HEALTH LOCUS OF CONTROL OF PATIENTS UNDERGOING OPEN HEART SURGERY

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We hereby recommend that the thesis prepared under our supervision by Mary Christina Hansen entitled Health Locus of Control of Patients Undergoing Open Heart Surgery

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DEDICATION

To Roger, Ray, Mildred, Dale, Bernie, and Jerry whose love and support I will always cherish.

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CHAPTER 1

INTRODUCTION

Patients with cardiovascular disease constitute one of the largest morbidity and mortality groups within the United States. Large amounts of time and money are spent in diagnosis, treatment, rehabilitation, and education of this patient population. Cardiovascular disease is a drain on the financial reserves and productivity of the individual and society.

A major treatment modality for cardiovascular disease is open heart surgery. Multi-disciplinary research has been conducted to determine the impact of undergoing this procedure on the patient. The results of this research have documented associated problems of depression, anxiety, dependency, and psychosis (Edgerton & Kay, 1960; Heller, Frank, Kornfield, Malm, & Bowman, 1974; Kimball, 1969).

Nurse researchers continue to explore a variety of nursing approaches to reduce psychological stressors and promote successful adjustment after open heart surgery. One possible way of promoting successful

adjustment might be to use the construct of locus of control to assess the patient's motivation to learn.

Locus of control is a concept developed by Rotter (1954) to help explain varying degress of motivation in the individual's information seeking behaviors. A basic assumption of social learning theory is that the more perceived control an individual has the better able he will be to adapt to stressful life events. Open heart surgery is a stressful situation that promotes loss of physiological and environmental control and leaves the person dependent on powerful others. Nursing interventions aimed at increasing the person's perception of control within the framework of Rotter's theory could reduce maladaptive postsurgical psychological responses.

Problem of Study

The major questions for this study were:

1. Does the person's health locus of control change after undergoing open heart surgery?

2. Is there a relationship between age and the patient's health locus of control posttest score following open heart surgery?

3. Is there a relationship between development of complications and the patient's health locus of control posttest score following open heart surgery?

Justification of Problem

According to McIntosh and Garcia (1978), over 400,000 people have undergone aorto-coronary bypass grafting since the operation was first performed in 1964. Other researchers are predicting that coronary artery revascularization will be one of the most commonly performed major elective surgeries on adults in the United States (McIntosh & Garcia, 1978). Extensive research has been done and is currently being conducted on the physiological risks and benefits of this surgery. Recent publications, however, are beginning to raise questions about the psychosocial and economic impact of aorto-coronary bypass surgery on the individual and society. Millman (1977) stated that

> coronary bypass surgery may be the most momentous innovation in contemporary American medicine. Some analysts have predicted on the basis of present trends that within ten years, the operation could be a hundred billion dollar a year industry; it could dominate not only our health budget but a large part of our national resources. (p. 217)

Nursing, then, in its commitment to holistic health care and community involvement, must begin to explore its

role in maximizing the benefits of this surgical procedure for the patient.

An integral component of the nurse's role in maximizing the benefits of the open heart surgical procedure is health education. In order to educate the patient, nursing must first explore the factors that influence the patient's learning capabilities.

Jillings (1978) sought to clarify the patient's response to open heart surgery by describing common behavioral and emotional reactions of a selected group of patients. Jillings found patients verbalized that the surgery evoked feelings of anxiety, depression, loneliness, and fear. Patients also expressed a need for psychological support. Applying the results of the research to nursing interventions, the following directives for care were formulated:

> 1. Recognize individual differences in needs manifested during the recovery period.
> 2. Assist the individual toward independence, recognizing his individual needs and concerns as he progresses.
> 3. Assess current and pre-hospital factors that may impede "resolution" and endeavor to alleviate these.
> 4. Teach the patient regarding aspects of his recovery and lifestyle as he demonstrates an interest and motivation to learn. (Jillings, 1978, p. 994)

In an earlier study of the psychological effects of open heart surgery (Weiss, 1966), the patient's response to surgery appeared to be based on ability to respond effectively to overwhelming psychological stress. Support for this observation was found in a study by Layne and Yudofsky (1971) who were researching incidence of postcardiotomy delerium. The findings of these authors supported the hypothesis that patients who did not or could not express anxiety preoperatively developed psychosis more frequently during the postoperative period.

Kinney (1977) attempted to isolate and study the effects of preoperative teaching on the anxiety level of a selected patient sample undergoing aorto-coronary bypass. The stated goal was to identify some criteria to distinguish individual differences in regard to the kinds of information the person needs and can utilize. The study concluded that preparation of the open heart surgical patient psychologically was desirable, but the coping style a given patient possesses was seldom known. This study underlined the need for a systematic and theoretically-based tool to facilitate formation of an individualized plan for preoperative and postoperative psychological support.

A further attempt to identify a "personality profile" of the open heart surgical patient was made by Lair and Biddy (1968). These authors referred to past studies that suggested denial and level of anxiety as predictors of an unsatisfactory postoperative recovery (Abram, 1965; Abram & Gill, 1961; Kennedy & Bakst, 1966). Following a review of these studies, Lair and Biddy (1968) studied 20 open heart surgical patients, utilizing a battery of psychological tests administered before and after surgery. The results obtained did not demonstrate any statistically significant personality traits for the sample undergoing this surgical procedure.

Another component of the individual's psychological milieu is locus of control. There have been no published studies correlating locus of control with the person's response to open heart surgery. However, recent publications have dealt with locus of control and health behaviors. Wallston and Wallston (1978b) wrote that knowledge of locus of control theoretically should contribute to the prediction of health behaviors. Wallston and Wallston (1978b) also stated that at a recent National Heart and Lung Institute Working

Conference on Health Behaviors, the relevance of locus of control was emphasized. One particularly applicable piece of data that the group identified was that external locus of control was associated with higher rates of morbidity and lower rates of compliance coupled with lower health motivation.

Saltzer (1978) applied health locus of control to health education and attitudes. Saltzer found that, in general, individuals with an internal locus of control were more successful in education programs that utilized a self-motivation and self-reward framework. Whereas, those with an external locus of control were more successful within a learning framework based on extrinsic imposed reinforcement. The so-called external person responded best to social pressure. Saltzer (1978) summarized that data by stating

> health education strategies might well begin with an assessment of the locus of control of the target audience. Utilizing locus of control measurements, health education programs could more effectively correspond to the locus of control orientation of the audience. (p. 127)

Locus of control has also been examined as a clinical phenomena associated with life crisis. Smith (1970) found that the patient undergoing crisis showed

a marked change in the mean internal-external score. The researcher postulated that different expectancies regarding course of improvement could contribute to these changes.

Recent definitions of the scope of nursing practice has included health education as an independent function. Education is viewed as a tool the nurse should employ to reduce anxiety and foster patient participation in and compliance with health promoting strategies. One of the first steps in developing an educational program is to assess the individual's ability to receive, process, and utilize information. In order for nursing to implement educational programs, the locus of control perception of the patient must be examined. Wallston and Wallston (1978a) summarized this in the following statement:

> The concept of internal-external control can provide direction for health education programs and a means of assessing whether or not the programs are accomplishing what they set out to do. (p. 114)

The thrust of health care in the United States is to promote optimum level of wellness through patients' participation in care. In order to promote patient participation, nurse educators must assess the person's

motivation to seek and utilize pertinent information. Health locus of control is a vital personality facet that may be assessed to ascertain the person's motivation to learn.

The aim of the present study was to measure the patient's health locus of control prior to and following open heart surgery. The locus of control construct within social learning theory was examined as an influencing variable on the planning of nursing strategies to promote wellness. The psychosocial implications of undergoing this procedure were discussed to explore possible factors influencing health locus of control.

Theoretical Framework

Rotter's concept of locus of control is a construct within the general theoretical background of the social learning theory and is based on the concept that reinforcement acts to strengthen an expectancy that a particular behavior or event will be followed by that reinforcement (Rotter, 1966). The emphasis of the locus of control construct, according to Rotter (1975), is that variations in expectancy for reinforcement occur systematically as a result of the nature of the situation

and the consistent characteristics of the particular person who is being reinforced.

In order to formulate his theory, Rotter (1954) identified six basic assumptions underlying locus of control:

> 1. The unit of investigation for the study of personality is the interaction of the individual and his meaningful environment.
> 2. The emphasis of the theory is on learned social behavior.
> 3. The personality has unity.
> 4. The theory emphasizes both general and specific determinants of behavior.
> 5. The behavior of the person has purposeful quality.
> 6. The occurrence of a behavior of a person is determined not only by the nature or importance of goals or reinforcement but also by a person's anticipation or expectancy that these goals will occur. (p. 85-102)

These assumptions facilitate use of the construct locus of control to study and predict human behavior.

Inherent in Rotter's theory is the personality variables which are labeled internal and external control. Within the definition of these two variables, the person's perception of events is stressed. Internal control is defined as the perception that reinforcement is contingent upon the person's own behaviors or relatively permanent characteristics. External control is the perception that reinforcement is not contingent upon the

person's actions but the result of luck, chance, fate, or under the control of powerful others and, therefore, unpredictable (Rotter, 1966).

Since the conception of the social learning theory, investigators have utilized it in studying the effects of locus of control on different learning variables and behavioral responses. Lefcourt (1976) indicated that no matter what experiences persons have, if they do not perceive that the experiences are the result of their own actions, they will not alter the way in which they view situations nor the way in which they function. Phares, Davis, and Ritchie (1968) applied locus of control to threatening situations. Their study showed that persons who scored as internals on Rotter's internal-external scale were more likely to engage in action-taking behaviors that confronted a problem directly than were those who scored as externals.

Two aspects related to Rotter's concept of locus of control are applicable to health education programs. The first is that internals acquire and utilize more information than do externals (Ducette & Wolk, 1973; Seeman, 1963). The second aspect pertains to compliance. Internals will resist attempts to influence their

behavior unless the benefits are explained and valued. Externals will comply with influence attempts, particularly by individuals whom they perceive as important (MacDonald & Hall, 1971).

In order to utilize an internal-external control framework for health education, the concept of locus of control needed to be specified to health-related behaviors and information seeking. Rotter (1975) recognized the need for such a specific measurement "if one's interest is in a limited area and particularly if one is seeking some practical application where every increment in prediction is important" (p. 59).

Wallston, Maides, and Wallston (1976) related locus of control to health and developed a tool to measure the construct health locus of control. These authors stated that persons will seek information about a particular health-threatening condition if they value both the outcome (health) and believe that personal behaviors will influence health.

Knowledge of the person's locus of control in relation to a specific health event is a valuable prerequisite in planning health care. This conceptual framework facilitates prediction of patient motivation

and formulation of individualized learning strategies. Therefore, information regarding the person's health locus of control before and after open heart surgery can be utilized by the nurse to tailor learning approaches based on this variable.

Hypotheses

The following null hypotheses were tested in this study:

1. There is no significant difference in the patient's health locus of control before and after open heart surgery.

2. There is no significant relationship between age of the patient and the health locus of control posttest score obtained after open heart surgery.

3. There is no relationship between development of complications and the patient's health locus of control posttest score obtained after open heart surgery.

Definition of Terms

For the purposes of this study, the following terms were defined:

1. Health locus of control--the degree to which the individual perceives that a given behavior will

secure the reinforcement of health maintenance as measured by the health locus of control scale (Rotter, 1954; Wallston, Wallston, Kaplan, & Maides, 1976).

2. Internal health locus of control--perception of positive and/or negative events as being a consequence of one's actions and thereby under personal control as designated by a score below the sample mean as measured by the health locus of control scale (Lefcourt, 1976; Wallston & Wallston, 1978b).

3. External health locus of control--perception of positive and/or negative events as being under the control of powerful others and therefore beyond personal control as designated by a score at or above the mean as measured by the health locus of control scale (Lefcourt, 1976; Wallston & Wallston, 1978b).

4. Open heart surgery--a surgical procedure performed by a cardiovascular surgeon to bypass blocked coronary arteries with a vein graft in order to revascularize portions of the myocardium.

5. Change in health locus of control--the direction and magnitude of difference between the person's preoperative and postoperative health locus of control score.

6. Complications--for the purpose of this study, the following were considered as complictions:

(a) chest drainage greater than 100 cc. per hour;

(b) arrhythmias requiring the use of drugs and/or cardiac support devices;

(c) hypotension/hypertension requiring the use of drugs and/or intra-aortic balloon pump;

(d) documented medical diagnosis of gastro-intestinal disorders;

(e) chest pain requiring the utilization of drug therapy;

(f) infection requiring adjunct therapy not listed on the routine postoperative orders;

(g) documented medical diagnosis of pulmonary complications.

Limitations

The limitations which may have influenced the conclusions of this study were:

1. The variables of sex, race, religion, level of eduation, and socioeconomic status may have influenced the person's health locus of control.

2. Psychosocial stressors unrelated to the surgical procedure may have been present.

3. Quality of nursing and medical care before and after open heart surgery may have influenced the person's health locus of control.

Assumptions

The assumptions upon which this study was based included the following:

1. Open heart surgery is a stressful life event.

2. Locus of control can change in response to a perceived stressful life event.

3. The person's locus of control will affect the ability to deal with stress and acquire knowledge essential to optimum recovery from open heart surgery.

Summary

This study was designed to determine whether or not the person's health locus of control changes following open heart surgery and to examine the impact of age and development of complications if a change occurs. This information can be utilized by nursing to plan strategies to facilitate learning and psychosocial adjustment for the population undergoing this procedure.

CHAPTER 2

REVIEW OF LITERATURE

This chapter examines locus of control as a construct of Rotter's (1954) social learning theory. Research findings pertaining to the interaction of locus of control and psychological variables are presented. A review of the psychosocial implications of undergoing open heart surgery is discussed in order to clarify their possible influence on the individual's perception of control.

Locus of Control

Locus of control is a construct formulated by Rotter within the framework of a social learning theory. This theory views personality as the interaction of the individual and a meaningful environment. This interaction is perceived as behaviors which are goal-directed. Occurrence of a behavior is predicted on the nature of the goal and reinforcement, and the anticipation that goal attainment will occur based on past experiences (Rotter, 1971).

Implicit in social learning theory is choice of behaviors based on perception of reinforcement value

and expectancy that the desired outcome will occur as a direct result of the person's actions. Rotter (1966) speculated that the individual's history of reinforcement would influence the degree to which reinforcement was attributed to personal actions. The locus of control construct is utilized to specify the mechanisms by which an individual attributes causality for reinforcement. Individuals who perceive an event as contingent upon their own behaviors are characterized as having an internal locus of control. Those who believe that what happens to them is the result of luck, fate, chance, or under the control of powerful others are characterized as having an external locus of control.

Locus of control is considered to be a relatively stable personality factor that can be used to predict behavior. However, this constract views psychological situation as an extremely important determinant that can influence the individual's perception of reinforcement value (Phares, 1976). "Changes in expectancies can be brought about by introducing new experiences that alter previous patterns of success and failure" (Phares, 1976, p. 13). Phares (1976) further pointed out that

there is a dearth of research describing the different situations that affect locus of control.

There has been extensive research evaluating locus of control within various social and situational milieu. Due to the explosion of published materials on this construct, a total comprehensive review of literature has become an overwhelming task (Lefcourt, 1972). The focus of this review was limited to those areas pertinent to the research topic.

The review of literature will include a partial summary of research on locus of control relating to the individual's response to perceived threat. Areas of discussion will include: (a) antecedents, (b) attempts to control the environment and aversive stimuli, (c) effects on learning, (d) modifying locus of control, and (e) health related locus of control.

Antecedents

Lefcourt (1976) stated that interest in social and familial origins of locus of control has been increasing in recent years. The study by Katkovsky, Crandall, and Good (1967) was cited by Lefcourt (1976) as one of the earliest research studies on familial antecedents. These researchers evaluated children's

locus of control using the Intellectual Achievement Responsibility questionnaire (IAR). They then rated maternal behaviors during home observations. High levels of maternal nurturance were associated with internal IAR scores ($r = .64$, $p < .001$). A significant correlation ($r = .57$, $p < .001$) was also found between an internal locus of control among children and a high degree of praise and approval by the parents. Five other parental behaviors were evaluated that did not show a significant statistical correlation to the children's IAR. These included: (a) restrictiveness, (b) severity of punishment, (c) clarity of rules and consistent enforcement, (d) coerciveness, and (e) acceleration attempts. As cited by Lefcourt (1976), it was suggested that the

> child's belief in internal control of reinforcements is related to the degree to which their parents are protective, nurturant, approving, and non-rejecting. (p. 99)

Davis and Phares (1967) attempted to expand on the research of Katkovsky et al. (1967) by measuring internal-external scores of college students and their parents and attempting to correlate these data with students' reports of their parents' behavior and parents' self-reports of their child-rearing behaviors.

Results of the study indicated no relationship between parent and child internal-external scores. Analysis of parental behavior data did demonstrate that children who scored as internals reported that their parents were more accepting, positively involved with them, less rejecting, and exerted less hostile control modalities than parents of children who scored externally. An interesting corollary discovered during data analysis was that parents with children of the same internal-external orientation were less disciplinarian, more indulgent, and more rejecting than parents whose internal-external scores were not congruent with their children's scores.

MacDonald (1971) sought to further clarify the relationship between control orientation and parent-child relationships. The internal-external scale and the perceived parenting questionnaire was administered to 427 undergraduate students. Analysis of variance elicited the following results:

> A. Internality (positively correlated with): (1) maternal nurturance ($p < .04$), (2) paternal nurturance ($p < .05$), (3) maternal predictability of standards ($p < .08$).
> B. Externality (positively correlated with): (1) maternal protectiveness ($p < .03$), (2) maternal deprivation of privileges ($p < .08$). (MacDonald, 1971, p. 145)

A unique study of antecedents of locus of control was presented by Crandall (1973). Longitudinal data representing 10 years of home observations of maternal behaviors were correlated with locus of control scores assessed during young adulthood. Research findings demonstrated positive correlation between maternal "coolness" and "criticality" and internal locus of control scores obtained in young adulthood. Crandall attempted to explain the unique findings by postulating that these maternal attributes "forced [the child] to learn cause-effect contingencies, adjust to them, and recognize their own instrumentality in causing outcomes" (cited in Lefcourt, 1976, p. 103).

The literature contains a preponderance of information regarding antecedents of an internal locus of control (Lefcourt, 1976). There is one parental attribute that has correlated significantly with externality. Davis and Phares (1969) found that externality in children was associated with inconsistent parental behavior resulting from a lack of consensus among family members regarding standards of behavior. Levenson (1973) found that subjects who viewed their parents as having unpredictable standards had stronger beliefs that events were controlled by chance factors.

The previous discussion has focused on parental antecedents of locus of control. A limited number of researchers has explored antecedents of locus of control from developmental and chronological perspectives. Lao (1970) and Ryckman and Malikiosi (1975) demonstrated that an increase in internality was directly correlated with an increase in age. Penk (1969) found that as children matured chronologically and developmentally, there tended to be a greater generalized expectancy that reinforcement occurred as a result of one's own actions. Pawlicki (1974) stated that data on social reinforcement indicated a developmental trend of increasing internality as one progressed through school. These studies did not control for the mediating variable of socioeconomic status, thus limiting the applicability of the findings.

Several studies have utilized socioeconomic factors to evaluate social antecedents to locus of control. Gurin, Gurin, Lao, and Beattie (1969) found that middle-class children are more internal than lower class children. Walls and Miller (1970) discovered a direct relationship between higher educational levels and internality. Jessor, Graves, Hanson, and Jessor (1968)

found that internal control expectancies are correlated positively with socioeconomic status.

The previous discussion of antecedents of locus of control has laid the groundwork for an understanding of locus of control as a personality variable. Subsequent areas of discussion examine locus of control orientation as it impacts on behavioral response to a variety of contrived and naturally occurring events.

Attempts to Control the Environment and Aversive Stimuli

A large body of research has been conducted utilizing the locus of control framework to study an individual's response to stress-producing stimuli. Corah and Boffa (1970) and Geer, Davison, and Gatchel (1970) discovered that subjects experience less autonomic reactivity to stressful stimuli when they perceive themselves to be in control of the stimuli. Corah and Boffa (1970) suggested that a procedure which gives the subject the choice of avoiding or not avoiding the aversive consequences of a stimulus is equivalent to giving the individual perceived control over the potential threat.

Glass, Singer, Leonard, Cohen, Krantz, and Cummings (1973) found a significant ($p < .01$) decrease in

stress and adverse behavioral after-effects following administration of an electrical shock in the subjects who experienced perceived control. Watson and Baumal (1967) also utilized administration of electric shocks in skill and chance situations. These authors found significant interaction effect: internal subjects committed more errors in the chance condition than skill condition and external subjects showed the reverse effect ($p < .05$). The researchers concluded from this study that anxiety occurs when the subjects' expectations and preferences concerning means to an end are not met, particularly when the ends are highly valued ones. In a related experiment, Houston (1972) studied the performance of internal and external subjects in avoidable and unavoidable electrical shock situations. Results of the study supported the hypothesis that subjects will perform better in situations in which there is congruence between the individual's locus of control and the situational locus of control ($p < .05$).

Lefcourt, alone and in collaboration with a variety of researchers, examined the mechanisms used by internal and external subjects to deal with experimental situations. Lefcourt (1967) studied task completion of 132

college students under three different situations varying in low to high cue directions for reinforcement. External subjects demonstrated a change in performance across the conditions with a better performance in situations having high cue explication ($p < .001$). Internal control groups showed no significant changes in response to different conditions. Lefcourt concluded this study by suggesting that the externally controlled individual needs to be informed of the available achievement reinforcements intrinsic to varying situations.

In a similar study by Lefcourt (1967), a low and high cue experimental situation was used. Utilizing data from this study, Lefcourt (1967) concluded that:

> the individual with external control expectancies does not adequately search for reinforcement opportunities. It is possible that he fails to maintain the kind of internal dialogue that would facilitate the cognitive sorting and categorizing of the situations so that the opportunities for reinforcement in different situations would be more self-evident. The more explicit directions in the high cue condition, however, allow for the missing cognitive link for external control subjects. The findings suggest that the provision of an explicit interpretation as to the meaning of behavior in given situation can rectify some of the avoidance behavior of external control in individuals. (p. 377)

This conclusion was further supported in an experimental situation devised by Lefcourt and Wine (1969).

A common trend in Lefcourt's research is that externals depend on denial and avoidance. Phares et al. (1968) supported this finding by experimentally creating a condition of threat. The hypothesis that internals engage in more confronting behavior was supported ($p < .025$). Butterfield (1964) and Brissett and Nowicki (1973) examined the individual's reaction to frustration as a function of locus of control. Both studies demonstrated that the more internal a person was, the more he/she would react to frustration in a constructive manner; while the more external a person was, the more he/she would react less constructively to frustration.

The research discussed thus far highlights the positive aspects of an internal locus of control. A number of studies, however, present data that conflict with this viewpoint. Houston (1972), in a study of shock situations and locus of control, discovered that internal control subjects increased significantly more in heart rate than external control subjects in response to stress ($p < .01$). Houston postulated that a possible explanation for this finding was that externals viewed outside forces as responsible for life events, and

therefore, do not become aroused when threatened. Internal control subjects became highly aroused when threatened but are reluctant to admit to feelings of helplessness.

Rotter (1975), in a discussion of problems and misconceptions related to the locus of control construct, discussed the theory that subjects may score as externals on locus of control measurements as a defense or rationalization for expected failure but may act in an internal fashion in actual achievement situations. Rotter labeled these individuals defensive externals. Rotter further stated that previous hypotheses linking an internal locus of control with successful adjustment variables have not been substantiated with current research findings.

Collins (1974) addressed the problem identified by Rotter through identification of four orthogonal subscales. Collins restructured the internal-external scale and found that a respondent may score external because of a belief in: (a) a difficult world, (b) an unjust world, (c) a world governed by luck, or (d) a politically unresponsive world. In this study, a belief in a just world resulted from a combination of

> (a) internal attribution to effort and ability, (b) an external attribution of justice and equity in the environment, and (c) an admission of the importance of discriminative stimuli in the environment that specify the strategy appropriate for that specific environment situation. (Collins, 1974, p. 390)

Averill (1973) attempted to clarify and specify the relationship between control and response to aversive stimuli by critiquing experimental research data. From this review, Averill distinguished three types of personal control: (a) behavioral (direct action on the environment), (b) cognitive (the interpretation of events), and (c) decisional (having a choice among alternative courses of action).

Researchers have extensively utilized a locus of control framework to analyze the individual's reaction to threat and ability to control the environment. Results of these studies support the utilization of this construct to differentiate and predict behavioral responses within a variety of environmental conditions.

Effects of Learning

In a majority of research an internal locus of control is associated with successful utilization of learning strategies. Early studies conducted by Seeman (cited in Seeman & Evans, 1962) laid the

groundwork for this hypothesis. In 1962, Seeman and Evans published results of a study performed on hospitalized tuberculosis patients. These patients were chosen due to the perceived lack of control over their fate, reliance upon powerful others (health care workers), and loss of support systems. Results indicated a positive relationship between high scores on an alienation tool and poor learning ($p < .05$). Seeman (1967) replicated this study utilizing university students in Sweden. Seeman (1967) summarized the results with the observation that:

> people who believe that the environment is one they can have an effect upon show that they are sensitive to potentially helpful cues about that environment. (p. 121)

Results of these and related studies prompted Seeman (1967) to conclude that an individual's sense of powerlessness governs his attention and acquistion processes.

Several researchers have studied this concept of information seeking and utilization within the specific framework of locus of control. Davis and Phares (1967) structured an experimental situation in which subjects were led to believe that they were to influence another person's beliefs regarding the Vietnam war. The number of questions asked by the subject about the person they

were to influence was the criteria used to measure their information seeking. The subjects were divided into three groups and given either skill, chance, or no directions for task completion. Results indicated that internals tended to ask significantly more questions within all three situations ($p < .025$).

In a related study, Phares (1968) sought to demonstrate that internals were more effective in the utilization of information. Subjects were given bits of information to learn and asked to utilize this information a week later. Financial rewards were given for correct utilization. The results showed a positive relationship between internal locus of control and utilization of information ($p < .02$). Phares (1968) concluded from this relationship that "internals have a greater potential for effectiveness in the environment" (p. 661).

Lefcourt, Lewis, and Silverman (1968) studied learning abilities of internals and externals within the context of attention-related responses. Findings supported the concept that internals spend more time deliberating in skill-related tasks. Further support for this finding was shown in a study by Rotter and

Mulry (1965). In this study, internals required a longer decision time when given skill versus change directions.

DuCette and Wolk (1973) approached the relationship between locus of control and learning from the perspective of cognitive behaviors of interest. Results supported the hypothesis that internals were more sensitive to environmental stimuli and extracted, recalled, and utilized information more efficiently than externals. On the basis of these findings, the researchers contended that

> differing expectancies for control will give rise to different decisions about the exertion of control (motivation) as well as differing efficiency with which this control is exerted (cognitive). (DuCette & Wolk, 1973, p. 425)

Another cognitive function that has been examined in locus of control research is awareness of relevant cues for goal attainment. Lefcourt and Wine (1969) directed subjects to interview two research assistants and compile personality profiles. One assistant maintained eye contact while the other avoided it. A significant interaction ($p < .02$) was found that indicated a joint affect of locus of control and the assistant's behavior on the attentiveness of the subjects, with

internals recording more observations about the assistant who avoided eye contact.

Ude and Vogler (1969) assessed the interaction between locus of control and awareness on learning by asking subjects to predict light flashes. Internals showed significantly more awareness of correct response-reinforcement contingencies than externals ($p < .01$).

> Overall results indicated that the approach to a learning situation is determined by locus of control when perceived locus of control influences the tendency to become aware of contingencies in the environment (with internals more likely to become aware). (Ude & Vogler, 1969, p. 67)

The aforementioned studies illustrate the construct validity of locus of control to predict differences in learning. Rotter (1966) summarized these predictions for the person who believes in control of individual destiny as

> more likely to (a) be more alert to those aspects of the environment which provide useful information for his future behavior; (b) take steps to improve his environmental condition; (c) place greater value on skill or achievement reinforcements and be generally more concerned with his ability. (Rotter, 1966, p. 25)

Formulating learning strategies is an integral function of promoting high level wellness. Documentation of the person's locus of control provides health

care professionals with valuable data to implement individualized learning modalities.

Modifying Locus of Control

According to locus of control proponents, people construct interpretation of events within the framework of causality. This allows for both stability and change within this construct. Therefore, locus of control can be utilized as a working tool to assess the individual's interpretation of events indicative of beliefs about causality (Lefcourt, 1976). Research in this area has focused on the two areas of natural and contrived changes in a person's locus of control.

Smith (1970) conducted a study of the relationship between locus of control and life crisis and crisis resolution in an attempt to clarify situational factors which may temporarily affect the individual's expectancies regarding locus of control. A significant group score change interaction was found, with the crisis group having a higher initial mean internal-external score and a lower 6-week score than the non-crisis group (Smith, 1970). The results support the hypothesis that life crisis and resolution can affect locus of control scores. Smith concluded that persons

who are markedly internal might be more likely to experience a crisis when their means of controlling the environment fail in extremely threatening situations.

Internal-external orientation was examined by Gorman (1968) in a study of college students following McCarthy's defeat at the Democratic National Convention. The internal-external scores obtained were more external ($p < .001$) than the national norms for university students at that time. In a related study, McArthur (1970) administered the internal-external scale to a group of Yale undergraduates the day following a draft lottery. The scores of those favorably affected by the lottery were compared to those who were not. Students eliminated from draft eligibility scored in a more external direction. Both of these studies highlight the occurrence of locus of control shifts with relevant environmental events.

Two researchers have explored a correlation between locus of control changes and age. Penk (1969) and Feather (1967) discovered a correlation between increased internality and mental and chronological maturation. These studies implicated the passages of time

and natural changes in status as determinants in locus of control.

One further study of naturally occurring changes in locus of control was conducted by Harvey (1971). Harvey studied 50 government administrators. Subjects who held high administrative positions for 11 years or more were significantly more internal than those holding their positions a shorter period of time ($p < .05$).

Contrived shift in locus of control has been approached within both a counseling and a teaching milieu. MacDonald (1971) laid the groundwork for utilization of a counseling technique by asserting that externals feel powerless to effect change in their lives and do not try. Efforts aimed at increasing client motivation should be redirected to facilitating an internal locus of control. MacDonald (1972) and MacDonald, Majunder, and Greever (1972) identified three counseling techniques for changing locus of control: (a) confronting the clients' external statements with internal alternatives, (b) verbally rewarding internal statements, and (c) assisting the person to identify and focus on the results of behavior and formulate more effective behavioral patterns.

Foulds (1971) and Foulds, Guinan, and Warehime (1974) utilized group therapy to change locus of control of participating college students in the direction of internality. In the earlier study, involvement in a growth group experience focusing on increased self-awareness and interaction elicited a significant movement in group members toward internality ($p < .005$). In the Foulds et al. (1974) study, a 24-hour marathon growth group was conducted. The findings of the earlier study were replicated.

Dua (1970) attempted to differentiate locus of control changes between experimental groups exposed to two diverse counseling techniques. One group participated in an action program to change behaviors while the other group was involved in an attitude re-education program. Both groups demonstrated a decrease in locus of control scores; however, the action program induced a significantly greater movement toward internality.

Diamond and Shapiro (1973) employed encounter group techniques to create an environment in which an internal orientation could be learned. Members were encouraged to take responsibility for their verbal and nonverbal

behavior, as well as focusing on their own feelings and actions. There was a significant change toward a greater internal locus of control for the three experimental groups ($F = 4.05$, $p < .05$), with no significant change occurring in the control group. Diamond and Shapiro (1973) summarized implications of these findings with the comment that, "enhanced feelings of control may serve to counteract feelings of alienation and powerlessness" (p. 517).

Gilbert (1976) echoed Diamond and Shapiro's (1973) theme following a study of situational and characteristic factors of locus of control. Gilbert's research was based on the concept that real life stressors could result in a feeling of losing control and result in a temporary shift toward externality. Experimental data supported this hypothesis.

Locus of control has been shown to change in response to contrived and naturally occurring situational factors. In order to utilize this personality variable to promote health, the effect of specific illnesses, and related nursing invervention or locus of control orientation, should be investigated.

Locus of Control and Health

Locus of control has been utilized within the paradigm of health-related behaviors. The majority of research has linked an internal locus of control with positive health-related modalities.

Dabbs and Kirscht (1971) studied expectancies about ability to control and motivation to control through assessment of college students who had taken influenza innoculations. The results showed that innoculations were more likely among students motivated to exert control over their own health.

Auerbach, Kendall, Cuttler, and Levitt (1976) studied the effects of two types of preparatory information (general and specified) given prior to dental surgery. Internal subjects viewing the specific information tape showed better adjustment during surgery than internals who viewed the general tape. The converse held true for external subjects. Auerbach et al. (1976) felt that the specific information tape provided data that enhanced the internals' ability to manipulate the impending aversive stimuli. However, this same information confronted the external individual with active participation in an aversive stimuli, thereby

diminishing utilization of externality as a means of escaping the aversive stimuli through attribution on outside forces.

Lipp, Kolstoe, James, and Randall (1968) examined disability and locus of control utilizing a perceptual defense paradigm. Externally controlled disabled individuals were found to be less denying of disability. These researchers suggested that an internal subject who was placed in an external situation would be more threatened and denying than the externally controlled individual.

Kirscht (1972) reported on investigations of personal control and perceptions of health-related behaviors. The impetus for this study was that many health actions are predicated on voluntary behaviors and most health programs assume that the individual accepts responsibility for health-related behaviors. Discussion of findings pointed out that

> until we can better specify the dimensions of perceived health, it may not be possible to assess the role of belief about control in relation to specific health-relevant content. (Kirscht, 1972, p. 235)

In response to this call for greater specificity, Wallston, Wallston, Kaplan, and Maides (1976) formulated

and validated a health locus of control scale and utilized it in two research studies. In the first study, college students completed the internal-external scale (IE), the health locus of control scale (HLC), and a scale measuring health values. The students were then evaluated for information-seeking behaviors. Consistent with the hypothesized prediction, when the health locus of control was used to classify high health value internals, these subjects sought more information than any group classified according to the IE scale or the health value scale. This study was replicated by Wallston, Maides, and Wallston (1976).

The second study (Wallston, Maides, & Wallston, 1976) examined the effect of a self-directed versus a group program for weight control. Following evaluation of their health locus of control, subjects were randomly assigned to one of these programs. Externals lost more weight in the group program than in the self-directed program, with the converse holding true for internals (Wallston, Maides, & Wallston, 1976).

Since its inception, the Health Locus of Control Scale has provided a valuable tool in many research studies. Saltzer (1978) utilized the IE scale, HLC

Scale, and a specific weight locus of control scale to evaluate weight reduction.

> For predicting the intention to lose weight, only the specific weight locus of control scale produced the expected pattern between the two predictors of intentions and locus of control. (Saltzer, 1978, p. 125)

Kaplan and Cowles (1978) designed a study to evaluate the effectiveness of continued-contact formats for the maintenance of smoking reduction. The HLC Scale was included in program evaluation instruments to assess the applicability of this tool to the prediction of smoking reduction. A priori comparisons of health locus of control internals and amount of cigarettes smoked in follow-up periods showed that this group smoked fewer cigarettes. The researchers felt that health locus of control beliefs were important for subjects to effectively utilize the procedures taught.

Lewis, Morisky, and Flynn (1978) researched the construct validity of the HLC Scale as part of a study involving inner city hypertensive patients. Internal consistency reliability was .36. This is considered a low coefficient indicating that subjects are not responding to each of the Scale's items in a consistent manner. The relationship between health locus of control

and demographic characteristics was also examined. There was no correlation between sex, age, or income level. Lewis et al. (1978) did find, however, that when predictions with the health locus of control were utilized within a broader theoretical context, there was evidence to support its predictive value for self-reported health-related behaviors.

Wallston and Wallston (1978b) have outlined three uses of possible benefits derived from utilization of the HLC Scale. These three uses were: (a) evaluation of health programs' success, (b) identifying health locus of control and training internality (since internals appear more likely to engage in positive health and sick role behaviors), and (c) tailoring health education programs to individuals' health locus of control beliefs.

Saltzer (1978) advocated training to increase internality as a benefit beyond brief behavior changes.

> Changes in these attitudes and values can help individuals more effectively care for themselves with respect to health-related situations which can increase the quality of their lives in general, as well as the quality of their health. (Saltzer, 1978, p. 137)

Locus of control as a predictor of health behaviors has been discussed. In response to Rotter's (1975) call

for development of a situational specific measurement of locus of control, the Health Locus of Control Scale was formulated by Wallston, Wallston, Kaplan, and Maides (1976).

In summary, locus of control has been examined from the perspectives of antecedents, aversive stimuli and control of the environment, affects on learning, modification variables, and health. The next section of this review of the literature will discuss the psychosocial implications of undergoing open heart surgery in order to document its impact as a stressful life event that could influence health locus of control.

Psychosocial Responses to Open Heart Surgery

In 1977, Barnes, Ray, Oberman, and Kouchoukos estimated that 60,000 coronary bypass surgeries were being performed annually in the United States at a cost of $10,000 per procedure. Recently, multidiscipline studies have been conducted to ascertain the psychosocial implications of undergoing this surgery. Nursing, as a member of the health team caring for this population of patients, has a responsibility to contribute to this research. The following discussion of

studies examining normal and abnormal psychological responses to open heart surgery demonstrates that this procedure is a stressful life event and a valid clinical nursing concern.

Results of psychological testing correlated with survival rates have been one framework utilized in the study of psychosocial responses to open heart surgery. Gilberstadt and Sako (1967) measured intellectual changes in a group of 75 open heart surgery patients. Twenty-three percent of their sample did not survive. These researchers compared survivors' and nonsurvivors' presurgical psychological test scores. Results of this comparison demonstrated more agitation, withdrawal, and organic disability in the nonsurvivor group, while the survivors exhibited more preoperative denial.

In an earlier study by Blachy and Starr (1964), a psychological profile was obtained for 164 open heart surgical patients. Their findings demonstrated that 33% of the patients studied with significant preoperative psychiatric pathology died within the first postoperative week. From these findings, Blachy and Starr hypothesized that preoperative psychiatric disturbances were significantly related to mortality.

Support for the findings of Blachy and Starr (1964) was demonstrated in a study by Henrichs, Mackenzie, and Almond (1969). These authors evaluated 68 adult open heart surgical patients utilizing the Minnesota Multiphasic Personality Inventory (MMPI). This tool was also administered to 43 medical patients who served as the control group. Content and analysis of the results suggested

> that the male non-survivors demonstrated a more marked degree of susceptability to anxiety and more vulnerability to stress and were non-commital, less able to cope with tension than were the male survivors. (Henrichs et al., 1969, p. 162)

These researchers concluded that health professionals needed to become more attentive to preoperative symptoms of pronounced anxiety as an indicator of mortality predictions.

A more recent study of the effect of psychological variables on survival was performed by Kilpatrick, Miller, Allain, Huggins, and Lee (1975). The purpose of this research was to evaluate the predictive validity of a preoperative battery of psychological tests. The investigators discovered that the group designated as fatalities following open heart surgery had more difficulty in performing tasks requiring concentration and

abstract symbol manipulation than did the survivors ($F = 5.39$, $p < .05$). Kilpatrick et al. (1975) reported a 92% accuracy of prediction of fatalities using psychological test data only.

Kimball (1969) examined predictive psychological criteria for survival utilizing interviews obtained the day prior to open heart surgery. This data were then correlated with postoperative observation of behavior by health team members and patients' description of their feelings. Analysis of this information prompted Kimball to categorize patients undergoing open heart surgery into four groups:

> Group I--"Adjusted" included patients who appeared confident and in control;
> Group II--"Symbiotic" were dependent and denied apprehension;
> Group III--"Anxious" manifested high anxiety levels which they were unable to verbalize; and
> Group IV--"Depressed" characterized motivation for surgery as "the doctors thought I should have it. (Kimball, 1969, pp. 891-893)

Following the grouping of patients, the postoperative psychological response and survival trends were identified:

> Group I--Improved overall;
> Group II--Demonstrated prolonged recovery times with decreased long-term functioning;
> Group III--Showed a 25 percent mortality with differing levels of postoperatively functioning;

> Group IV--Had the highest mortality rate of any of the groups while showing neither improvement or deterioration of preoperatively level of functioning. (Kimball, 1969, p. 894)

On the basis of these findings, Kimball felt that further studies were needed to support the use of grouping patients according to psychological data to identify survival trends.

Jillings (1978) approached psychological responses to open heart surgery from the perspective of post-operative phases of recovery. The study was prefaced with the observation that

> patients with heart disease who elect to undergo corrective surgery have influencing lifestyle patterns that impact on the psychological aspects of recovery and shape rehabilitation lifestyle. (Jillings, 1978, p. 987)

The sample consisted of 20 adult patients interviewed preoperatively and then every 2 to 3 days following the surgery. Descriptive information obtained during interviews was tabulated for analysis. This analysis revealed three phases of postoperative recovery:

> 1. Somatic (preoccupation with bodily state and function);
> 2. Transition (increased awareness of others and reflection on the surgical experiences);
> 3. Resolution (conflicts and problems appear to achieve total or partial solution). (Jillings, 1978, pp. 988-991.

Jillings (1978) concluded with directives for nursing care based on the research findings. Included among these directives were the concepts of assisting the patient toward independence and assessing current and prehospital factors that could impede resolution.

Layne and Yudofsky (1971) designed a study to examine the impact of organic and nonorganic stressors in the development of post-pump psychosis. Neurological examinations and interviews were utilized to obtain data. The most important psychological finding was that the anxiety scores of the group who developed psychosis were significantly lower than the group that did not develop this complication ($t = 1.647$, $p < .005$). The researchers felt that the patients who developed psychosis relied heavily on the defense mechanism of denial.

In a related study, Freyhan, Giannelli, O'Connell, and Mayo (1971) sought to identify predisposing factors to the development of postoperative psychosis following open heart surgery within the broad framework of reactive psychosocial factors. Personality ratings, attitude scales, and a psychopathological profile were used to obtain information. A factor analysis of the psychopathological profile indicated that psychological factors

had a marked impact on postoperative patterns of adaptation. Freyhan et al. (1971) concluded that

> the prolonged stress of illness and the marked dependency on staff and medical regimen imposed by postoperative conditions constitutes a severe emotional stress. (p. 194)

An interesting corollary finding of this study was that increased age of patients was a variable in the development of psychiatric complications.

The previous discussion has focused on open heart surgery as a stressful life event. The review of the literature has documented a need to assess the effect of undergoing this surgery on the psychological milieu of the individual in order to have a more complete data base to plan health care interventions. In an attempt to contribute to this data base, the affect of undergoing this procedure on the person's health locus of control was examined in this study.

Summary

The review of the literature has discussed locus of control as a construct of social learning theory and the psychosocial implications of undergoing open heart surgery. Various aspects of locus of control research were examined in order to clarify the utilization of this

construct in planning nursing care. The psychological stress of undergoing open heart surgery was documented as a factor that could influence the person's locus of control orientation.

CHAPTER 3

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This study was a pre-experimental, one group, pretest-posttest study. The aim of this research design, according to Polit and Hungler (1978), was to study inter-relationships among behaviors, practices, values, and characteristics of existing groups within a natural setting. This design excludes manipulation of the independent variable by the researcher.

The variable examined was the personality construct of health locus of control before and after undergoing aorto-coronary vein graft bypass. Demographic data of age, as well as data regarding development of complications following open heart surgery, were also collected in order to evaluate the effect of these variables on a change in the patient's health locus of control.

Setting

The setting for this study was a 500-bed private hospital in the Midwest area of the United States. There are approximately 500 open heart surgeries

performed yearly by a group of four cardiovascular surgeons.

Patients not requiring emergency open heart surgery are offered a formal preoperative teaching program the evening before surgery. This includes a videotape that shows the physical surroundings of the surgical intensive care unit and normal equipment used postoperatively.

The Health Locus of Control Scale (HLC) was administered to the patient in a hospital private room before surgery. After open heart surgery, the tool was administered to the patient in a surgical intensive care unit private room or in one of the three step-down areas within the hospital.

Population and Sample

The population of this study included all persons in a private institution who had undergone vein graft bypass for the first time during a 6-month period. The sample consisted of 30 patients between the ages of 30 and 75 years who had undergone open heart surgery for vein graft bypass. Criteria for inclusion in the study was neurological integrity before and after the

surgery and an opportunity to participate in a formal preoperative teaching program.

Quota sampling was used to select the subjects so that 50% of the study sample met the criteria for development of complications. "Quota sampling gets its name from the procedure of establishing 'quota' within the various strata from which data are to be collected" (Polit & Hungler, 1978, p. 455). The characteristics used to form the strata are selected according to the researcher's judgment. The basis of stratifications are variables which, in the estimation of the investigator, would influence the dependent variable of the study (Polit & Hungler, 1978).

Protection of Human Subjects

Before this study was implemented, approval was obtained from the Human Subjects Review Committee at Texas Woman's University (Appendix A) and from the Institutional Review Committee at the medical center where data were collected (Appendix B). Permission was also obtained from the graduate school (Appendix C). The four cardiovascular surgeons were given a copy of the thesis proposal prospectus and the Health Locus

of Control Scale and their consent to perform the research was obtained (Appendix D). Following a verbal explanation of the study (Appendix E), each patient was asked to sign the informed consent required by Texas Woman's University (Appendix F).

The Health Locus of Control Scale was coded using a number-letter system. All pertinent information about the subject was identified with the corresponding number-letter code. All results were stored in the investigator's office and destroyed upon completion of the study. Individual scores of the Health Locus of Control Scale were not revealed.

The instrument was administered at a convenient time for the subject. Responding to the 11 questions required very little expenditure of time or energy and did not cause fatigue. The patients were informed that medical and nursing care was not affected by participation or nonparticipation in the study. The patients were also told that they could withdraw at any time from the study without penalty and the only possible side effects would be anxiety, fatigue, and loss of anonymity. Strict confidentiality regarding all information obtained from the chart was maintained.

Instrument

Locus of control was measured with the Health Locus of Control Scale (HLC) (Appendix G) developed by Wallston, Wallston, Kaplan, and Maides (1976). This self-administered tool is composed of 11 statements designed to elicit information regarding the person's health-related beliefs. A 6-point Likert scale is used for categorization of responses. Questions 1, 2, 8, 10, and 11 must be reverse scored (subtracted from 7). The total score may range from 11 to 66. A high score indicates an external health locus of control orientation, while a low score denotes belief in an internal locus of control.

This instrument was developed to provide a more sensitive measurement of the individual's health behaviors related to locus of control (Wallston, Maides, and Wallston, 1976). Inter-instrument correlation between the Health Locus of Control Scale and the more general Internal-External Scale (Rotter, 1971) varied from .25 to .45 in two studies conducted by Wallston, Wallston, Kaplan, and Maides (1976). The first study was conducted on 98 college students in a small Southern university. The second study, to examine correlation

between the two tools, was conducted on 34 overweight women who were students or staff members of a private Southern college.

Preliminary evidence of construct validity of the Health Locus of Control Scale was demonstrated by Wallston, Wallston, Kaplan, and Maides (1976). In these studies, specific measurements of health locus of control were shown to have greater validity than general locus of control measurements when researching patient health beliefs. Information on the reliability characteristics of the instrument yielded alpha reliability ranging from .46 to .72.

Collection of Data

Following approval from Texas Woman's University and agency permission to conduct the study, the investigator obtained a copy of the surgical schedule daily from the surgical department. Room numbers for those patients who were undergoing vein graft bypass the next day were obtained from the hospital switchboard. The investigator then approached these patients regarding participation in the study.

Following these preliminaries, the patient was given the coded Health Locus of Control Scale (HLC) to

to complete in the presence of the investigator. The patient was given the same tool by the investigator within 10 days after surgery if he/she continued to meet the study criteria. Following review of the chart, the patient's age and whether or not he/she met the operational definition for development of complications was recorded in table form next to their code number and preoperative and postoperative health locus of control (Appendix H).

Treatment of Data

The absolute change in the subject's health locus of control scores was computed. An increase in the score postoperatively was designated as a positive (+) change, while a decrease in the postoperative score was labeled a negative change (-) (Appendix I).

The *t*-statistic for paired data was used to ascertain whether or not there was a significant change in the patient's health locus of control score after undergoing open heart surgery. The *t*-test is a basic parametric procedure for testing differences in the means of paired sets of data (Polit & Hungler, 1978). The computed *t*-value for the study sample operated within a degree of freedom (*df*) of 29. In order to reject

Hypothesis 1, the t-value needed to be equal to or greater than 2.045 at the .05 probability level (Polit & Hungler, 1978).

The Pearson product-moment correlation coefficient (r) was calculated to test the relationship between the age of the patient and a change in health locus of control score. This coefficient (r) is an index with values ranging from -1.00 to +1.00. The higher the absolute value, the stronger the relationship (Polit & Hungler, 1978). In order for this relationship to be significant at the .05 level, the obtained r value must be equal to or greater than .361 (Stahl & Hennes, 1980).

The point biserial correlation coefficient was calculated to evaluate the strength of the relationship between a change in health locus of control and development of complications. "The point biserial correlation coefficient is simply a Pearson correlation coefficient with one continuous variable and one dichotomous variable" (Roscoe, 1969, p. 84). For the purposes of this study, the change in health locus of control scores was the continuous variable and whether or not the subject developed complications was the dichotomous

variable. The nominal value of 0 was assigned if the subject did not develop complications, and the nominal value of 1 was assigned if the subject developed complications. Consistent with interpretation of the Pearson coefficient, the magnitude of the point biserial correlation coefficient ranges from -1.00 to +1.00 (Roscoe, 1969). In order to be significant, the obtained value must be greater than or equal to .361 at the .05 level of significance (Stahl & Hennes, 1980).

CHAPTER 4

ANALYSIS OF DATA

This study was a pre-experimental, one group, pretest-posttest design (Polit & Hungler, 1978). The purpose of this study was to explore the relationship between the person's health locus of control and undergoing open heart surgery. The subject's age and whether or not he/she developed complications postoperatively were also examined in relation to a change in health locus of control score following open heart surgery. This chapter will provide a description of the study sample and present the findings obtained following statistical analysis of the data for each hypothesis.

Description of Sample

The sample of this study consisted of 30 subjects ranging from 41 to 73 years of age. The mean age was 57 years with a standard deviation of 7.74. Twenty-one or 70% of the sample were male; 9 or 30% were female. All subjects were Caucasian.

Sixteen of the subjects who participated in the study developed complications as defined by study

criteria. This number constituted 53% of the sample. A list of the type of complications each subject exhibited is found in Appendix J.

Findings

Hypothesis 1 stated that there would not be a significant difference in the patient's health locus of control after open heart surgery. Data on the change in health locus of control scores postoperatively for the 30 subjects were analyzed utilizing the *t*-test. As shown in Table 1, the obtained *t*-value equals -1.81. This value did not fall within the critical region (i.e., $t = 2.045$, $p = 0.05$) dictated by study criteria. Since this value was not statistically significant, Hypothesis 1 was not rejected, inferring that health locus of control does not change following open heart surgery.

Hypothesis 2 predicted that there would be no significant relationship between age of the patient and the health locus of control posttest score obtained following open heart surgery. The relationship between change in health locus of control and age was examined by means of the Pearson product-moment correlation (*r*). A moderately significant negative correlation was found between the two variables ($r = -.43$, $p = .009$). This

Table 1

Results of *t*-test Analysis of Change of Health Locus of Control Scores Postoperatively

Number of Subjects	Mean Change	Standard Deviation	Standard Error	*t*-value	*df*	Probability
30	-1.9667	5.931	1.084	-1.81	29	.081

finding documents a tendency for subjects to change toward a more internal health locus of control orientation following open heart surgery as the subject's age increases. Conversely, it also demonstrates a tendency toward a more external health locus of control postoperatively as the age of the subject decreases. Results of this statistical analysis, therefore, allow rejection for Hypothesis 2, thus inferring that there is an inverse relationship between age and a change in the person's health locus of control.

Hypothesis 3 stated that there would be no significant relationship between development of complications and the patient's health locus of control posttest score obtained after open heart surgery. The point biserial correlation analysis of the relationship between change in health locus of control and development of complications was computed. This analysis yielded a value of $\underline{r} = -.252$. This value was not statistically significant at the level defined by this study (i.e., $\underline{r} = .361$, $\underline{p} = .05$). Therefore, the hypothesis that there was no relationship between development of complications and a change in the subject's health locus of control postoperatively was supported.

Summary of Findings

Description of the study sample included the variables of race, age, sex, and development of complications. All subjects were Caucasian with a mean age of 57 years. Seventy percent of the sample was male and 30% was female. Sixteen (53%) developed complications as defined in the study.

The statistical analysis revealed that health locus of control scores did not change significantly after undergoing open heart surgery. A moderately negative correlation was found between an increase in age and health locus of control scores. Finally, the correlation between development of complications and a change in health locus of control scores was found to be nonsignificant.

CHAPTER 5

SUMMARY OF THE STUDY

This chapter will review the information presented in the preceding chapters. A discussion of the statistical findings will be presented. Conclusions will be drawn from this discussion. Utilizing these conclusions, implications for nursing care of the population undergoing open heart surgery will be determined. The chapter will conclude with recommendations for further study.

Summary

The purpose of this study was to determine the relationship between a change in health locus of control and undergoing open heart surgery. The variables of age and development of complications were also examined to ascertain a correlation with a change in health locus of control. The justification of the problem dealt with the psychosocial implications of undergoing this procedure and the importance of assessing these implications when planning health education strategies. Health locus of control was presented as

a personality variable influencing the individual's motivation to seek and utilize health-related information. Three null hypothesis were formulated for this study:

1. There is no significant difference in the patient's health locus of control before and after open heart surgery.

2. There is no significant relationship between age of the patient and the health locus of control posttest score obtained after open heart surgery.

3. There is no relationship between development of complications and the patient's health locus of control posttest score obtained after open heart surgery.

A review of pertinent material written on locus of control as a construct within social learning theory was undertaken. This review was limited to the following areas of discussion: (a) antecedents, (b) attempts to control the environment, (c) effects on learning, (d) modifying locus of control, and (e) health-related locus of control. A discussion of the psychosocial implications of undergoing open heart surgery was also presented in order to clarify interaction with the individual's perception of control.

The sample for this study consisted of 30 patients who had undergone coronary artery bypass surgery at one private hospital. Quota sampling was utilized to insure that 50% of the sample met the criteria for development of complications. Compliance with the guidelines for protection of human subjects as outlined by Texas Woman's University was documented. Data regarding the subject's age and development of complications were summarized.

Statistical analysis of the data demonstrated that health locus of control did not change significantly following open heart surgery, $t = -1.81$ (29), $p < .05$). A negative correlation was found between age and a change in health locus of control score following surgery, $r = -.43$, $p = .009$. The correlation between development of complications and a change in health locus of control score was nonsignificant, $r = -.252$, $p < .05$.

Discussion of Findings

The data showed that health locus of control scores did not change significantly following open heart surgery. This nonsignificant relationship is not congruent with published findings. Following a review

of studies examining naturally occurring change in locus of control, Lefcourt (1976) stated that "locus of control scores shift with relevant environmental events" (p. 115). Smith (1970) demonstrated that persons in crisis became significantly more internal following crisis resolution. Viewing the need to have open heart surgery as a crisis, it would be expected that survival of this procedure would parallel crisis resolution and, therefore, cause a shift in the person's locus of control toward a more internal orientation. However, it can be argued that simply surviving the procedure was not viewed by the subjects as a crisis resolution. Perhaps this resolution had not occurred at the time the HLC Scale was administered, but did occur later in the postoperative period (e.g., following discharge from the hospital).

Another possible explanation of the nonsignificant results obtained in this study was offered in a recent article by Wallston and Wallston (1978b). These researchers stated that the HLC Scale, while more specific than the I-E Scale, was still generalized since the items related to health and illness in general. Wallston and Wallston (1978b) discussed the possibility of

developing "more specific scales" (p. 102) for specific health/illness situations. Lewis et al. (1978) also identified a need for a more situationally specific tool "if one is interested in predicting health behaviors accurately in a narrowly defined area" (p. 139).

The correlation between age and the patient's health locus of control score after surgery was statistically significant. Data analysis documented that postoperative health locus of control scores become more internal (i.e., decreased) as the age of the subject increased. This finding is consistent with published research results that demonstrate a more internal locus of control orientation as a function of an increase in age (Feather, 1967; Penk, 1969).

The lack of a significant correlation between development of complications and the patient's health locus of control score postoperatively was inconsistent with theoretical expectations. Given the inability of the subject to control the development of complications identified in this sample, it would be expected that a change toward a more external health locus of control would result. A review of selected studies dealing with the individual's response to threat offers a

possible explanation of the inconsistent findings obtained in the present study. Investigators conducting other studies (Lipp et al., 1968; Phares & Lamiell, 1975) found that internally oriented individuals utilized denial to deal with threatening stimuli. It is possible, then, that the use of denial enabled the subjects in the present study to maintain their preoperative locus of control orientation.

No attempt was made in the present study to examine the interaction of the variables as an influencing factor on a change in health locus of control, nor was the perceived value of the outcome of undergoing open heart surgery addressed. Wallston, Wallston, Kaplan, and Maides (1976), developers of the Health Locus of Control Scale, stressed that

> statistical procedures to account for the multi-variate, interactive relationship of beliefs in locus of control and health behaviors need further development and standardization. (cited in Wallston & Wallston, 1978b, p. 104)

Conclusions and Implications

Polit and Hungler (1978) identified several limitations of the pre-experimental, one group, pretest-posttest design used in this study. These limitations

are referred to as threats to internal validity. Included in these limitations are the occurrence of events external to the situation which can effect the dependent variable, lack of a control group, and sensitization of the subjects by administration of a pretest. However, this experimental design was viewed as

> introducing some controls over potential threats to internal validity [while still maintaining] practicality, feasibility, and to a certain extent, generalizability. (Polit & Hungler, 1978, pp. 169-170)

Considering the strengths and weaknesses of this type of research, the following conclusion was inferred with regard to adult patients undergoing vein graft bypass surgery: Utilization of the Health Locus of Control Scale to evaluate the postoperative locus of control of this population does not demonstrate results consistent with the theoretical framework.

Implications drawn from the results of the present study indicated that the group as a whole did not change their health locus of control orientation postoperatively or following development of complications. However, there was a weak inverse relationship between increase in health locus of control scores postoperatively and increase in age.

This lack of a change in the perceived control of the group as a whole could be construed as beneficial. Compliance with the nursing regimen in the immediate postoperative period might be less stressful if the preoperative locus of control orientation is maintained by the patient. On the other hand, this finding does have implications for long-term adjustment and rehabilitation. Arakelian (1980) identified various studies that demonstrated that the more internally oriented patient was better adjusted and more motivated during rehabilitation. A goal of health care professionals then might be to re-evaluate the open heart surgical patient's health locus of control postdischarge. If the patient's health locus of control has not become more internal, utilization of internalization techniques might be incorporated into the rehabilitation program.

The relationship between age and health locus of control has direct implications for nursing. As has previously been discussed, teaching approaches are the most effective when individualized. Knowledge of the correlation between age and the personality variable of health locus of control can provide a framework for formulation of individualized teaching strategies.

Recommendations for Further Study

Recommendations for further research based on the findings of this study include:

1. Formulate a more precise measurement of health locus of control of the open heart surgical patient.

2. Replicate the study and measure the individual's health locus of control following discharge from the hospital in order to assess whether or not there has been a change over time.

3. Replicate the study utilizing a control group consisting of patients who have undergone elective general surgery.

4. Measure perceived value of the outcome of open heart surgery in relation to health locus of control.

5. Analyze the interactional effects of age and development of complications on the individual's health locus of control.

APPENDIX A

TEXAS WOMAN'S UNIVERSITY
Box 23717, TWU Station
Denton, Texas 76204

1810 Inwood Road
Dallas Inwood Campus

HUMAN SUBJECTS REVIEW COMMITTEE

Name of Investigator: Mary Hansen Center: Dallas

Address: 3212 Giles Date: 8/8/80

W. Des Moines, Iowa 50265

Dear Ms. Hansen:

Your study entitled Health Locus of Control of Patients Undergoing Open Heart Surgery

has been reviewed by a committee of the Human Subjects Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education, and Welfare regulations typically require that signatures indicating informed consent be obtained from all human subjects in your studies. These are to be filed with the Human Subjects Review Committee. Any exception to this requirement is noted below. Furthermore, according to DHEW regulations, another review by the Committee is required if your project changes.

Any special provisions pertaining to your study are noted below:

____ Add to informed consent form: No medical service or compensation is provided to subjects by the University as a result of injury from participation in research.

____ Add to informed consent form: I UNDERSTAND THAT THE RETURN OF MY QUESTIONNAIRE CONSTITUTES MY INFORMED CONSENT TO ACT AS A SUBJECT IN THIS RESEARCH.

____The filing of signatures of subjects with the Human Subjects Review Committee is not required.

____Other:

__xx__No special provisions apply.

Sincerely,

Estelle D. Kurtz

Chairman, Human Subjects
Review Committee

at Dallas

PK/smu/3/7/80

APPENDIX B

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE ___ _____

GRANTS TO Mary C. Hansen
a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem.

Health Locus of Control of the Open Heart Surgical Patient

The conditions mutually agreed upon are as follows:

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

_____

_____

Date: 8-25-81

_____
Signature of Agency Personnel

Mary Hansen
Signature of Student

Helen A. Burch Ph.D. R.N.
Signature of Faculty Advisor

*Fill out & sign three copies to be distributed as follows: Original - Student; First copy - Agency; Second copy - TWU College of Nursing.

APPENDIX C

TEXAS WOMAN'S UNIVERSITY

DENTON, TEXAS 76204

THE GRADUATE SCHOOL

October 1, 1981

Ms. Mary Christina Bradford Hansen
3212 Giles
West Des Moines, Iowa 50265

Dear Ms. Hansen:

I have received and approved the Prospectus for your research project. Best wishes to you in the research and writing of your project.

Sincerely yours,

Robert S. Pawlowski
Provost

RP:dl

cc Dr. Helen Bush
Dr. Anne Gudmundsen
Graduate Office

APPENDIX D

Cardiac Surgery Associates, P. C.

Practice Limited to Cardiac Surgery
944 - 18th Street
Des Moines, Iowa 50314
Tel.: (515) 243-1010

Steven J. Phillips, M.D., F.A.C.S.
Chamnahn Kongtahworn, M.D., F.A.C.S.
Robert H. Zeff, M.D., F.A.C.S.
Shirley E. Beshany, M.D.

October 30, 1980

TO WHOM IT MAY CONCERN:

We, the surgeons of Cardiac Surgery Associates, having read the protocol, approve the participation of our patients in the study, "Health Locus of Control of Patients Undergoing Open Heart Surgery," to be conducted by Mary C. Hanson, RN, BSN.

Sincerely,

Cardiac Surgery Associates

Steven J. Phillips, M.D.
Chamnahn Kongtahworn, M.D.
Robert H. Zeff, M.D.
Shirley E. Beshany, M.D.

ci

APPENDIX E

Description of Study

My name is Mary Hansen and I am a graduate student in nursing. I am conducting a study of individuals' reactions and feelings before and after open heart surgery. This study involves completing a questionnaire with 11 statements with which you may agree or disagree. The questionnaire is to be completed before surgery and within 72 hours after surgery. Your physicians have approved participation by their patients in this study.

There are no right or wrong answers and the questionnaires are kept in a locked box and destroyed at the completion of the study. Names of patients who participate will not be used and all information will be coded and confidential. Participation in this study will not affect the type of care you receive and you are free to withdraw from the study at any time. The results obtained from this research project will assist the nurses to individualize teaching approaches for the person undergoing open heart surgery. Would you agree to participate?

Thank you for your cooperation.

APPENDIX F

Consent Form
TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING

Consent to Act as a Subject for Research and Investigation:

The following information is to be read to or read by the subject. One copy of this form, signed and witnessed, must be given to each subject. A second copy must be retained by the investigator for filing with the Chairman of the Human Subjects Review Committee. A third copy may be made for the investigator's files.

1. I hereby authorize Mary Hansen to perform the following as part of an investigation:

   (a) Administer an 11 question tool before and after I undergo open heart surgery. The purpose of this tool is to find out how different people view health-related issues.

   (b) Review hospital records to gather demographic data and information regarding condition and medical therapies.

2. The procedure or investigation listed in Paragraph 1 has been explained to me by Mary Hansen.

3. (a) I understand that the procedures or investigations described in Paragraph 1 involved the following possible risks or discomforts:

   (1) fatigue
   (2) anxiety
   (3) loss of anonymity

   (b) I understand that the procedures and investigations described in Paragraph 1 have the following potential benefits to myself and/or others:

   (1) improvement of patient education

   (c) I understand that no medical service or compensation is provided to subjects by the University or Mercy Hospital Medical Center as a result of injury from participation in research.

4. An offer to answer all of my questions regarding the study has been made. If alternative procedures are more advantageous to me, they have been explained. I understand that I may terminate my participation in the study at any time.

Date: _____ _____
Subject's Signature

_____ _____
Witness Investigator

APPENDIX G

Health Locus of Control Scale

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 no 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 marking 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.

Please answer according to the following key:

1--strongly disagree
2--moderately disagree
3--slightly disagree
4--slightly agree
5--moderately agree
6--strongly agree

1.	If I take care of myself, I can avoid illness.	1	2	3	4	5	6
2.	Whenever I get sick, it is because of something I've done or not done.	1	2	3	4	5	6
3.	Good health is largely a matter of fortune.	1	2	3	4	5	6

Please answer according to the following key:

1--strongly disagree
2--moderately disagree
3--slightly disagree
4--slightly agree
5--moderately agree
6--strongly agree

4.	No matter what I do, if I am going to get sick I will get sick.	1	2	3	4	5	6
5.	Most people do not realize the extent to which their illnesses are controlled by accidental happenings.	1	2	3	4	5	6
6.	I can only do what my doctor tells me to do.	1	2	3	4	5	6
7.	There are so many strange diseases around, that you can never know how or when you might pick one up.	1	2	3	4	5	6
8.	When I feel ill, I know it is because I have not been getting the proper exercise or eating right.	1	2	3	4	5	6
9.	People who never get sick are just plain lucky.	1	2	3	4	5	6
10.	People's ill health results from their own carelessness.	1	2	3	4	5	6
11.	I am directly responsible for my own health.	1	2	3	4	5	6

APPENDIX H

Pre-Operative and Post-Operative HLC Scores,
Age, and Development of Complications

Subject	Pre-Operative HLC Score	Post-Operative HLC Score	Age	Development of Complications
1	41	24	67	yes
2	30	24	47	yes
3	40	39	50	no
4	45	46	55	yes
5	33	33	58	no
6	34	34	60	no
7	26	30	59	no
8	28	28	60	yes
9	34	31	55	no
10	29	35	65	no
11	34	32	58	yes
12	27	27	55	yes
13	28	37	57	yes
14	42	41	52	no
15	46	37	68	yes
16	39	37	66	no
17	37	35	49	yes
18	42	41	55	yes
19	29	31	48	no
20	34	36	53	no
21	47	47	46	yes
22	36	38	52	yes
23	35	23	68	yes
24	43	33	67	no
25	48	46	48	yes
26	35	24	64	no
27	34	27	41	yes
28	43	37	43	yes
29	34	31	63	no
35	35	45	45	no

APPENDIX I

Change in HLC Scores

Subject	Change in HLC Score
1	-17
2	-6
3	-1
4	+1
5	0
6	0
7	+4
8	0
9	-3
10	+6
11	-2
12	0
13	+0
14	-1
15	-9
16	-2
17	-2
18	-1
19	-2
20	+2
21	0
22	+2
23	-12
24	-10
25	-2
26	-11
27	-7
28	-6
29	-3
30	+10

APPENDIX J

Summary of Complications

Complication	Number of Subjects Developing Complications
Pericarditis	1
Hypertension	2
Hypotension	1
Hypotension and arrhythmia	4
Arrhythmias	5
Blood loss greater than 100 cc./hr.	1
Chest pain	1
Abdominal pain	1

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