were for compensation against other parties. The median time off for WC subjects was 10 weeks, over three times that for the whole sample. Even when they eliminated the severity of the injury, they found that there was a striking difference in time off between those with compensation claims and those without. Whereas the WC system was designed to contain incentives for the injured workers to return to work, it appears that it also has built-in incentives for the injured workers not to return to work.

Summary

The above literature review has offered insight into the four areas of focus for this study: psychological factors affecting recovery, social learning theory, Locus of Control, and the Worker's Compensation system. Collectively and singularly, these areas may influence the rate of recovery from a work related injury. No literature has been found by this author to date that utilizes the MHLC in relationship to job related injuries or Worker's Compensation claims. Kenneth Wallston (personal communication, September, 1986) states that nowhere in their work do they claim that the health locus of control scales by themselves will have much predictive validity of behavior. He suggests that prediction may be possible by using the MHLC scores in combination with the specifics of the situation, the behavior of concern, and the reinforcement as variables. The present study of persons with job related injuries was an attempt to accomplish this.

CHAPTER 3

## Method

This study involved the measurement of each subject's health locus of control belief through the administration of Form A of the Multidimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978) (Appendix A). The results of the MHLC provide a score for each individual subject in three categories: Internal, Chance, and Powerful Others. The researcher reviewed the subject's medical records, preinjury and postinjury compensation rates, and physical therapy appointment schedules. An initial physical therapy evaluation was also performed for each subject. All the data were scored (Appendix B) and recorded on a Data Collection Form (Appendix C).

### Subjects

The subjects used in this study consisted of the first seventy-five patients referred to a physical therapy clinic located in a light manufacturing industry for a job related injury between June 1, 1986 and October 30, 1986. All the subjects were full time employees of this particular industry which employs 11,500 persons. The industry is located in a large metropolitan area in the state of Virginia with more than 10 sites of operation. The employees are engaged in a diverse classification of jobs ranging from manual unskilled labor to highly technical and professional occupations. These employees may be classified into three categories based upon how they are compensated:

1. Hourly employee - a person paid by the hour for actual hours worked. Workers Compensation's temporary total disability

payment for this person is based on the weekly rate set by the Code of Virginia.

2. Skilled craft employee - a person paid by the hour for actual hours worked but is paid a higher hourly rate than an hourly employee because of training in a specific skill, for example, an electrician or welder. Workers compensation for this person is also based on the established rate set by the Code of Virginia.

3. Salaried employee - a person renumerated an annual salary amount who receives pay on a monthly or bi-monthly basis regardless of the number of hours worked. Certain subclasses of this employee group may receive overtime pay based on their normal work hours. Workers compensation for this group of employees is paid at the regular salary rate for the individual when unable to work.

Subject data collected were age, sex, race, MHLC scores, the number of previous job related injuries, and the number of days missed from work due to these previous job related injuries over a three year period. Data was also collected on the number of physical therapy appointments scheduled for the current complaint; the number of physical therapy appointments missed for the current complaint; acute or chronic classification of the complaint; the adjusted preinjury weekly wage; and the weekly temporary total disability payment received by each subject during the course of this study.

Procedures

Each subject was initiated into the study at the time of their first physical therapy visit. At that time the subject was given a

brief description of the purpose of the study and asked if they would participate in it. The subject was then asked to read the instructions, complete Form A of the MHLC scale (Appendix A), and signed a consent form (Appendix D). An initial physical therapy evaluation of the subject was performed concerning their chief complaint. The subject's history provided data regarding the length of time the injury had existed to determine if the chief complaint was acute or chronic.

Subsequent physical therapy appointments were scheduled when indicated, to provide the appropriate treatment necessary for each case. The number and frequency of appointments scheduled were based on the severity of the subject's symptom, the date the subject was to be re-evaluated by the referring physician and the number of other cases scheduled to be treated by the physical therapist. Thirty-four of the subjects were able to continue working and therefore, were scheduled around their normal work hours, either after, before or during those hours. All the subjects received physical therapy for injuries that were to the musculoskeletal system, i.e., strains, sprains, low back pain.

Each employee's medical record is maintained in the company's medical department of the facility in which the employee works. The medical record of each subject was reviewed to obtain the data regarding their previous and current job related injuries. A three year interval of time was selected as the period for review for two reasons; because: 1.) the company switched to its present workers compensation carrier at that time, and 2.) the medical records' data was computerized at that time, and therefore, was easier to access by

the researcher than years prior to 1983. From each medical record the researcher was able to collect information concerning the number of previous job related injuries incurred and the number of days missed from work because of these injuries in the past three years for each subject participating in the study.

Pre-injury weekly wages and temporary total disability payment amounts were also collected for each subject. The pre-injury hourly rate of pay was obtained from the company's employee information systems record for hourly and skilled craft employees. The hourly rate was multiplied by 37.5 (the number of hours worked per week) to give the gross weekly wage for each hourly or skilled craft worker in the study. This weekly wage amount was reduced by 23% in an attempt to approximate the wage withholding amount for state and federal income and social security taxes. Exemption categories, for single and married with three dependents, were used to establish the 23% withholding rate. The researcher worked through the company's payroll department to secure the amount of weekly withholding tax at the various hourly rates. The social security tax, FICA, rate was 7.15% for all employees. The federal and state withholding amounts were summed for each of the two exemption classifications. A ratio of this sum to the gross weekly wage was established to show the percentage of the gross weekly wages that was withheld for income tax. The FICA was added to this rate to give the total percentage of the gross weekly wage that represented withholding tax. These two groups of withholding tax rates, single and married with three dependents, were summed and divided by two to yield the average withholding rate of 23%. The pre-injury weekly wage used in this study may not reflect

the actual amount of take home pay a person received because of overtime pay and other deductions that may be taken by the worker for such items as health insurance, savings, and donations.

Salary information was not accessible for persons employed in the salaried employee classification as this information is considered highly confidential and could not be released to the researcher. Since the salaried employees' pre-injury wages and temporary total disability payment amounts are equal, the specific wage amounts were not considered necessary for this group of subjects. Furthermore, the number of salaried employees represented in this study was 5.4% of the total sample.

The data collection was considered completed for each subject when the person was discontinued from physical therapy, or returned to work, whichever occurred first. For those persons receiving physical therapy for a period greater than six weeks, six weeks was used as the cut off period for data collection. This cut off point allowed the researcher to somewhat control the duration of the data collection phase of this study.

Data Analysis

To determine a subject's health locus of control beliefs score, items for each category (Internal, Chance, Powerful Others) were totalled to give the score for each category as stated in Form A of the MHLC (Appendix C). Items 1, 6, 8, 12, 13, and 17 are worded in the internal (IHLC) direction and were scored from 1-6 as they were circled by the subject. Items 3, 5, 7, 10, 14 and 18 are worded in the Powerful Others (PHLC) direction and were scored from 1-6 as they were circled by the subject. Items 2, 4, 9, 11, 15 and 16 are worded

in the chance (CHLC) direction and were scored from one to six as they were circled by the subject.

Each subject was assigned to a category according to the type of health locus of control pattern demonstrated by his scores on the MHLC scale. The median splits method developed by Wallston & Wallston (1982) was used to categorize each subject. The median splits methods involved determining the median of the subjects' scores in each subscale of the MHLC scale. A subject was classified "high" in a particular subscale if his score for that scale was above the median. A subject was classified "low" if his score in a particular subscale was below the median. Each subject had three HLC classifications, one for each subscale. These three classifications provide a pattern of health locus of control beliefs. There are eight potential types of patterns of health locus of control beliefs which are illustrated in Figure 1 in Chapter 2. The types of HLC belief patterns were used in an attempt to answer the research questions put forth in this study.

Question 1: A frequency count was made of all the subjects according to the type of HLC belief pattern they revealed.

Question 2: The number of previous job related injuries for each subject was ranked and listed according to his type of HLC belief classification. The Kruskal-Wallis test (chi square approximation) was performed to analyze this data.

Question 3: The number of days missed from work for previous job injuries for each subject was listed and ranked under their particular type of HLC belief pattern. The Kruskal-Wallis test (chi square approximation) was performed to analyze this data.

Question 4: A ratio of the number of physical therapy appointments missed to the number of physical therapy appointments scheduled for each subject's current complaint was calculated and represented as a percentage. These percentages were ranked and listed according to each subject's type of HLC belief pattern. The Kruskal-Wallis test (chi square approximation) was performed to analyze this data.

Question 5: Frequency counts of the scores in each scale were performed for each category of subject complaint (acute or chronic). The Chi Square Test was performed for each complaint category.

Question 6: The wage replacement ratio was established for each subject by calculating the ratio of the weekly amount of temporary total disability payment to the weeking pre-injury after tax wage. The resulting ratio was represented as a percentage figure. These percentages were ranked and listed according to the subjects' HLC belief type. The Kruskal-Wallis test (chi square approximation) was performed to analyze this data.

# CHAPTER 4

## Results

This chapter presents the results of the statistical analysis of the data collected during this study. All the persons referred to physical therapy during this study voluntarily agreed to participate in this study except two who refused and one who failed to keep the initial appointment given. The physical therapy referrals were initiated at various times after the injury's occurrence, from a few days to months post-injury. The sample, thus, represents 72 full time employees of this manufacturing company. Sixty-four subjects of this sample population are hourly employees; four are skilled craft employees and four are salaried employees. Other demographic data may be found in Table 1. Table 2 shows the means with standard deviations for each variable investigated in this study.

The frequency distribution of subjects according to the types of patterns of MHLC beliefs ranged from six to 15 and are shown in Figure 2. The median split for the IHLC was taken at 26/27 and for the PHLC and CHLC at 19/20. The largest groups of subjects, 15 and 12 respectively, were categorized as Type I (Pure internals) and Type VII (high IHLC, PHLC and CHLC). There were nine subjects in Type II (high PHLC) and Type VIII (low IHLC, PHLC and CHLC) classifications. Type IV (low IHLC with high PHLC and CHLC), Type V (high IHLC and PHLC, with a low CHLC), and Type VI (high IHLC and CHLC with a low PHLC) had nine subjects each.

TABLE 1

Characteristics of the Subjects

| Variables | N = 72 |
|---|---|
| Males | 39 |
| Females | 33 |
| Age Range (years) | 26 to 56 |
| Mean Age (years) | 36.26 |
| S.D. | 7.16 |

Table 2

Means and Standard Deviations for Each Variable

| Type | N | Previous Injury | # Days Missed Previously | Appointments Missed Ratio | Acute | Chronic | Wage Replacement Ratio |
|---|---|---|---|---|---|---|---|
| I | 15 | 1.67 (1.23) | 21.27 (37.76) | 0.06 (0.12) | 10 | 5 | 0.71 (0.39) |
| II | 9 | 1.78 (1.42) | 15.78 (26.57) | 0.04 (0.05) | 3 | 6 | 0.82 (0.31) |
| III | 6 | 3.50 (2.81) | 71.50 (126.40) | 0.13 (0.12) | 3 | 3 | 0.75 (0.36) |
| IV | 7 | 3.29 (1.03) | 81.86 (111.32) | 0.12 (0.19) | 4 | 3 | 0.62 (0.40) |
| V | 7 | 2.00 (1.41) | 27.00 (30.31) | 0.01 (0.03) | 3 | 4 | 0.77 (0.33) |
| VI | 7 | 0.86 (0.83) | 54.14 (69.34) | 0.10 (0.13) | 1 | 6 | 0.66 (0.43) |
| VII | 12 | 4.33 (5.18) | 22.58 (52.07) | 0.14 (0.16) | 8 | 4 | 0.65 (0.46) |
| VIII | 9 | 2.89 (2.88) | 0.78 (1.87) | 0.07 (0.13) | 7 | 2 | 0.45 (0.45) |

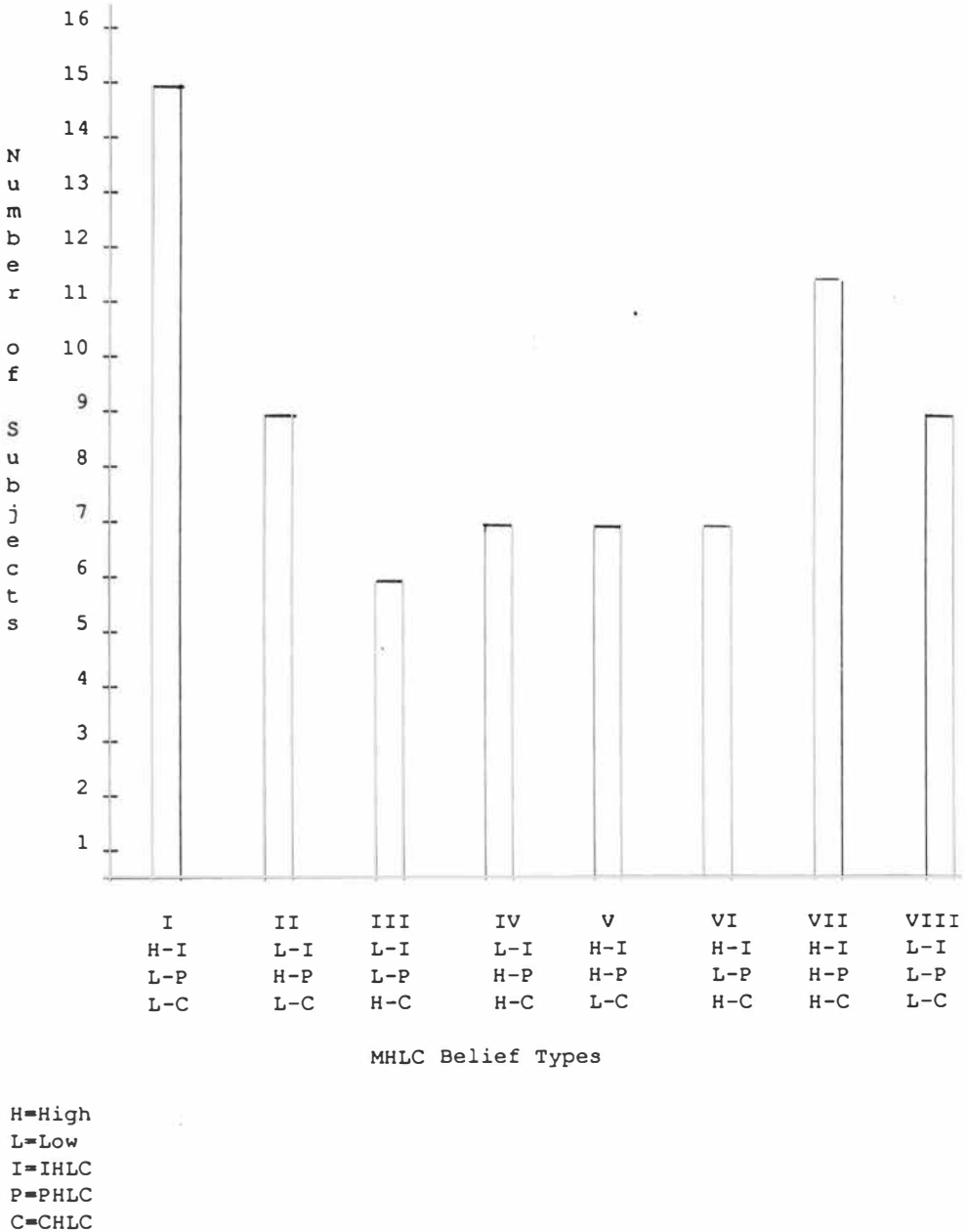


Figure 2. Distribution of MHLC Belief Types

The number of previous job related injuries ranged from zero to 15 for the subjects included in this study. The mean number of previous job injuries experienced by this sample are listed according to MHLC belief type in Table 2. Thirty-two subjects were found to have experienced zero or one job related injury in the three years prior to this study. No significance was found on this variable and the MHLC using the Kruskal-Wallis test, $\chi^2$ (7, N = 72) = 11.64, $p$ > .11.

The number of days missed from work due to previous job related injuries ranged from 0-353. These days were unevenly distributed among the MHLC belief types. The mean number of days missed from work due to previous job related injuries are listed in Table 2. No significant relationship was found between these two variables in the Kruskal-Wallis test, $\chi^2$ (7, N = 72) = 10.54, $p$ > .16.

The ratio of the number of physical therapy appointments scheduled and missed for the current complaint was analysed according to the subjects' MHLC belief classification. The number of appointments scheduled ranged from one to 41. The number of appointments missed ranged from zero to seven. Table 2 shows the mean for these ratios. There was no significance in these ratios and the subjects' MHLC beliefs according to the Kruskal-Wallis test, $\chi^2$ (7, N = 72) = 7.90, $p$ > .34.

There was an uneven distribution of MHLC belief types among complaint classifications. No significance was found with analysis, $\chi^2$ (7, N = 72) = 14.06, $p$ > .50. Table 2 shows the frequency distribution of subjects by acute and chronic classifications.

The data showed a range of wage replacement ratios to be from 0.00 to 1.00. The mean wage replacement ratios according to MHLC belief type are given in Table 2. The Kruskal-Wallis Test, $\chi^2$ (7, N = 72) = 3.42, $p > 0.84$, was not significant.

# CHAPTER 5

## Conclusion, Discussion and Summary

This chapter presents conclusions relative to the research questions posed in this study. Included is a discussion of the results, trends and clinical implications of this investigation with suggestions for future research. The chapter concludes with a brief summary of the study.

### Conclusion

The purpose of this study was to investigate the relationship between an injured worker's health locus of control belief and several factors that may effect recovery from such an injury. Conclusions are presented for each research question examined in the order in which they are listed in Chapter 1.

What is the frequency count of health related locus of control beliefs, as measured by the MHLC, of patients referred to an industrial physical therapy clinic? These results are illustrated in Figure 2, Chapter 4. There were more subjects scoring in the Type I and Type VII categories than in the others. (The reader may wish to refer to Figure 1 in Chapter 2). The persons referred to this physical therapy clinic during this study reflect a variety of health locus of control beliefs. The results suggest that most of these subjects believe that there are aspects of their health over which they have complete control; and aspects of their health in which they, fate and powerful others together control their health.

Do persons with high PHLC and CHLC scores have a greater frequency of previous job related injuries than those with lower scores in the Powerful Others and Chance subscales of the MHLC? The number of previous job injuries for the subjects in this study ranged from zero to 15. Of this group of subjects, thirty-two persons were found to have experienced zero or one job related injury in the three years prior to this study. These differences were not significance ($p > 0.11$); however, and this study does not support a definite relationship between the number of job related injuries an individual has experienced and that individual's particular MHLC belief type.

What is the relationship between the length of time missed for previous job related injuries over the past three years and the subject's MHLC belief classification? The number of days missed from work due to previous job injuries ragned from zero to 353. These days were unevenly distributed among the various MHLC belief types. Subjects scoring in the Type III (high CHLC) and Type IV (high PHLC and CHLC) classifications though, had missed more days from work, on the average, for job injuries in the past than any of the other six MHLC belief types. No significant ($p > 0.16$) relationship was found between these two variables in this study and there was no support for the hypothesis that job injured workers will score high in the PHLC and CHLC subscales of the MHLC if they have experienced a large number of days away from work for past job injuries.

What is the relationship between the ratio of the number of physical therapy appointments missed and the number of physical therapy appointments scheduled for the present complaint for the duration of the treatment period to a maximum of six weeks and the

subject's MHLC belief classification? The range of appointments scheduled was from one to 41. The range of appointments missed was from zero to seven. There was no significance ($p > 0.34$) in these ratios and the subject's MHLC belief classifications. Although the statistical analysis of this data did not show significance to conclude a relationship between appointment keeping behavior and MHLC belief type, an interesting observation was that the Type V subjects showed the lowest (0.01) mean missed appointment ratio of the eight types. Wallston & Wallston (1982) noted that the Type V believers were the most adaptive of the eight MHLC belief types. These people believed that their health is controllable by themselves or some powerful others, and not up to luck, fate or chance. Based on social learning theory, one might expect these subjects to show good appointment keeping behaviors, since they may view themselves and the physical therapist as important in effecting a positive recovery from a job injury.

Are the MHLC scores equally distributed across subjects in the acute and chronic classifications? There was an uneven distribution of MHLC scores among these two classifications. No significance was found ($p > 0.50$) on these three variables. It appears that the stage of a job injured worker's complaints and health locus of control belief upon referral to a physical therapy clinic is a random occurrence, varying in frequency and distribution at different points in time.

What is the relationship between the wage replacement ratio and the subjects MHLC belief classification? The data showed the range of the wage replacement ratio to be from 0.00 to 1.00. Subjects scoring

in the Type I MHLC belief (high IHLC) showed the highest sum of the scores on the wage replacement ratio variable, but the Type II classification showed the highest mean wage replacement ratio. The statistical analysis did not show a significance ($p > 0.84$) on these two variables. Though there was no significance found in the statistical analysis, certain trends were found that may suggest a need for further research.

Discussion

The results of the MHLC scores for these subjects, as measured by the MHLC - Form A, showed that the subjects' health locus of control beliefs spanned all eight MHLC belief types described by Wallston & Wallston in 1982. The highest frequency of scores was found in the Type I and Type VII categories in which the IHLC belief is high. This suggests that a large group of these subjects believe that their own actions play an important part in their health. Of this group of high internals, some individuals (those with high PHLC and CHLC scores) also see chance and powerful others playing a significant role in their general health.

Whether subjects' general health beliefs incorporate experiences in which a job related injury has occurred is not clear since not all have had previous job injuries or learned expectancies regarding this type of situation. Thus, some subject's general health beliefs may have been partially influenced by prior job injury experiences and other subjects' general health beliefs clearly could not have been influenced by job injury experiences. In Rotter's (1966) social learning theory, expectations and subsequent locus of control orientations are the result of cognitive learning and one's collective

experiences in various life situations. Similar situations will produce similar behaviors based on how the individual perceives his or her role in the outcome and the value the person places on the outcome. A worker injured at home will develop a general expectancy regarding the recovery process which may be quite different from one developed during a job injury experience. In a non-job related injury, the individual has a greater freedom of choice of health care providers; more decision making power regarding the course and direction of health care; and experiences less administrative supervison of the medical case. With a job injury, one has a limited number of health care providers from which to choose; has shared decision making power in the direction and type of health care provided; and, because of the WC process, is enclosed in a rigid administrative organization. The non-job related injury allows control on the patient's part, whereas a job injury involves a very structured process, often attached with a negative stigma, in which the patient has little control. The health locus of control belief for the job injury situation is likely to be a more specific construct than the general health locus of control belief. The health locus of control beliefs measured in this study represent general and specific health locus of control beliefs.

The variables measured in this study concerning job related injury were previous job injury experience, appointment keeping behavior, complaint classification and associated financial factors. Although many of these subjects were found to have experienced previous job injuries, many of these injuries (51%) did not result in the persons missing time from work for which they would have received

temporary total disability payment through the WC system. A large number of these subjects had little experience with the WC process. Social learning theory emphasizes the effects of repeated reciprocal environmental interactions and the expectancies regarding outcomes that a person develops in response to these environmental interactions. One might suggest that these subjects have not developed a specific expectancy as to the outcome of their current condition due to the lack of experiences in the past with the WC process. Their expectancy in this situation may be more related to their own general health locus of control belief, than one related to a job injury. On the other hand, in those subjects who have experienced previous job related injury and the WC claims process, their measures of health locus of control belief may reflect their expectancy as a more specific measure of health locus of control belief.

The appointment keeping behaviors for this sample showed that most (76.7%) of the subjects kept all of their scheduled physical therapy appointments. Thirty-three percent of the subjects missed one or more appointments. This group represented all eight MHLC belief types including persons who were able and unable to continue working. Type III and Type VII categories showed the higher missed appointment ratios (0.13 and 0.14 respectively) than in the other categories. A high CHLC is consistent in both Type III and Type VII which may suggest that these subjects may not have kept all their appointments, to some degree, because of their belief that chance rather than treatment has an influence on their recovery. Type V (high IHLC and PHLC) subjects showed the least average missed appointment rate (0.01)

of all of the eight MHLC belief types. These subjects place a high degree of belief in their role and the role of the physical therapist in effecting their recovery. It is conceivable that this belief could have developed as a result of their own life experiences or the life experiences of others under the treatment of a physical therapist which is a cognitive learning experience.

An uncontrollable variable that influenced a few subject's appointment keeping behaviors emerged in this study. Near the end of this study, a conflict arose between several employees and their supervisors regarding receiving physical therapy treatments during their shift. Some supervisors allowed their employees to come during shift hours and some did not. As a result, three employees were required to schedule their appointments after the shift. After this mandate, the three employees involved did not return for subsequent physical therapy appointments. This situation appears to have strongly influenced the appointment keeping behaviors of these three persons.

The complaints for which the subjects in this study received physical therapy were classified as acute or chronic. This classification was based on the number of days missed from work for a worker to be covered from day one of a job related injury under the temporary total disability benefit. Types I and VII showed a two to one occurrence of acute to chronic complaints. These two types of MHLC beliefs have a high internality component. These subjects with acute complaints and high IHLC beliefs may be demonstrating their general health locus of control belief which may not have yet been altered by those factors that impact on individuals during chronic

situations as noted in works by Johns (1981), Lefcourt (1984) and Parnes and King (1977). Type VIII showed a seven to two occurrence of acute over chronic complaints. These individuals scored low on all three subscales of the MHLC. Wallston & Wallston (1982) suggested that these persons may feel that the MHLC items do not reflect their own health control expectancies and, thereby, respond negatively to all the items. This may be the situation for this sample.

The wage replacement ratio for the subjects of this study was examined to see its relationship to the subjects' MHLC belief classifications. This sample showed that 35 subjects (49%) received their regular wages throughout the course of the study. Nineteen subjects (26%) were in the waiting period for compensation to begin and 18 subjects (25%) were receiving temporary total disability payments. Of the group receiving temporary total disability, the wage replacement ratios ranged from 0.61 to 1.00 with the mean = 0.78 (S.D. = 0.08).

There were two subsamples among this sample which included those persons who continued to work and those who were unable to work with their injury. Examination of the data for these two subsamples showed a difference on the number of days missed for previous job related injury; 17 (4.6%) working subjects had missed days from work in the past three years which provided them experience with the WC process. Ten subjects (29%) were unable to work with the current job injury and also had missed enough days from work with a previous job related injury to give them experience with the WC process. Both groups showed fairly diverse MHLC classifications. The previous missed days among working subjects may have given them an additional incentive to

continue working with the current injury. No significant differences were noted on the other variables of this study for these two subsamples.

Suggestions for Future Research

The research questions posed in this study may be better answered by adjusting the research design. A larger sample population, N = 100, may have been beneficial in statistically analyzing the variables in this study. Setting stricter criteria on the definition of previous job injury may allow for inclusion of more subjects who have experienced the WC process and have specific health locus of control beliefs operating in this situation. Future research in the area of health locus of control and behaviors of persons with job related injuries may shed more insight on the psychological, social and economic ramification involved with job related injurys.

There is little in the literature that investigates the locus of control construct with persons who suffer a job injury. Future research in this area may benefit many persons involved in the recovery process as well as administrative processes of such cases. Suggestions for future research include:

1. A longitudinal study over the duration of a job related injury that may assess any changes in health locus of control belief.
2. A study that would look at a particular type of injury, control for the severity of the injury and compare recovery ratios among the various MHLC classification.

3. A study to develop a new scale or adopt the MHLC to reflect items that specifically relate to injury or accidental trauma.
4. A study of subjects with no previous job related injury experience who experience their first job injury, to see if there is a change in their health locus of belief orientation.

Summary

The investigation of health locus of control beliefs in persons with job related injuries was an attempt to provide useful information on the psychological, as well as, economic factors that influence behaviors in persons suffering this type of injury. This study does not show a clear relationship between the variables chosen in this study but it does suggest a need for future research in this area. Although these variables considered independently may not all be predictive of a worker's health locus of control belief, it may be possible that a combination of these variables may show a relationship to an injured worker's health locus of control belief during a job related injury. Also, the value a person places on the physical therapist's and the role of other power figures in his or her recovery will effect his or her behavior in keeping scheduled medical appointments. The experiences that an individual faces during a job injury may be quite different due to one's lack of control of the WC process than when one experiences the same injury away from the job. There is a need to assess a worker's need or value to return to his previous employment situation, which was not addressed in this study, in addition to the particular health locus of control orientation. It is not clear to this author if the MHLC is sensitive enough to monitor

specific beliefs regarding locus of control when one has been injured on the job. Further research in this area may produce additional insight into the utility of the MHLC with persons suffering a job injury.

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# APPENDIX A

## Multidimensional Health Locus of Control Scale

### Form A

This is a questionnaire to determine the way in which different people view certain important health-related issues. Each item is a belief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item you are to circle the number that represents the extent to which you disagree or agree with the statement. The more strongly you agree with a statement, then the higher will be the number you circle. The more strongly you disagree with a statement, the lower will be the number you circle. Please circle only one number. This is a measure of your personal beliefs; obviously there are not right or wrong answers.

Please answer these items carefully but do not spend too much time on any one item. Be sure to answer every item. Also, try to respond to each item independently when making your choice; do not be influenced by your previous choices. It is important that you respond according to your actual beliefs and not according to how you feel you should believe.

| | Strongly Disagree | Moderately Disagree | Slightly Didagree | Slightly Agree | Moderately Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| 1. If I get sick, it is my own behavior which determines how soon I get well again. | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. No matter what I do, if I am going to get sick, I will get sick. | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. Having regular contact with my Physician is the best way for me to avoid illness. | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. Most things that affect my health happen to me by accident. | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. Whenever I don't feel well, I should consult a medically trained professional. | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. I am in control of my health. | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. My family has a lot to do with my becoming sick or staying healthy. | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. When I get sick I am to blame. | 1 | 2 | 3 | 4 | 5 | 6 |
| 9. Luck plays a big part in determining how soon I will recover from an illness. | 1 | 2 | 3 | 4 | 5 | 6 |
| 10. Health professionals control my health. | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. My good health is largely a matter of good fortune. | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. The main thing which affects my health is what I myself do. | 1 | 2 | 3 | 4 | 5 | 6 |
| 13. If I take care of myself, I can avoid illness. | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me. | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. No matter what I do, I'm likely to get sick | 1 | 2 | 3 | 4 | 5 | 6 |
| 16. If it's meant to be, I will stay healthy. | 1 | 2 | 3 | 4 | 5 | 6 |
| 17. If I take the right actions, I can stay healthy. | 1 | 2 | 3 | 4 | 5 | 6 |
| 18. Regarding my health, I can only do what my doctor tells me to do. | 1 | 2 | 3 | 4 | 5 | 6 |

# APPENDIX B

## Key to Scoring the MHLC, Form A

Key:

Items 1, 6, 8, 12, 13, and 17 are worded in the internal (IHLC) direction and are scored from 1-6 as they are circled by the subject.

Items 3, 5, 7, 10, 14, and 18 are worded in the Powerful Others (PHLC) direction and are scored from 1-6 as they are circled by the subject.

Items 2, 4, 9, 11, 15, and 16 are worded in the chance (CHLC) direction and are scored from 1-6 as they are circled by the subject.

The largest total score of the three subscales will indicate the subject's particular health locus of control belief.

# APPENDIX C

## Data Collection Sheet

I. MHLC scale's score: IHLC _____ CHLC _____ PHLC _____

MHLC scale's LOC: _____

II. Number of previous job related injuries: _____

III. Numbers of days off from work due to previous job injuries: ____

IV. Number of P.T. appointments scheduled for the present complaint: _____

V. Number of P.T. appointments missed or rescheduled for the present complaint: _____

VI. Subject's complaints: Acute _____ Chronic _____

VII. Preinjury weekly wages: _____

VII. Weekly Temporary Total Disability payments: _____

VIII. Age: _____ Sex: _____ Race: _____

# APPENDIX D

## Consent Form

Elnora H. Allen, P.T., has my persission to use information related to my job injury here at Philip Morris, U.S.A. and the health questionnaire completed by me in a research project for her graduate studies at Virginia Commonwealth University, Medical College of Virginia.

I understand that no where in the study will my name be mentioned or my specific identity revealed. I understand that I may withdraw from this study at any time.

_____ _____

Signature Date

_____

Witness

# APPENDIX E

## Health Locus of Control Belief and Health Behavior in Patients With Job Related Injuries

Elnora H. Allen

Otto Payton

Nora Donohue

and Janet Watts

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This Study was completed in partial fulfillment of the requirements for Ms. Allen's Master's degree of Physical Therapy, Virginia Commonwealth University.

## Abstract

This study examines the relationship between an individual's health locus of control belief and four variables: previous job injury experience, the duration of work absence due to previous job injury, appointment keeping behavior, and the wage replacement ratio. Seventy-two subjects with job related injuries referred to an industrial physical therapist were administered the Multidimensional Health Locus of Control Scale (MHLC). There was an uneven distribution of subjects according to MHLC belief patterns with more subjects demonstrating a "pure internal" health locus of control belief. No significance ($p > .05$) was found between our four variables associated with a job injury and a high powerful others (PHLC) and chance (CHLC) locus of control beliefs. Not all the subjects had experienced a previous job injury and, therefore, had not developed learned expectancies regarding this type of situation. Their health locus of control belief may be a general measure whereas for those subjects with prior job injury experience, the health locus of control for this situation is likely to be a more specific construct. We conclude that a worker's belief that the external factors of chance or a significant powerful other may not relate to experience with previous injury on the job, the duration of previous job injuries, financial factors associated with job injury and the stage of the injury.

## Introduction

Recovery from an injury involves more than the status of the physical condition such as its severity, it also involves the patient's mental status, including such factors as attitudes, beliefs and values.[1,2] Thus, physical therapy for work-related injuries must be based on a complete assessment of both the patient's physical and mental conditions. The physical dimension of this assessment seems to be consistently and thoroughly addressed; however, all physical therapists may not systematically evaluate the psychological dimension.

Physical therapists should understand and assess the psychological factors that may influence a patient's recovery. Assessment of the patient's psychosocial status may not only result in more effective treatment but when done early, it may assist in a smooth progression of the recovery process with a less protracted absence from work. This could improve productivity and reduce health care costs.

Several social psychological theories have been developed that attempt to explain how perceptions, attitudes, beliefs, and values relate to and influence behavior.[3] One of these is the social learning theory (SLT) of personality and behavior which offers a view of human behavior in which expectancy for an outcome rather than the reinforcement as the motivator of behavior. Expectancy is viewed as the perception that a particular reinforcement will occur as a function of a specific behavior on the individual's part within a given situation or related situations. The expectancies are the result of the individual's collective experiences in various life

situations. Similar situations will give rise to similar and specific behaviors based on how the individual perceives his or her role in the outcome and the value of that type of outcome in a given situation. This perception is referred to as locus of control belief.[3]

One's locus of control belief may be internal or external. Internal locus of control belief is an individual's belief that an outcome of an event is contingent upon his one's behavior or is largely controlled by some permanent characteristic of the individual. External locus of control belief is an individual's belief that an outcome of an event follows some action of one's own but is not entirely contingent upon one's own actions.[4]

Many instruments have been developed to measure locus of control beliefs in general and specific topic areas. In this study, we used the Multidimensional Health Locus of Control Scale (MHLC) to assess locus of control beliefs in job injured persons.[5]

Wallston and Wallston proposed a typology to classify health locus of control beliefs based on MHLC scores.[6] The MHLC scores represent eight patterns of health locus of control beliefs which are combined scores on the three subscales of the MHLC: internal health locus of control (IHLC); powerful others health locus of control (PHLC); and chance health locus of control (CHLC). Figure 1 presents these eight patterns. We used this typology for this study.

The purpose of the study was to examine the relationship between an injured worker's health locus of control measure, and four variables: previous job injuries, work absences, appointment keeping behavior and the wage replacement ratio. We questioned whether persons with high PHLC and CHLC scores would have experienced greater

numbers of previous job injuries, longer work absences due to prior job injuries; have higher missed physical therapy appointment rates and lower wage replacement ratios than persons scoring high IHLC and low PHLC and CHLC.

Recovery and successful rehabilitation of an injured person are the result of many social, economic and psychological variables acting on the person. Litman found that a person with a positive self-concept, in spite of their disability, achieved more successful rehabilitation.[7] Andersson and Berg found that self confidence and ego strength were also positive factors in rehabilitation.[8] Brewin, Robson and Shapiro and Nichols suggested that a need to achieve financial reward as compared with the financial support one receives while not working is an incentive for recovery from an injury.[9,10] Butler and Worrall found that higher benefits increased the duration of absence from work in workers with low back injuries.[11] Later, work by Butler and Worrall found that the less costly the work absence was to the employee the longer the duration of the absence.[12] Chronic unemployment may also affect one's locus of control orientation.[13,14] Much research has been undertaken to investigate the locus of control construct, as well as the social, economic and psychological factors that affect recovery. There is no evidence in the literature of any research that addresses recovery from a job related injury and a person's health locus of control belief.

## METHOD

### Subjects

Our sample consisted of seventy-two patients referred to a physical therapy clinic located in a light manufacturing industry.

Each subject was a full time employee of the industry and had experienced a job injury. The sample consisted of 39 males and 33 females. The mean age was 36.26 (S.D. = 7.16) years ranging from 26 to 56 years of age.

Subject data collected were age, sex, race, MHLC scores, the number of previous job related injuries, and the number of days missed from work due to the previous job injuries over a three year period. We also collected data on the number of physical therapy appointments scheduled for the current injury; the number of physical therapy appointments missed for the current injury; acute or chronic classification of the injury and the wage replacement ratio for each subject.

Procedure

Each subject was asked to participate in the study at the time of his or her first physical therapy visit. Form A of the MHLC was completed by each subject and an initial physical therapy evaluation was performed concerning the chief complaint. The subject's history provided us with data about whether it was an acute or chronic complaint. The medical record of each subject was reviewed to obtain the data regarding their previous and current job related injury.

Preinjury weekly wages and temporary total disability payment amounts were also collected for each subject from the company's employee information systems record. This weekly wage was adjusted to account for state and federal income and social security taxes.

We considered the data collection completed for each subject when the person was discontinued from physical therapy, or when he returned to work, whichever occurred first. For those persons receiving

physical therapy for a period greater than six weeks, six weeks was used as the cut off period for data collection.

Data Analysis

A subject's health locus of control belief score was determined for items in each subscale (IHLC, CHLC, PHLC). The total score for each subscale was determined based on the numbers selected by each subject for each item. The median split method was used to determine if a particular score represented a high or low score in its subscale.[6]

Each subject was assigned a classification number according to the type of health locus of control belief pattern demonstrated by his scores on the MHLC using the Wallston and Wallston classification model. Each subject had three HLC classifications, one for each subscale. These three classifications provide a pattern of MHLC beliefs. There are eight potential types of MHLC belief patterns illustrated in Figure 1. We used the typology of MHLC belief patterns to answer the research questions posed in the study.

Statistical analysis of the data were varied based on the nature of our research questions. A frequency count was made for each subject according to the type of MHLC belief pattern demonstrated. A Kruskal Wallis test[15] was used to compare the number of previous job injuries, number of days missed from work for previous job injuries, missed appointment rates, and wage replacement ratio to the MHLC belief type demonstrated by each subject. The Chi Square test was used to analyze acute and chronic complaints categories of the current job injury according to the MHLC belief type.

RESULTS

Table 1 shows the means for each variable investigated in this study. MHLC belief patterns are illustrated in Figure 2. Statistical analysis showed no significant ($p > .05$) relationships between MHLC type and the four variables in our study, but we came upon some interesting observations.

Discussion

The results of the MHLC scores for these subjects, as measured by the MHLC - Form A, showed that the subjects' health locus of control beliefs represented all eight MHLC belief types described by Wallston & Wallston. The highest frequency of scores was found in the Type I and Type VII categories in which the IHLC belief is high. This suggests that a large group of these subjects believe that their own actions play an important part in their health. Of this group of high internals, some individuals (those with high PHLC and CHLC scores) also see chance and powerful others playing a significant role in their general health.

It is not clear whether their general health beliefs incorporate experiences in which a job related injury has occurred since not all of our subjects have had previous job injuries, and thus have not developed learned expectancies regarding this type of situation. Some subjects' general health beliefs may have been partially influenced by their prior job injury experiences, while the others' could not have been so influenced. In social learning theory, expectations and subsequent locus of control orientations are learned from one's collective experiences in various life situations. Similar situations will produce similar behaviors based on how the individual perceives

his or her role in the outcome and the value the person places on the outcome. A worker injured at home will develop a general expectancy regarding the recovery process which may be quite different from one developed during a job injury experience. The non-job related injury allows control on the patient's part, whereas a job injury involves have very structured process, often attached with a negative stigma, in which the patient has little control. The health locus of control belief for the job injury situation is likely to be a more specific construct than the general health locus of control belief. The health locus of control beliefs measured in this study represent general and specific health locus of control beliefs.

The variables measured in this study concerning job related injury were previous job injury experience, appointment keeping behavior, complaint classification and associated financial factors. Although many subjects were found to have experienced previous job injuries, many of these injuries (51%) did not result in the persons missing time from work for which they would have received temporary total disability payment through the Workers Compensation (WC) process. A large number of these subjects had little experience with the WC process. Social learning theory emphasizes the effects of repeated reciprocal environmental interactions and formation of expectancies regarding outcomes that a person develops in response to these environmental interactions. One might suggest that these subjects have not developed a specific expectancy as to the outcome of their current condition due to the lack of experiences in the past with the WC process. Their expectancy in this situation may be more related to their own general health locus of control belief, than one

related to a job injury. On the other hand, in those subjects who have experienced previous job related injury and the WC claims process, measures of health locus of control belief may reflect their expectancy as a more specific measure of health locus of control belief.

The appointment keeping behaviors for our sample showed that most (66.7%) of the subjects kept all of their scheduled physical therapy appointments. Thirty-three percent of the subjects missed one or more appointments. Type III and Type VII categories showed the highest missed appointment ratios. A high CHLC is consistent in both Type III and Type VII which suggest that these subjects may not have kept all their appointments, to some degree, because of their belief that chance rather than treatment has an influence on their recovery. Our Type V (high IHLC and PHLC) subjects showed the least average missed appointment rate of all of the eight MHLC belief types. These subjects place a high degree of belief in their role and the role of the physical therapist in effecting their recovery.

The complaint for which the subjects in this study received physical therapy were classified as acute or chronic. This classification was based on the number of days missed from work for a worker to be covered from day one of a job related injury under the temporary total disability benefit. Types I and VII showed a 2:1 occurrence of acute to chronic complaints. These two types of MHLC beliefs have a high internality component. These subjects with acute complaints and high IHLC beliefs may be demonstrating their general health locus of control belief which may not have yet been altered by those factors that impact on individuals during chronic situations.

The wage replacement ratio for the subjects of this study was examined to see its relationship to the subjects' MHLC belief classifications. None was found.

The results of our investigation showed little support for our hypothesis that there is a positive correlation between a persons previous job related injury experience and high HLC beliefs in the influence of Chance or Powerful Others. The other variables, missed appointment rates, wage replacement rates and type of complaint classification, in themselves may not show a correlation with an injured worker's MHLC belief type, but in combination with other variables such as desire to return to work, there may be a correlation. The items in the MHLC reflect statements regarding illness and health that may not accurately measure or elicite true responses regarding a job injured workers post-injury behavior. The MHLC items are not worded in such a way to reflect impaired health that is the result of uncontrollable trauma or accident. We feel that further research is needed to determine the sensitivity of MHLC items in measuring specific locus of control beliefs in persons who have experienced an accidental injury or trauma. A study that would investigate a combination of variables such as desire to return to work, MHLC belief orientation and missed appointment rate may prove more useful for providing information that can be applied in the clinical setting regarding our industrial or WC patients.

## CONCLUSIONS

The investigation of health locus of control beliefs in persons with job related injuries was an attempt to provide useful information on the psychological, as well as, economic factors that influence

behaviors in persons suffering this type of injury. This study does not show a clear relationship between individual variables chosen in this study, but it does suggest a need for future research in this area. Although these variables considered independently may not all be predictive of a worker's health locus of control belief, it may be possible that a combination of these variables show a more specific relationship with an injured worker's health locus of control belief during a job related injury. Also, the value a person places on the physical therapist's and the role of other power figures in his or her recovery will effect his or her behavior in keeping scheduled medical appointments. The experiences that an individual faces during a job injury may be quite different due to one's lack of control of the WC process than when one experiences the same injury away from the job. There is a need to assess a worker's need or value to return to the previous employment situation, which was not addressed in this study, in addition to the particular health locus of control orientation. It is not clear if the MHLC is sensitive enough to monitor specific beliefs regarding locus of control when one has been injured on the job. Further research in this area may produce additional insight into the utility of the MHLC with persons suffering a job injury.

Table 2

Means and Standard Deviations for Each Variable

| Type | N | Previous Injury | # Days Missed Previously | Appointments Missed Ratio | Acute | Chronic | Wage Replacement Ratio |
|---|---|---|---|---|---|---|---|
| I | 15 | 1.67 (1.23) | 21.27 (37.76) | 0.06 (0.12) | 10 | 5 | 0.71 (0.39) |
| II | 9 | 1.78 (1.42) | 15.78 (26.57) | 0.04 (0.05) | 3 | 6 | 0.82 (0.31) |
| III | 6 | 3.50 (2.81) | 71.50 (126.40) | 0.13 (0.12) | 3 | 3 | 0.75 (0.36) |
| IV | 7 | 3.29 (1.03) | 81.86 (111.32) | 0.12 (0.19) | 4 | 3 | 0.62 (0.40) |
| V | 7 | 2.00 (1.41) | 27.00 (30.31) | 0.01 (0.03) | 3 | 4 | 0.77 (0.33) |
| VI | 7 | 0.86 (0.83) | 54.14 (69.34) | 0.10 (0.13) | 1 | 6 | 0.66 (0.43) |
| VII | 12 | 4.33 (5.18) | 22.58 (52.07) | 0.14 (0.16) | 8 | 4 | 0.65 (0.46) |
| VIII | 9 | 2.89 (2.88) | 0.78 (1.87) | 0.07 (0.13) | 7 | 2 | 0.45 (0.45) |

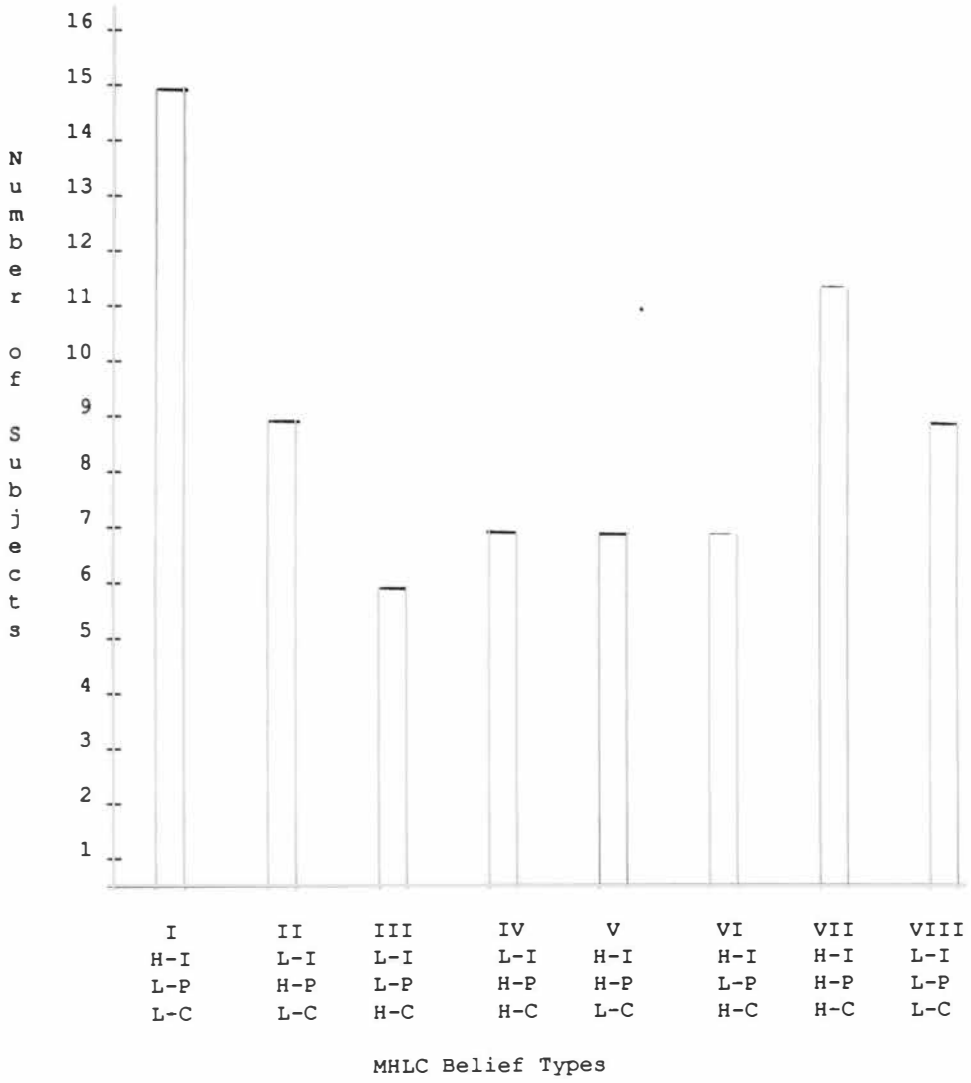


Figure 2. Distribution of MHLC Belief Types

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