1990

Relationship between locus of control and exercise

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RELATIONSHIP BETWEEN LOCUS OF CONTROL AND EXERCISE

A Thesis

Presented to

The Faculty of the Department of Nursing
San Jose State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

By

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May, 1990

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ABSTRACT

RELATIONSHIP BETWEEN LOCUS OF CONTROL AND EXERCISE

by Freeda Bush

This thesis explored the relationship between locus of control and exercise for a population of university students. Utilizing a cross-sectional survey research design, data were collected to measure locus of control and exercise among a sample of university students ($N=427$) in northern California.

The analysis indicated that locus of control was related to the specific health behavior of participation in exercise. A statistically significant positive correlation between internal locus of control and exercise was found. Furthermore, there was a statistically significant negative correlation between chance locus of control and exercise. Although the powerful other locus of control and exercise were negatively correlated on all three measures of exercise, only the measure of vigorous exercise 20-30 minutes three times a week was statistically significant. Review of the findings generated recommendations for health promotion and further study.

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To the graduate
faculty and students for
scholastic instruction
and guidance
and
to my husband
for his
love and patience

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Chapter 1

INTRODUCTION

Purpose of Study

The purpose of this study is to explore the relationship between locus of control and exercise for a population of university students. Health professionals as well as the media promote exercise as a potential method of decreasing risk factors for illness and of promoting health. Therefore, understanding how locus of control relates to exercise will benefit health professionals by providing a basis for more effective promotion of exercise among clients.

Statement of Problem

In 1979, the Surgeon General of the United States issued a report about the importance of health promotion (U.S. Department of Health, Education, & Welfare, 1979). Health promoting measures are those "which help individuals and communities to maintain and improve their health" (Pledger & Watson, 1986, p. 338). In 1980, a second report from the Surgeon General's office included specific objectives for health promotion. One of these objectives included physical fitness and exercise (U.S. Department of Health & Human Services, 1980). Regular exercise is essential for optimal functioning of the human body (Astrand, 1987), yet only about 20% of the population

exercises at a level recommended for cardiovascular benefit (Stephens, Jacobs, & White, 1985).

The problem for health care professionals who plan health promotion programs is to determine the optimum strategy to promote a change in behavior such that there is an increase of participation in exercise and a realization of the physical fitness goal. In a research study by Slenker, Price, and O'Connell (1985), joggers were found to be significantly more internally reinforced in their locus of control than nonexercisers. Locus of control (Wallston, Wallston, & DeVellis, 1978) refers to the individual's construct of reinforcement and whether the individual is motivated by: (a) sources internal to himself/herself, (b) chance, or (c) powerful others such as family, nurse, physician, and so forth.

Research findings on the relationship between locus of control and exercise are mixed. Some studies report significant positive correlations (O'Connell & Price, 1982; Sonstroem & Walker, 1973), while others show no association (Blair et al., 1980; Laffrey & Isenberg, 1983). Therefore, further exploration of the relationship of locus of control and exercise is required to more fully understand this relationship.

This study explored how locus of control relates to exercise in an effort to better define their relationship. Once the relationship is understood, this information can be

used to plan more effective programs for health promotion of physical fitness and exercise.

Significance of the Study

Exercise is beneficial to both mental and physical health (Caldwell, 1987) and physically active individuals live longer (Paffenbarger, Hyde, Wing, & Hsieh, 1986). Yet, in spite of the benefits, the dropout rate in clinical exercise settings is about 50% (Dishman, 1982). Even if the problem of initial participation in exercise can be solved, inclusion of exercise as a long term habit remains a problem. Therefore, it is important to understand correlates of exercise which may impede or facilitate participation.

Research investigating the relationship of locus of control and exercise may reveal patterns that will help health professionals who take the effects of locus of control into account to plan exercise programs which are more appropriate for a larger part of the general population. In particular, an understanding of the relationship between locus of control and exercise would help an occupational health nurse in planning programs to promote wellness. With the rising costs of health care, wellness and health promotion are becoming more important issues for employers. For example, one study revealed that a health promotion program in stress management at Kennecott-Copper yielded a three to one financial return for

the company (White, 1986).

Occupational health nurses must find cost effective health promotion programs in this cost conscious organizational environment. If a relationship between higher internal locus of control scores and increased participation in exercise is supported, those individuals with internal locus of control may need less of the nurse's time and resources. For example, the nurse's time may be most productive in providing information with programs such as guest speakers or posters so that the individual can decide upon an appropriate exercise. In contrast, those individuals with powerful other or chance locus of control may need different teaching strategies or possibly more of the nurse's time. The nurse may want to plan group programs such as aerobics classes or lunch time walking parties which offer peer support. Furthermore, literature supports the possibility of programs which change the locus of control toward one that correlates with health promoting behaviors (Dufault, 1985; Haefner & Kirscht, 1970).

Research Question and Objectives

The research question is: What is the relationship between locus of control and exercise? This research is designed to meet the following objectives:

1. Determine the locus of control of sample subjects,
2. Determine reported participation in exercise,
3. Measure the relationship of locus of control and

participation in exercise.

The hypotheses are:

1. The higher the internal locus of control score, the higher the reported participation in exercise.
2. The higher the powerful other locus of control score, the lower the reported participation in exercise.
3. The higher the chance locus of control score, the lower the reported participation in exercise.

Definitions of Terms

For the purpose of this study, the following definitions apply:

1. Locus of control is the construct that determines an individual's source of reinforcement as either internal, chance, or powerful other. Internal locus of control (LOC) refers to the degree to which an individual perceives the events that happen to him/her as dependent upon his/her own behavior. Chance LOC refers to luck, chance, or fate as controlling the events. Powerful other LOC refers to reinforcement by individuals outside one's personal control (Strickland, 1978).

2. Health internals are those individuals who believe that control for their health is internal or that one's own behavior or characteristics determine whether that person will be healthy or sick (Wallston et al., 1978).

3. Health externals are those individuals who believe control of whether they are healthy or sick is determined by

luck, fate, chance, or powerful others (Wallston et al., 1978).

4. Exercise "is physical activity that is planned, structured, repetitive, and purposive in the sense that improvement or maintenance of one or more components of physical fitness is an objective" (Caspersen, Powell, & Christenson, 1985, p. 128). However, for the purpose of this study, exercise is considered to be any structured, repetitive, and purposeful movement of skeletal muscles that results in the expenditure of energy.

Research Design

This study used a cross-sectional survey research design to investigate the relationship of locus of control and reported exercise. Permission was sought and granted to use the research questionnaire tools (Appendix A, B). After the proposed design was approved by the Human Subjects Review Board, the questionnaires were distributed to students who volunteered to participate. The setting was a large, public university in northern California. A convenience sample of 427 undergraduate and graduate university students completed the survey questionnaire which contained the consent form (Appendix C). Some questionnaires were distributed to students as they entered the Dining Commons for lunch, and others were distributed in a variety of selected classrooms with the instructor's permission. Students returned the questionnaire to a

collection box or by mail.

The Multidimensional Health Locus of Control Scale (Wallston et al., 1978) was used to measure the independent variable, locus of control (Appendix D). This scale provides scores for: (a) internal, (b) chance, and (c) powerful other locus of control or reinforcement. The Health Promoting Lifestyle Profile (Walker, Sechrist, & Pender, 1987) was used to measure exercise (Appendix E). Exercise scores were computed for (a) the exercise subscale and (b) two specific items from that subscale. Data analyses included descriptive statistics and the Pearson's product moment correlation coefficient to estimate the relationship between locus of control and exercise.

Limitations

This study was limited by design, sample, and measurement. A nonexperimental research design prevented the investigator from establishing cause-effect relationships between the variables (LoBiondo-Wood & Haber, 1986, p.139).

Lack of randomization could have led to selection bias. There may have been differences between participants and nonparticipants.

Finally, the study was limited by the questionnaire. Use of a self-reporting methodology poses additional limitations in that subjects may try to change answers to meet the expectations of researcher or social desirability

(LoBiondo-Wood & Haber, 1986, p. 181). This questionnaire was referred to as a "lifestyle survey," and there was no mention of locus of control or exercise explicitly.

However, a bias may still exist due to publicity related to the value of exercise and healthy lifestyles. Therefore, findings of this study should be generalized with caution.

Chapter 2

CONCEPTUAL FRAMEWORK AND REVIEW OF RELATED LITERATURE

Conceptual Framework

The theoretical background for exploring the relationship between a person's reinforcement and exercise begins with Rotter's studies of internal-external control (Rotter, 1966) and the Health Belief Model (Rosenstock, 1974) and proceeds more recently to the Health Promotion Model (Pender & Pender, 1987).

Rotter (1966) postulated that acquisition and performance of skills and knowledge depended on the role of reinforcement, reward, or gratification. In other words, a person's behavior depends upon the perceived cause and effect relationship between the behavior and the reward. The way the individual perceives this causal relationship determines his/her perception of control. A person with internal control perceives his/her own behavior or his/her own characteristics as affecting the event and is sometimes called a health internal. In contrast, a health external perceives control of the event as occurring because of luck, chance, fate, or the control of powerful others. Powerful others could be family, friends, personal physician, nurse, or others. Rotter (1966) developed the Internal-External Locus of Control Scale to measure reinforcement beliefs as either under internal or external control.

Rotter's (1966) Internal-External Locus of Control Scale was used to measure generalized expectancies. However more currently, the Health Locus of Control Scale was developed to measure generalized expectancies in the specific area of health as a predictor of behavior in situations related to health (Wallston, Wallston, Kaplan, & Maides, 1976). This first unidimensional scale yielded a single score as a measure of an individual's beliefs about health. Further analyses of health locus of control data led to the development of the Multidimensional Health Locus of Control (MHLC) Scale (Wallston et al., 1978). The MHLC Scale measured three dimensions of health locus of control beliefs: (a) internality (IHLC), (b) powerful other (PHLC), and (c) chance (CHLC) externality.

The Health Belief Model (Rosenstock, 1974) has been used to explain health promoting behavior, but critics of this model argue the model does not provide complete understanding of health promoting behaviors (Mikhail, 1981). The Health Belief Model works best with health protecting or preventive behavior (Pender & Pender, 1987, p. 43). Examples of health preventive behavior would be such behaviors as seeking immunizations, tuberculosis screening, or Pap smears.

Health promoting behavior is activity for the purpose of preventing or detecting disease in the asymptomatic stage by a person who believes himself to be healthy (Davidhizar,

1983). However, Pender and Pender (1987) further define health promoting behavior as behavior "directed toward increasing the level of well-being and self actualization of a given individual or group (p. 57). In addition, it is defined as "continuing activities that must be an integral part of an individual's life style" (Pender & Pender, 1987, p. 59). An individual's health promoting behaviors are acts upon the environment with the aim of higher levels of health rather than reacting to the environment (Pender & Pender, 1987, p. 60).

Using Social Learning Theory (Rotter, 1954) and the Health Belief Model (Rosenstock, 1974), Pender and Pender (1987) have developed the Health Promotion Model which is directed toward increasing the level of wellness. As Figure 1 shows, this model is made up of cognitive-perceptual factors and modifying factors which lead to participation in health-promoting behavior. Health promoting behaviors involve such things as: (a) exercise, (b) nutritional habits, (c) social support, and (d) stress management as a habitual part of the person's lifestyle. The cognitive-perceptual factors are hypothesized to be the primary motivational mechanism toward participation in health-promoting behavior, and these are: (a) importance of health, (b) perceived control, (c) perceived self-efficacy, (d) definition of health, (e) perceived health status, and (f) benefits or barriers to health promoting behaviors.

Figure 1. Health Promotion Model.

Note. From Health promotion in nursing practice (2nd ed.) by N. J. Pender and A. R. Pender (1987, p. 58).

The modifying factors are hypothesized to indirectly influence health behavior. These factors include:

(a) demographic characteristics such as age, sex, race, ethnicity, education, and income; (b) biological characteristics such as body weight; (c) interpersonal influences such as expectations of friends, family, or health professionals; (d) situational factors such as availability of health-promoting alternatives; and (e) behavioral factors such as previous experience (Pender & Pender, 1987, p. 68).

It is also hypothesized that an individual's health promoting behavior may depend upon cues from the environment or cues of internal origin. Conversations with other individuals may serve as external cues. In addition, cues may come from the mass media or from internal cues such as a feeling of well-being after a particular behavior such as exercise (Pender & Pender, 1987, p. 68-69).

This study explores the relationship of perceived control or health locus of control and the self-reported health promoting behavior of participation in exercise. Results of this study are useful in planning exercise programs as well as overall health promotion programs.

Review of Related Literature

Methodological Approaches

Wallston et al. (1976) postulated that a health scale would be more sensitive in predicting the relationship of

health behaviors and internal or external control than Rotter's general Internal-External Locus of Control Scale. They developed the Health Locus of Control Scale using a sample of college students and college staff members. Later, this unidimensional Health Locus of Control Scale was reconceptualized and the Multidimensional Health Locus of Control Scale was developed (Wallston et al., 1978). With this instrument, the researcher can measure the three reinforcement subscales of control: (a) primarily internal, (b) a matter of chance, or (c) under the control of powerful others. Using various instruments, Strickland (1978) found that beliefs about internal versus external control are significantly related to health behaviors. Determining the relationship between one of these subscales of locus of control and participation in exercise would be useful in planning health promotion programs to meet reinforcement needs of individuals or groups.

The Health Promoting Lifestyle Profile is an instrument designed to measure multidimensional aspects of self initiated actions and perceptions that serve to promote wellness or an optimal level of health (Walker et al., 1987). In the past, most studies of lifestyle behaviors have used the Health Belief Model which focused on preventive behaviors rather than an optimal level of health (Walker et al., 1987). Because few attempts had been made to develop a valid and reliable research instrument to

measure lifestyle, Walker et al. (1987) developed the Health Promoting Lifestyle Profile (HPLP) to specifically measure health promoting behaviors. The instrument is currently being used in many research studies involving health promotion; however, since most of these are longitudinal studies, they have not appeared in the published literature at the time of this writing (N. J. Pender, personal communication, February 27, 1990).

Locus of Control

Research studies have used locus of control to study various health promoting behaviors. An internal locus of control has been associated with: (a) smoking cessation (James, Woodruff, & Werner, 1965; Kaplan & Cowles, 1978; Coelho, 1985), (b) weight loss (Chambliss & Murray, 1979; Kristiansen & Eiser, 1986), (c) use of seat belts (Williams, 1972), (d) birth control (MacDonald, 1970), (e) influenza vaccinations (Dabbs & Kirscht, 1971), (f) dental care (Wallston & Wallston, 1978), and (g) fitness class performance (Carter, Lee, & Greenockle, 1987).

One study of locus of control and attitudes toward physical activity among a sample of 102 male university upperclassmen found that internals with favorable attitudes toward physical activity had better fitness scores and reported greater amounts of voluntary physical exercise than the remainder of the sample (Sonstroem & Walker, 1973). The Rotter Internal-External Scale was used to measure locus

of control in this study.

Another study of 121 employees of a mid-western insurance company used the Multidimensional Health Locus of Control to identify reinforcement differences among participants in a corporate physical fitness program as well as dropouts and non-participants (O'Connell & Price, 1982). This study found that the program participants had higher internal scores than the others who dropped out or did not participate in the fitness program.

Slenker et al. (1985) found joggers to have higher internal scores than nonexercisers in a sample of 132 joggers at an organized 10-kilometer race and 93 nonexercisers from office employees at a major corporation. The Multidimensional Health Locus of Control Scale was used to determine locus of control.

However, not all studies find health behaviors related to an internal locus of control. DiGiuseppe (1973) used Rotter's Internal-External Scale to measure internal or external control and participation in team, individual, and intramural sports. Those findings did not support the previous research showing sports participants to be more internal.

Results of a study on leisure time physical activity, health locus of control, and perceived social support were not consistent, but more individuals with higher internal scores exhibited positive health behaviors than did the

individuals with higher external scores (Blair et al., 1980). Also, the vigorous exercisers with the higher internal scores also had better health status scores.

Summary

Locus of control and health promotion behavior have been the focus of many studies. Researchers have used locus of control scales to measure whether reinforcement is internal or external. An internal locus of control means the individual perceives his/her own actions as affecting the outcome, whereas, an external locus of control means the individual perceives fate, luck, chance, or powerful others as controlling the outcome.

Most studies of locus of control and exercise have shown a correlation between an internal locus of control and participation in exercise and other health related behaviors. However, the research methods and results have not been consistent. The measurement tool has progressed from the generalized expectancies design (Rotter, 1966) and the unidimensional design to measure health locus of control (Wallston et al., 1976) to the multidimensional health design (Wallston et al., 1978) which is currently used for health related studies. Present health research studies usually use this health related locus of control instrument which has proved reliable with a variety of specific health conditions (K. A. Wallston, personal communication, May 16, 1989).

Health promotion is moving away from a focus on preventive health behaviors toward behaviors which promote health as a high level of wellness. The Health Promoting Lifestyle Profile has been developed to potentiate research of lifestyles and specifically to measure health promoting behaviors.

This research study explored the relationship of locus of control and exercise among university students. The Multidimensional Health Locus of Control Scales were used to measure locus of control, and the exercise subscale of the Health Promoting Lifestyle Profile was used to measure participation in exercise. The correlation of locus of control and exercise was estimated using Pearson's product moment correlation coefficient.

Chapter 3

RESEARCH METHODOLOGY

Research Design

This applied research used cross-sectional survey research design. Using a survey questionnaire, locus of control and participation in exercise were measured, but there was no attempt to control any other variables. The rationale for using the survey was that a great deal of information could be obtained in a fairly economical way (LoBiondo-Wood & Haber, 1986, p. 120).

Setting and Sample

The convenience sample consisted of 427 university undergraduate and graduate students who completed the survey. The university was a large, urban campus in northern California. The students represented a multicultural sample. Using the dining commons or selected classrooms as collection sites, an attempt was made to include a diverse sample. To increase the variety of the sample, various majors and demographic groups were included.

Data Collection Process

The Multidimensional Health Locus of Control (MHLC) Scales, Form A, (Wallston et al., 1978) and the Health Promoting Lifestyle Profile (Walker et al., 1987) were included in a survey questionnaire as part of a larger study of lifestyle behaviors among university students (see

Appendices D and E). With the instructor's permission, the researcher explained to a class of students that this survey was research related to lifestyle behaviors. Respondents were directed to indicate the answer that best described their agreement or disagreement with each statement on the MHLC Scale and to indicate the regularity with which they engaged in each behavior on the Lifestyle Profile. On some occasions, certain instructors allowed 15 minutes of class time to complete the questionnaire and the survey was deposited in the collection box during the class period. However, on other occasions, students took the survey home with them, and either the researcher returned the next day to collect the completed questionnaires, or the regular instructor collected the surveys and returned them via intercampus mail to the principal investigator.

At the dining commons, the researchers set up a table at one entrance to the dining hall during midday. A banner was hung behind the table which explained that this was a lifestyle survey. The researchers asked for volunteers to complete the questionnaire during their lunch time and to return the survey to the collection box. Any respondent who expressed a desire to participate and return the survey later was given a self addressed and stamped envelope to return the survey by mail.

Measurement

Locus of Control

Locus of control was measured by the Multidimensional Health Locus of Control (MHLC) Scales (Form A) developed by Wallston et al. (1978). The MHLC was developed to improve the original Health Locus of Control (HLC) Scale (Wallston et al., 1976). It incorporates three scales into one questionnaire focusing on the following areas:

(a) internality, (b) powerful other externality, and (c) chance externality. The MHLC yielded scores in each of these dimensions.

The MHLC Scales were intended for use with adults; however, the reading level was calculated at the fifth to sixth grade level. Most persons without functional impairments and with an eighth grade reading level would be expected to understand and respond to the items. The MHLC is a self administered questionnaire containing 18 Likert-type items with a choice of six answers from strongly agree to strongly disagree.

Content of MHLC Scales. There were six items in each of the three dimensions of locus of control. The six items used to measure internality can be found in Table 1. The identified items were meant to measure whether the person has an internal locus of control and believed that their own behavior affected their health.

The items used to measure powerful other locus of

Table 1

Items of the MHLIC Determining Internal Health Locus of Control

-
1. If I get sick, it is my own behavior which determines how soon I get well again.
 6. I am in control of my health.
 8. When I get sick I am to blame.
 12. The main thing which affects my health is what I myself do.
 13. If I take care of myself, I can avoid illness.
 17. If I take the right actions, I can stay healthy.
-

control can be found in Table 2. A respondent with a high powerful other score believed people other than themselves had greater control of their health. Examples of powerful others could be a personal physician, nurse, family, or friends.

The items used for the chance score are found in Table 3. A respondent with a high score in chance locus of control believed that luck, fate, or chance has the greater control of their health.

Reliability and validity. Reliability is the degree of consistency with which the instrument measures an attribute, and internal consistency is the extent to which the subparts are measuring the same characteristic (Polit & Hungler,

Table 2

Items of the MHLIC Determining Powerful Other Health Locus of Control

3. Having regular contact with my physician is the best way for me to avoid illness.
 5. Whenever I don't feel well, I should consult a health professional.
 7. My family has a lot to do with my becoming sick or staying healthy.
 10. Health professionals control my health.
 14. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.
 18. Regarding my health, I can only do what my doctor tells me to do.
-

Table 3

Items of the MHLC Determining Chance Health Locus of Control

-
- 2. No matter what I do, if I am going to get sick, I will get sick.
 - 4. Most things that affect my health happen to me by accident.
 - 9. Luck plays a big part in determining how soon I recover from an illness.
 - 11. My good health is largely a matter of good fortune.
 - 15. No matter what I do, I'm likely to get sick.
 - 16. If it's meant to be, I will stay healthy.
-

1978, p. 424). Wallston et al. (1978) used alpha coefficients to test the internal consistency of the MHLC Scales with scores ranging from .673 to .859. Scores above 0.70 are considered satisfactory, but "the higher the coefficient, the more stable the measure" (Polit & Hungler, 1978, p. 428).

Validity is the degree that an instrument measures what it is supposed to be measuring (Polit & Hungler, 1978, p. 434). Wallston et al. (1978) used intercorrelations to compare the MHLC Scales with Levenson's (1973) general scales, and each subscale of the MHLC was found to correlate most highly with the theoretical counterpart of internal, powerful other, or chance of the Levenson scales.

Predictive validity was computed by correlating health status and the MHLC scores. "As expected, health status correlated positively with IHLC ($r=.403$, $p<.001$), negatively with CHLC ($r=-.275$, $p<.01$) and did not correlate with PHLC ($r=-.055$)" (Wallston et al., 1978, p. 167) (see Appendix F for a definition of statistical symbols).

Scoring. The Multidimensional Health Locus of Control Scales were scored by totaling the numerical values assigned to each answer for the questions of the subscale (Appendix G). The choices of answers for each question with the numerical value were: (a) strongly agree = 6, (b) moderately agree = 5, (c) agree = 4, (d) disagree = 3, (e) moderately disagree = 2, and (f) strongly disagree = 1. There were six questions in each of the subscales, therefore, scoring ranged from 6 to 36 for a particular subscale of the MHLC.

Exercise

Exercise was measured by a subscale of the Health Promoting Lifestyle Profile (HPLP) developed by Walker et al. (1987) as a research instrument to measure lifestyle behaviors focusing on sustaining or increasing level of wellness (Appendix E). This instrument consists of 48 items designed to measure six factors of the health promoting lifestyle: (a) self-actualization, (b) health responsibility, (c) exercise, (d) nutrition, (e) interpersonal support, and (f) stress management. For

the purpose of this research study, only the exercise subscale was used.

Content of the exercise subscale. The five items of the exercise subscale of the Health Promoting Lifestyle Profile are listed in Table 4. The choices of answers were: (a) never, (b) sometimes, (c) often, or (d) routinely.

Table 4

Exercise Subscale of Health Promoting Lifestyle Profile

-
- 4. Perform stretching exercises at least 3 times per week.
 - 13. Exercise vigorously for 20-30 minutes at least 3 times per week.
 - 22. Participate in supervised exercise programs or activities.
 - 30. Check my pulse rate when exercising.
 - 38. Engage in recreational physical activities (such as walking, swimming, soccer, bicycling).
-

Validity and reliability. Walker et al. (1987) report that after their pilot study using the HPLP, content validity was evaluated by four nursing faculty who were familiar with the health promotion literature. They examined each item for congruence with the health promotion concept. Based on recommendations from these nursing faculty, some items were added, while other items dealing with disease prevention or detection were deleted.

Factor analysis was used to determine the final 48 items of the HPLP, and these items had levels of .35 or higher which are considered acceptable according to Nunnally (1967, p. 357). Each of the subscale factors "represents a distinct dimension related to other dimensions of health promoting lifestyle without being redundant" (Walker et al., 1987, p. 79).

In tests for reliability, Walker et al. (1987) found high internal consistency in the Health Promoting Lifestyle Profile. For the 48 item questionnaire, the alpha coefficient was .922. Examination of the subscales revealed alpha coefficients ranging from .702 to .904. The five items of the exercise subscale had an alpha coefficient of .809. Reliability coefficients above .70 were considered satisfactory (Polit & Hungler, 1978, p. 428). Examination of the frequency distributions for each scale showed essentially symmetrical histograms.

Scoring. Scoring of the Health Promoting Lifestyle Profile was a total of the numerical values assigned to each answer (Appendix H). Each subscale score was a total of the numerical values for the answers to questions in that subscale. The choices of answers for each question and their numerical value were: (a) never = 1, (b) sometimes = 2, (c) often = 3, and (d) routinely = 4. There were five questions in the exercise subscale; therefore, scoring ranged from 5 to 20 for the exercise score used in this

study.

In addition, items 13 and 38 were taken from the exercise subscale (Table 4) and scored individually as well as part of the subscale. These scores ranged from one to four. Items 13 and 38 measured exercise behaviors that are particularly relevant and common for university students.

Demographics

The demographic data were gathered as part of the survey. These data included: (a) age, (b) sex, (c) ethnic or racial group, (d) undergraduate or graduate classifications, and (e) school and department of university major.

Data Analyses

The returned questionnaires were examined for completeness, and the answers were coded and entered on computer coding sheets to facilitate computerized statistical analyses. Scores were totaled for the internal, powerful other, and chance subscales of the Multidimensional Health Locus of Control Scale. Scores were also totaled for the exercise subscale of the Health Promoting Lifestyle Profile.

In addition, scores from two individual items of the exercise subscale of the Lifestyle Profile were examined. The items were: (a) How frequently do you "exercise vigorously for 20-30 minutes at least 3 times per week" and (b) How frequently do you "engage in recreational physical

activities (such as walking, swimming, soccer, bicycling)?" Scores for each of these two questions were calculated to yield additional exercise scores.

The scores from this data were entered into a computer for analysis using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics (frequency and percent occurrence) were calculated on the demographic data. The Pearson product moment correlation coefficient was computed between internal LOC, powerful other LOC, chance LOC, exercise subscale, item 13, and item 38 of the exercise subscale using a correlation matrix which correlated the variables with each other. Probability values were calculated as an estimate of the probability the correlation could have occurred by chance.

Chapter 4

DATA ANALYSES AND INTERPRETATION

This chapter is a summary of the data collected from the survey of the university population. The results of this study will be described in four sections. The first section focuses on the demographics. The second section focuses on the three measures of locus of control: (a) internal, (b) powerful other, and (c) chance. The third section focuses on the exercise scores. The fourth section focuses on the estimate of the correlation between the locus of control and exercise scores.

Demographics

Demographic data included the students' school of study, university grade level classification, ethnic background, age, and gender. A total of 427 students participated in the study.

Among the sample of 427 university students, a variety of schools of study were represented as shown in Table 5. University classifications of year in college are shown in Table 6. There was a diversity of ethnic backgrounds; however, Table 7 shows that 64% were Caucasian. Table 8 shows that the largest number of students were between the ages of 20 to 24 years although a wide age range was represented. Table 9 shows that more than half of the participating students were female.

Table 5

Demographic Data on School of Study (N = 427)

School of Study	Frequency	Percent
Applied Arts and Science	169	39.6
Business	74	17.3
Education	10	2.3
Engineering	38	8.9
Humanities	59	13.8
Science	7	1.6
Social Science	45	10.5
Social Work	2	.5
Undecided	<u>23</u>	<u>5.5</u>
Total	427	100.0

Table 6

University Classification (N = 427)

Classification	Frequency	Percent
Freshman	71	16.6
Sophomore	43	10.1
Junior	93	21.8
Senior	188	44.0
Graduate	20	4.7
Missing data	<u>12</u>	<u>2.8</u>
Total	427	100.0

Table 7

Race or Ethnic Background of University Students (N = 427)

Ethnic Group	Frequency	Percent
Asian	59	13.8
Black	17	4.0
Caucasian	271	63.5
Filipino	18	4.2
Hispanic	31	7.3
Other	17	4.0
Missing data	<u>14</u>	<u>3.2</u>
Total	427	100.0

Table 8

Subject Age Categories (N = 427)

Age Category	Frequency	Percent
Under 20	84	19.7
20-24	195	45.7
25-29	55	12.9
30-34	18	4.2
35-59	39	9.1
Over 59	3	.7
Missing Data	<u>33</u>	<u>7.7</u>
Total	427	100.0

Table 9

Subject Gender (N = 427)

Gender	Frequency	Percent
Male	164	38.4
Female	238	55.7
Missing data	<u>25</u>	<u>5.9</u>
Total	427	100.0

Locus of Control

The Multidimensional Health Locus of Control Scales (MHLC) yielded scores on three subscales (Wallston et al., 1978). These subscales measured the variables of internal, powerful other, and chance locus of control. Each subscale had a possible 6 to 36 score for a possible range of 30.

Internal Locus of Control

In Table 10, internal locus of control values were given. The mean score on the internal subscale of the MHLC Scale was 27.3. The median score was 27.0 with a standard deviation of 3.9 and a range of 19. This median score is close to the mean for 749 college students of 26.68 (K. A. Wallston, personal communication, May 16, 1989).

Table 10

Multidimensional Health Locus of Control (N = 427)

Subscale	Mean	Median	Standard	
			Deviation	Range
Internal	27.3	27.0	3.9	6-36
Powerful Other	16.9	17.0	4.2	6-36
Chance	17.0	17.0	4.4	6-36

Note. Possible scores on each subscale ranged from 6 to 36.

Powerful Other Locus of Control

In Table 10, powerful other locus of control values

were given. The mean score on the powerful other subscale of the MHLC Scale was 16.9. The median score was 17.0 with a standard deviation of 4.2 and a range of 25. The mean for college students provided by Dr. Wallston was 17.87 (personal communication, May 16, 1989).

Chance Locus of Control

In Table 10, chance locus of control values were given. The mean score on the chance subscale of the MHLC Scale was 17.0. The median was 17.0 with a standard deviation of 4.4 and a range of 30. The mean for college students was 16.72 (K. A. Wallston, personal communication, May 16, 1989).

Exercise

Exercise was measured using the exercise subscale of the Health Promoting Lifestyle Profile (HPLP) (Walker et al., 1987). In addition to the exercise subscale scores, items 13 and 38 were taken from the subscale and scored individually.

Exercise Subscale

Table 11 shows the mean value of the five item exercise subscale with the frequency and percent of occurrence. That is, the total values of one to four were summed for each student, then divided by five to determine a mean value of how often the exercise behaviors were reported.

Vigorous Exercise, Item 13

In Table 12, exercise values were given with the frequency and percent of occurrence for item 13 on the

Table 11

Exercise Subscale of Health Promoting Lifestyle Profile
(N=427)

Mean Value of 5 item subscale	Frequency	Percent
Rarely	47	11
Sometimes	186	43
Often	157	37
Routinely	<u>37</u>	<u>9</u>
Total	427	100

Note. Rarely = Mean values of 1.0 - 1.4.

Sometimes = Mean values of 1.5 - 2.4.

Often = Mean values of 2.5 - 3.4.

Routinely = Mean values of 3.5 - 4.0.

Mean Value = Subscale value divided by 5 items.

Table 12

Item 13, Vigorous Exercise (N = 427)

Value	Frequency	Percent
Never	74	17.3
Sometimes	155	36.3
Often	71	16.7
Routinely	<u>127</u>	<u>29.7</u>
Total	427	100.0

exercise subscale of the HPLP. The mean score on the item about vigorous exercise performed for 20-30 minutes at least three times per week was 2.6 (with 1=never and 4=routinely). The median was 2.0 with a standard deviation of 1.1 and a range of 3.

Recreational Exercise, Item 38

In Table 13, exercise values were given with the frequency and percent of occurrence for item 38 of the exercise subscale of the HPLP. The mean score on the item about recreational physical activities was 2.9 (with 1=never and 4=routinely). The median was 3.0 with a standard deviation of 0.9 and a range of 3.

Table 13

Item 38, Recreational Exercise (N = 427)

Value	Frequency	Percent
Never	23	5.4
Sometimes	136	31.9
Often	120	28.1
Routinely	<u>148</u>	<u>34.6</u>
Total	427	100.0

Locus of Control and Exercise Correlations

Pearson product moment correlation coefficient, or the Pearson r , is a calculation used by researchers to explore

the degree of association between two or more variables (LoBiondo-Wood & Haber, 1986, p. 246). In Table 14, the correlation coefficients between the three measures of exercise and the three locus of control scores were given (see Appendix F for a definition of the statistical symbols r and p). That is, the exercise subscale, item 13 and item

Table 14

Correlations Between Exercise and Locus of Control (N = 427)

Measure	Locus of Control			
	Internal	Powerful	Other	Chance
Exercise Subscale of				
Lifestyle Profile	$r = .14$	$r = -.06$	$r = -.16$	
	$p = .004^{**}$	$p = .190$	$p = .001^{**}$	
Item 13: exercise 20-30				
minutes 3 X per week	$r = .16$	$r = -.12$	$r = -.12$	
	$p = .001^{**}$	$p = .013^{*}$	$p = .011^{*}$	
Item 38: recreational				
physical activity	$r = .14$	$r = -.06$	$r = -.15$	
	$p = .003^{**}$	$p = .198$	$p = .001^{**}$	

Note. * = Statistically Significant ($p < .05$)

** = Statistically Significant ($p < .01$)

38 were each correlated with each of the internal, powerful other, and chance locus of control scores.

Internal locus of control was positively correlated with exercise at a statistically significant level ($p < .01$) on all three of the exercise measures with $r = .14-.16$. That is, the higher the perceived internal locus of control, the higher the reported exercise.

Powerful other and chance locus of control are negatively correlated with the measures of exercise as shown in Table 14. Powerful other locus of control was negatively correlated with exercise on all three measures of exercise, but only the item about vigorous exercise 20-30 minutes three times per week was statistically significant at $p < .05$. The r value ranged from $-.06$ to $-.12$.

Chance locus of control was also negatively correlated with exercise and was statistically significant on all three measures with $p < .01$ for the exercise subscale and Item 38 about recreational physical activity. For those reporting vigorous exercise 20-30 minutes three times per week, the p value was $< .05$. The r value ranged from $-.12$ to $-.16$.

In summary, a large, heterogeneous sample of university students reported locus of control and exercise scores on a questionnaire. Results suggest that locus of control is significantly correlated with exercise; internal control is positively correlated with exercise, while chance and powerful others are negatively correlated with exercise.

Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to explore the relationship between locus of control and exercise for a population of university students. The study objectives were to: (a) determine the locus of control of sample subjects, (b) determine reported participation in exercise, and (c) measure the relationship of locus of control and participation in exercise. This chapter draws conclusions from the survey and provides suggestions for health education and practice in the area of health promotion. Finally, recommendations are made for further research in the area.

The findings of this correlational study of 427 university students indicated a statistically significant positive correlation between internal locus of control and exercise. On the other hand, there was a negative correlation between external locus of control and exercise. That is, chance locus of control had a statistically significant negative correlation with all three measures of exercise. However, although powerful other LOC was negatively correlated with all three measures of exercise, only the item measuring vigorous exercise 20-30 minutes three times per week was statistically significant in

negative correlation.

Recommendations for Health Promotion

Understanding an individual's locus of control is helpful to the nurse who wishes to promote a health behavior such as exercise since individuals have different types of locus of control. Whereas one individual with internal locus of control may be reinforced by his/her personal belief that a particular behavior affects his/her health, another individual with a chance locus of control may believe his/her health to be unpredictable in relation to behavior. Still another individual with a powerful other locus of control may believe his/her health is dependent upon the behavior of others such as family, friends, or health professionals. Therefore, the most effective health promotion program may well depend upon the locus of control of the individual participants.

Based upon the results of this study, one recommendation for planning a health promotion program is to begin with an assessment of locus of control among the participants. This information would be used to evaluate the effectiveness of various teaching strategies.

Another recommendation is to plan different teaching strategies into the program to reach individuals with the different locus of controls. Examples of strategies to reach an individual with internal locus of control are posters displayed to give the individual the information

needed to make his/her own decision to begin a health promoting activity, or this same information might be given in the written form of a pamphlet or brochure. This is a cost effective way to deliver health promoting information to clients because it frees the nurse to be doing other things.

Individuals with powerful other locus of control might benefit more by receiving health promoting information from one-on-one conversation with the nurse or from a guest speaker who is recognized as an expert on the subject. This information might be presented during a luncheon or during a meeting of support groups. In addition, the nurse is always teaching by her conversation, attitudes, and actions during any interaction with the individual.

Individuals with chance locus of control will need repetitive contact with health promoting information as well as with research statistics. Personal contacts and individual experience may be the best method of teaching health promotion to the individual with chance locus of control.

Strategies for teaching health promotion are varied, and the nurse is always alert to new methods for teaching individuals and groups. Strategies vary from a simple conversation or the display of a poster to a sophisticated seminar with guest speakers and group discussions. The nurse is only limited by his/her imagination.

Recommendations for Further Study

A recommendation for further study is to replicate the study. A true random sample would yield more valid results, although a large and diversified sample was used in this study. Replication of the study using a different population such as in an occupational setting would also provide valuable data.

Further studies on locus of control and exercise might also include additional variables. A suggestion would be to include the value of health or the definition of health.

A longitudinal study design to study how long term compliance to a health promoting behavior correlates with locus of control would provide valuable data. Finally, a study on the possibility of changing an individual's locus of control as related to health promoting behaviors would provide valuable data for nurses in health promotion.

Conclusions

This study found that locus of control was related to the specific health behavior of participation in exercise. There was a statistically significant positive correlation between internal locus of control and exercise. Furthermore, there was a statistically significant negative correlation between chance locus of control and exercise. Although the powerful other locus of control and exercise were negatively correlated on all three measures of exercise, findings were only statistically significant on

the measure of vigorous exercise 20-30 minutes three times a week.

In conclusion, findings from this study are in agreement with all three hypotheses:

1. The higher the internal locus of control score, the higher the reported participation in exercise. This was shown by a statistically significant positive correlation between internal LOC and exercise.

2. The higher the powerful other locus of control score, the lower the reported participation in exercise. This was shown by the negative correlation of powerful other LOC and exercise.

3. The higher the chance locus of control score, the lower the reported participation in exercise. This was shown by the statistically significant negative correlation of chance LOC and exercise.

Further research is needed to predict a cause and effect relationship between locus of control and exercise. However, this study supports the existence of a relationship between internal locus of control and participation in exercise. Furthermore, it suggests that locus of control is an important factor in health promotion programs.

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Appendix A
Permission to Use
Multidimensional Health Locus of Control Scales

VANDERBILT UNIVERSITY

NASHVILLE, TENNESSEE 37240

TELEPHONE (615) 322-7311

Health Care Research Project • School of Nursing • Direct phone 322-2520

To: Fellow Health Researcher
 From: Kenneth A. Wallston, Ph.D.

Thank you for your interest in the Health Locus of Control Scales. Please excuse this form response, but I have so many inquiries requiring similar replies that I have found this to be an efficient means of disseminating information.

You have my permission to utilize Form A or B of the MHLC scales in any health related research you are doing. My only request is that you keep me informed of any results you obtain using the scales. In that way I hope to continue to serve as a clearinghouse for information about the scales.

We are currently in the process of developing Form C of the MHLC scales, an instrument which can easily be made specific to any existing medically-related condition which your subjects might have (e.g., diabetes, cancer, high blood pressure, migraine headaches, arthritis, chemical dependencies, etc.) We have used Form C as an "Arthritis Locus of Control Scale" and are generally pleased with its psychometric properties. If you think such an instrument would be helpful in your research and if you are willing to share your data back with us, we would be pleased to make it available to you.

We have put many of the studies that have been done with the HLC/MHLC scales on a computerized database coded into 22 different fields. Thus, should you or any other investigator wish to know "how many studies have been done using Form A with an N > 100 with male subjects predicting smoking behavior?" we have the capability of searching the database and seeing which studies fit that description. There is a charge of \$25 for each search and report that we do; however, we will refund \$20 if the search comes up with nothing useful.

If you wish to be added to our mailing list or want additional material, please complete and return the enclosed interest questionnaire. For some items there is a small charge to cover duplication and postage. I hope to periodically send updated information related to the use of these scales as it becomes available.

If you have more specific questions, don't hesitate to contact me. Please remember to send me information on any use you make of these scales. I have included a usage questionnaire to facilitate your doing so. I look forward to hearing from you.

2/89

Appendix B
Permission to Use
Health Promoting Lifestyle Profile

Northern Illinois University
DeKalb, Illinois 60115-2854

Health Promotion Research Program
Social Science Research Institute
Ambulatory Cancer Clients Project
Cardiac Rehabilitation Project
Corporate Project
Older Adults Project
(815) 753-9670

May 8, 1989

Freedra Bush, RN
5505 Castle Manor Drive
San Jose, CA 95129

Dear Ms. Bush:

You have permission to use the 48-item Health-Promoting Lifestyle Profile in your study of the relationship between locus of control and participation. I understand that you will be doing a secondary analysis of the data collected by Dr. Coleen Saylor for her study of the correlates of health-promoting behaviors among university students.

I would appreciate receiving a complete report of your study for our files. We are particularly interested in information about scores (range, mean and standard deviation) on the Lifestyle Profile, reliability coefficients and correlations with other measured variables.

Best wishes with your study.

Sincerely,

Susan Noble Walker, Ed.D., R.N.
Associate Professor and
Co-Director, Health Promotion Research Program

Appendix C
Consent Form

Please sign this page.

Consent Form

Lifestyle Behaviors Among University Students

I have been asked to participate in a research study about lifestyle and health. The results of this study will be valuable to understand the health of University students. The study is being conducted by Dr. Coleen Saylor, an instructor in the Nursing Department, and two graduate research assistants.

The questionnaire takes approximately 15 minutes to complete. Participation is strictly voluntary and I may withdraw at any time. Responses will be combined with those of 300 other students, thus assuring anonymity. Responses are confidential and only the researchers will have access to the questionnaire. The names/addresses will be destroyed at the end of the study. If the results of the study are published, all responses will be presented as a group and my answers will remain confidential.

I may receive a follow up copy of one page of the questionnaire by mail in a few weeks. This consent form also applies to that questionnaire.

Any questions will be answered by Dr. Saylor (408) 924-3157. Complaints may be presented to Dr. Virgil Parsons (408) 924-3130 or Dr. Serena Stanford (408) 924-2480. A summary of results will be available if I request it.

I have received a copy of this consent form for my file. My signature indicates my willingness to participate.

Date

Signature

Appendix D
Multidimensional Health Locus of Control Scales,
Form A

PLEASE NOTE:

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

These consist of pages:

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U·M·I

Appendix E
Health Promoting Lifestyle Profile

Appendix F
Definition of Statistical Symbols

Definition of Statistical Symbols

1. Pearson product moment correlation coefficient r is the calculation to quantify the relationship between at least 2 variables. The possible range is +1.00 through 0.00 to -1.00 with the +1.00 indicating a perfect positive relationship and -1.00 indicating a perfect negative relationship. An r of 0.00 indicates no relationship (Munro, Visintainer, & Page, 1986, p. 64, 66).

2. The statistical significance, or p , is a calculation to quantify the probability that r occurred by chance alone. This level of statistical significance is greatly affected by the size of the sample with the largest sample being most desirable (Munro et al., 1986, p. 70).

A minimum level of statistical significance acceptable in scientific research is .05. The most frequently used levels of significance in nursing research are .05 and .01. A .05 significance level means that there is a risk that a true null hypothesis would be rejected 5 times out of 100. In other words, there is a 5% chance of incorrectly identifying a relationship where none exists. With a .01 significance level, there is a risk that 1 out of 100 would be incorrectly identified as having a relationship (Polit & Hungler, 1978, p 545).

Appendix G
Multidimensional Health Locus of Control Scales
Scoring Instructions

Multidimensional Health Locus of Control

Locus of Control Scales (MHLC)

Scoring Instructions

<u>Total Scale</u>	<u>Items</u>
MHLC	1 to 18

<u>Subscale</u>	<u>Items in Subscale</u>
Part A. Internal	1, 6, 8, 12, 13, 17
Part B. Powerful Others	3, 5, 7, 10, 14, 18
Part C. Chance	2, 4, 9, 11, 15, 16

Scoring

Strongly Agree (SA)	= 6
Moderately Agree (MA)	= 5
Agree (A)	= 4
Disagree (D)	= 3
Moderately Disagree (MD)	= 2
Strongly Disagree (SD)	= 1

Appendix H
Health Promoting Lifestyle Profile
Scoring Instructions

Health-Promoting Lifestyle Profile
Scoring Instructions

<u>Total Scale</u>	<u>Items</u>
Health-Promoting Lifestyle	1 to 48

<u>Subscale</u>	<u>Items in Subscale</u>
Part A. Self-actualization	3, 8, 9, 12, 16, 17, 21, 23, 29, 34, 37, 44, 48
Part B. Health Responsibility	2, 7, 15, 20, 28, 32, 33, 42, 43, 46
Part C. Exercise	4, 13, 22, 30, 38
Part D. Nutrition	1, 5, 14, 19, 26, 35
Part E. Interpersonal Support	10, 18, 24, 25, 31, 39, 47
Part F. Stress Management	6, 11, 27, 36, 40, 41, 45

Scoring

Never (N) = 1

Sometimes (S) = 2

Often (O) = 3

Routinely (R) = 4

(SNW)

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