

HEALTH BELIEFS AND PRACTICES OF
RUNNERS VERSUS NON-RUNNERS

A THESIS
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN THE GRADUATE SCHOOL OF THE
TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

BY
VALERIE RUBIN WALSH, B.S.N.

DENTON, TEXAS
DECEMBER 1984

The Graduate School
Texas Woman's University
Denton, Texas

October 30 1984

We hereby recommend that the _____ thesis _____ prepared under

our supervision by _____ Valerie Rubin Walsh, B.S.N. _____

entitled _____ Health Beliefs and Practices of _____

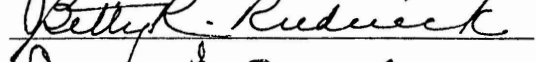
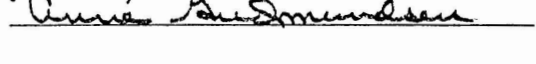
_____ Runners versus Non-runners _____

be accepted as fulfilling this part of the requirements for the Degree of _____

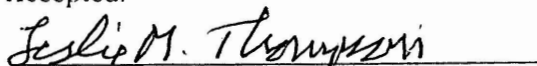
_____ Master of Science _____

Committee:


Chairman

Accepted:


Provost of the Graduate School

DEDICATION

This work is gratefully dedicated to my husband, Michael, for his advice, love, and encouragement throughout this endeavor; and to all of the others in my family, for their constant faith and support.

ACKNOWLEDGMENTS

The writer wishes to express her deepest gratitude to the following persons who were instrumental to the completion of this work:

To her faculty advisors, Dr. Elizabeth Anderson, Dr. Judith McFarlane, and Dr. Betty Rudnick, for their unfailing expert guidance, good will, and good humor, and for their untold hours and energies expended;

To Dr. Maija Selby, former faculty advisor, for her invaluable assistance in formulating and refining the project from its very beginnings;

And finally, to the persons who gave of their time and energy to provide the data for the study, and who, it is hoped, will benefit from its outcomes.

TABLE OF CONTENTS

DEDICATION	iii
ACKNOWLEDGMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii

Chapter

1.	INTRODUCTION	1
	Problem of study	3
	Justification of Problem	3
	Conceptual Framework	4
	Assumptions	9
	Hypotheses	10
	Definition of Terms	10
	Limitations	11
	Summary	12
2.	REVIEW OF LITERATURE	14
	Summary	17
3.	PROCEDURE FOR COLLECTION AND TREATMENT OF DATA	19
	Setting	20
	Population and Sample	21
	Protection of Human Subjects	23
	Instruments	24
	Data Collection	27
	Treatment of Data	29
	Summary	31

Chapter

4.	ANALYSIS OF DATA	32
	Description of Samples	33
	Findings	39
	Summary	45
5.	SUMMARY OF THE STUDY	46
	Summary	46
	Discussion of Findings	49
	Conclusions and Implications	52
	Recommendations	55
	APPENDIX A: QUESTIONNAIRE	57
	APPENDIX B: AGENCY APPROVALS	64
	APPENDIX C: COVER LETTERS	67
	APPENDIX D: INSTRUMENT PERMISSION	70
	REFERENCES	73

LIST OF TABLES

Table

1.	Frequencies and Percentages of Age, Gender, Ethnicity, and Marital Status of the Runner and Non-runner Respondents	34
2.	Frequencies and Percentages of Gross Annual Household Income, Highest Educational Degree, and Perception of Personal Health Status of the Runner and Non-runner Respondents	35
3.	Motivation for Having Begun to Run and for Continuing to Run as Reported by the Respondents	37
4.	Sites and Frequencies of Running- related Injuries Reported by the Respondents	38
5.	Typical Feelings When Unable to Run as Reported by the Respondents	39
6.	Relative Value Placed on Health by Runner and Non-runner Respondents	40
7.	Health-related Behaviors Routinely Undertaken by the Runner and Non-runner Respondents	41

LIST OF FIGURES

Figure

1. Combination of Pender's Two Models 6

CHAPTER 1

INTRODUCTION

Since 1975, in the United States there has been a five-fold increase in the number of persons who run for physical fitness, recreation, and competition. Between 20 and 30 million Americans run (Callen, 1983). Running is becoming the most heavily pursued sport (Hartung & Farge, 1981), and is generally encouraged by health professionals. The mental and physical benefits derived from running have been studied extensively and summarized (Callen, 1983; Cantu, 1981; Layman, 1974; United States Public Health Service, 1979).

In recent years, the negative aspects of running, particularly injuries, have come under scrutiny (Lutter, 1982; Nilsson, 1981). Other aspects receiving attention have been sudden death while running (Thompson, Funk, Carleton, & Sturner, 1982; Virmani, Robinowitz, & McAllister, 1982); hazards encountered while running (Koplan, Powell, Sikes, Shirley, & Campbell, 1982; Williams, 1981); and various running-related syndromes (Boileau, Fuchs, Barry, & Hodges, 1980; Boyden et al., 1982; Fogoros, 1980; Gumby, 1981; Hunding, Jordal, & Paulev, 1981). Concern for the negative effects of running has extended

into psychologic and personality research. Running has been compared to a drug in that it can be beneficial but can also result in addiction, abused to the point where physical, emotional, and social functioning is severely impaired (Morgan, 1979). Yates, Leehey, and Shisslak (1983) described a group of obligatory runners, similar to those addicted, but who also bore marked resemblance to anorexics. Increasing numbers of athletes, trainers, and sports medicine specialists have presented personal or anecdotal accounts of similar and related problems (Cherner, 1982; Levin, 1983; Moore, 1982; Pilcher, 1983; Todd, 1983), and researchers have demonstrated the need for recognizing compulsive and excessive running behavior (Hartung & Farge, 1981).

Although the health habits of Americans in general have been well-explored (Harris & Guten, 1979), few studies have compared health practices specific to groups of runners with those of non-runners. There is increasing concern, but little evidence, that a large portion of runners have unrecognized, neglected health risks (Hartung & Farge, 1981; Kirby & Valmassy, 1983; Morgan, 1979; Norval, 1980; Yates et al., 1983). In light of these concerns, this study attempted to add to the body of knowledge surrounding health beliefs and habits of the person who runs.

Problem of Study

This study addressed the question, What are some specific health beliefs and behaviors which might separate runners from non-runners? One research question asked: Are there differences between runners and non-runners in the value placed on personal health? The other asked: Is there a difference between runners and non-runners in the number of specific health-related behaviors performed?

Justification of Problem

There is increasing suspicion that, within the large group of individuals who run, a sizeable proportion are doing so to their detriment. Also, little is known about health problems which may primarily affect this group. This study was designed to help overcome this knowledge deficit.

For economic reasons, health professionals are developing stronger interest in primary care (Pender, 1982). There are two client-centered goals of primary care, health protection and health promotion (Pender, 1982). To help runners meet these goals, much more needs to be learned about their health behaviors.

If a uniqueness of health behaviors in runners exists, this information may have implications for the health care delivery system. Specific activities which could be

facilitated using information from this study include accurate, efficient screening, and incidental detection of actual or potential running-related problems. Prediction of compliance with the recommended treatment for ill and injured runners might also be improved. Finally, counseling or teaching aimed at prevention of or intervention in the event of illness or injury could be facilitated.

Conceptual Framework

Pender's modification of the Health Belief Model was chosen as the basis for this study because of its broad and well-established theoretical base, its adaptability to a variety of research formats, and the incorporation of key elements from other models of health behavior (Becker et al., 1977; Pender, 1982).

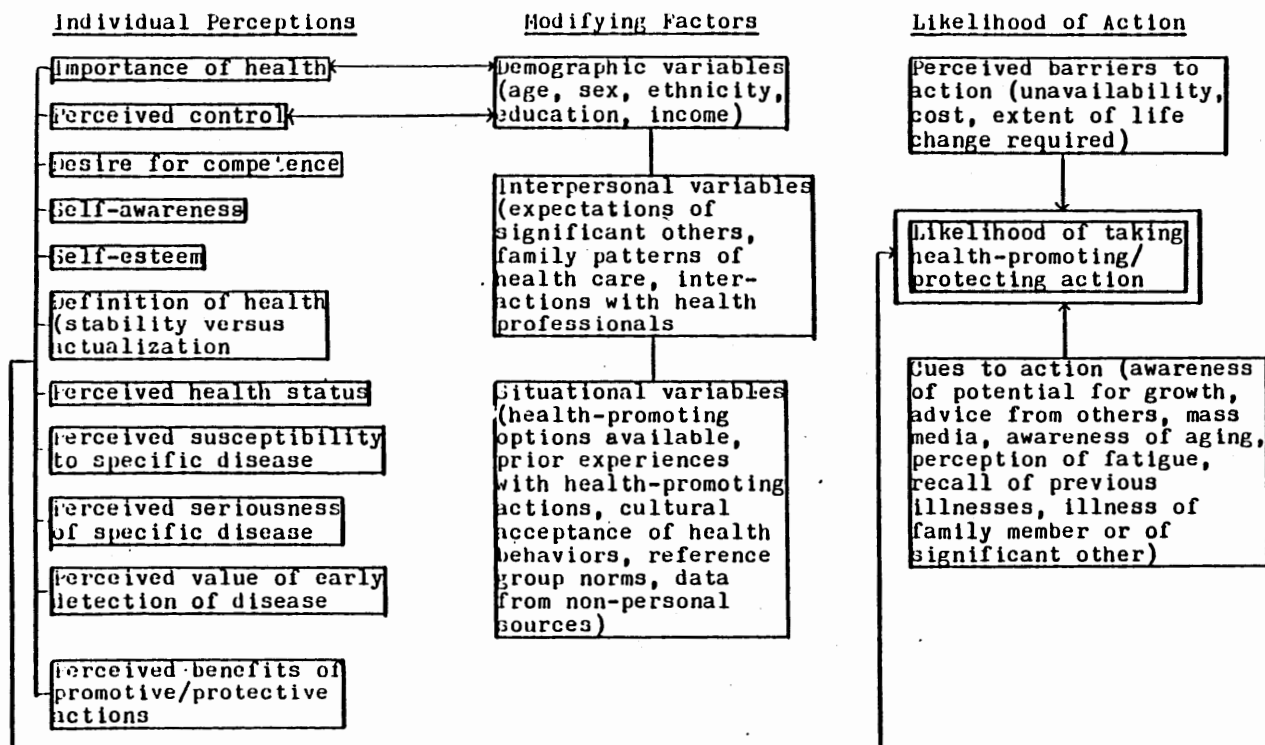
The Health Belief Model was developed by Rosenstock and other social psychologists in the 1950s. Although the focus of the U. S. Public Health Service at that time was on prevention (Becker, 1974), the free services provided were not being widely used. The model was designed to predict who would use those services by demonstrating what factors influenced an individual's decision to take a health-related action. The model was intended to be adaptable to many other areas as well. Since its inception, the model has been extensively applied and tested for a

variety of health-related actions, including cessation of smoking, information-seeking about specific diseases, dental health activities, and other personal health behaviors (Pender, 1982).

Several psychological theories formed the basis for the development of the Health Belief Model (Becker, 1974; Pender, 1982). These proved, ultimately, to be insufficient to explain and predict health behavior, and so the model was further modified, based on empirical studies. Becker, a health education specialist, was the major contributor to its modification (Pender, 1982).

Using more recent empirical studies relating to the various factors outlined in the model, Pender has modified Becker's form of the Health Belief Model. From it, she expanded and developed two distinct models, the Health Protection Model and the Health Promotion Model (Pender, 1982).

Both health-protective and health-promotive functions may be served by running, according to Pender (1982). Persons may run for general well-being, but also, for example, to prevent the development of cardiovascular disease. Therefore, both the Health Protection and Health Promotion models were deemed appropriate for this study. Because the models are very similar in content, they were combined for use in this study (see Figure 1).



Note. From Health Promotion in Nursing Practice (pp. 55, 66) by N. J. Pender, 1982, Norwalk, CT: Appleton-Century-Crofts. Copyright 1982 by Appleton-Century-Crofts. Adapted by permission.

Figure 1. Combination of Pender's Two Models.

The three main dimensions of Pender's (1982) models are individual perceptions, modifying factors, and factors which affect the likelihood of taking action. Individual perceptions include how the person views each of a number of factors; these perceptions have the most impact on the decision to take a specific health-related action, and make up the predisposition. Modifying factors are those which affect this predisposition only indirectly, and consist of demographic, structural, and social-psychologic factors from an individual's environment (Pender, 1982). All of the variables explicated in the models interact in specific ways to affect the likelihood of taking a specific health-related action.

Model terms were defined by Pender (1982) and were categorized under the three main dimensions of the models. These terms are summarized as follows, with special emphasis placed on those directly related to this study.

The first main dimension of the models, according to Pender (1982) would be individual perceptions. One of the factors, importance of health, is the value which an individual places on personal health. Another factor is perceived health status, or the individual's perception of personal health status, both currently and in general. The other individual perceptions include perceived control of personal health, desire for competence, self-awareness,

self-esteem, definition of health, perceived susceptibility to a specific disease, perceived seriousness of specific disease, perceived value of early detection, and perceived benefits of protective/promotive actions.

The second main dimension of the models, according to Pender (1982) would be modifying factors. One category in this dimension is that of demographic variables, which includes such qualities as age, gender, ethnicity, education level, and income level. Another pertinent category is that of situational variables. These include concepts such as the types of health behaviors which are available to the individual; the quality and quantity of past health-related behaviors, and their outcomes; the expectations of the person's cultural or peer group; and the quality and quantity of information about health behavior and its effects which is obtained from nonpersonal sources. The other modifying factors are interpersonal variables, such as interactions with health care professionals.

The third dimension of the models, according to Pender (1982) is the likelihood of taking a specific health-promoting or -protecting action. It is affected, if only slightly, by two main groups of factors, perceived barriers to action (such as inconvenience) and cues to action (such as mass media presentations).

This study of running as a health-promotive/protective action utilized several portions of Pender's (1982) combined Health Belief Model. The study was particularly focused on individual perceptions, to determine whether runners place a different value on health than non-runners. Importance of health was the major variable of interest, and perceived health status was considered a potentially strong extraneous variable. Under the dimension of modifying factors, demographic data were obtained. Additionally, the health-related behaviors were examined in relation to the practice of running. All of the above-mentioned variables affect the third dimension, likelihood of action. In this study, the likelihood of action was measured by the number of specific health-related behaviors undertaken by the subjects.

Assumptions

The following assumptions were inherent in this study:

1. The five main facets of human beliefs and behavior which influence health actions taken are purpose, motivation, awareness, control, and complexity (Pender, 1982).
2. It is possible to measure these factors for any person, using the terms of Pender's models (Pender, 1982).

Hypotheses

The specific hypotheses examined in this study were as follows:

1. There is a difference between runners and non-runners in the relative value placed on personal health.
2. There are differences in the number of specific health-related behaviors undertaken by runners and those undertaken by non-runners.

Definition of Terms

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

Runner: An individual who jogs or runs a minimum of two miles daily, at least three days a week. The terms jogging and running represent identical behavior, defined as a continuous, aerobic, endurance activity, similar to walking, but more rapid and steady, with springing steps so that both feet leave the ground for an instant in each step. A runner was defined as a person who reports the above-stated minimum running behavior, in terms of frequency and duration, on the questionnaire tool (Appendix A).

Non-runner: An individual who is not necessarily sedentary, and may jog sporadically, but who does not meet the criteria as a runner, in terms of frequency and duration, as self-reported on the questionnaire. A

non-runner was defined as a person who reports any running behavior from none to less than two miles daily, three days a week.

Relative value placed on health: The priority level to which an individual assigns health, as measured by the respondent's ordinal score on the Health Value Scale, adapted from Rokeach by Wallston (cited by Pender, 1982), which is Section I of the questionnaire (Appendix A).

Specific health-related actions: Behaviors undertaken by an individual for the purpose of health promotion or health protection, as measured by the investigator-designed Walsh Health Behaviors Questionnaire (WHBQ), which is Section II of the questionnaire (Appendix A). Health promotive behaviors are those undertaken for the purpose of "sustaining or increasing the level of well-being, self-actualization, and fulfillment of a given individual or group" (Pender, 1982, p. 65). Health protective behaviors are undertaken for the purpose of "decreasing the probability of encountering illness by active protection of the body against unnecessary stressors or detection of illness at an early stage" (Pender, 1982, p. 65).

Limitations

1. Since this is a nonexperimental study, findings cannot be generalized beyond this study population (Polit &

Hungler, 1983).

2. The Hawthorne effect may have influenced both internal and external validity (Polit & Hungler, 1983).
3. History may also have been influential, since some of the runners had just completed a marathon immediately prior to the data collection (Polit & Hungler, 1983).
4. Females tend to under-report physical activities where open-ended questions are used (Smith, Stewart, & Brown, 1980). Therefore, closed-ended questions were designed wherever feasible.

Summary

Little is known about specific health beliefs and practices of runners, and how they may differ from those of persons who do not run. In light of growing concerns that some runners may be doing so to their detriment, this study attempted to determine how runners may differ in terms of their behaviors and the value placed on health. This chapter outlined the conceptual framework and assumptions on which this research was based, then stated the hypotheses. The terms of the study were defined, and the limitations of the investigation were explained. Chapter 2 reviews the literature, Chapter 3 outlines the procedure for collection and treatment of the data, and Chapter 4 describes the analysis of the data. Finally, Chapter 5

presents a summary of the study, discussion of the findings, the conclusions and implications, and the recommendations for further study.

CHAPTER 2

REVIEW OF LITERATURE

Callen (1983) asserted that there are between 20 and 30 million American runners, representing a vast increase since 1975, when Virmani, Robinowitz, and McAllister found estimates of 4 million. Running has therefore become a fertile area for research, with new studies appearing almost daily in the medical literature. Many of the published works have focused on the physical and psychological benefits of running (Cantu, 1981; Folkins & Sime, 1981; Kam, 1980; Layman, 1974; Talan, 1982; United States Public Health Service, 1979). Of the remaining published reports, the majority deal with hazards, drawbacks, and syndromes associated with running (Boileau, Fuchs, Barry, & Hodges, 1980; Fecteau, 1984; Kerner & D'Amico, 1983; Koplan, Powell, Sikes, Shirley, & Campbell, 1982; Lutter, 1982; Morgan, 1979; Nix, 1982; Norval, 1980; Sutton & Bar-Or, 1980; Virmani et al., 1982; Yates, Leehey, & Shisslak, 1983).

Few studies have compared health attitudes or practices of runners to non-runners. This literature review will survey these studies found to have compared selected health beliefs or behaviors of runners to those

of non-runners. Due to the scarcity of research of this type, two related studies are first examined.

The Framingham study (Dawber, 1980) provided much of the preliminary information regarding the long-term effects of exertion on health status. The stated purpose of this longitudinal research was to identify risk factors related to coronary heart disease and other atherosclerotic diseases, and, to a great extent, this was accomplished. During the course of the study, enormous amounts of data regarding lifestyle practices and health behaviors were elicited and analyzed for each group or level of exertion. The group which engaged in the most strenuous types of exertion included some runners, although they were considerably fewer in number than today. The study revealed that a sedentary lifestyle was the least healthy.

The second study related to comparative research on running was done by Paffenbarger, Hale, Brand, and Hyde, and reported in 1977. This was another longitudinal epidemiologic investigation into relationships between health status, health behaviors, and exertion level. The exertion in this case pertained to that required on the job. The study served to add confidence to findings from other studies regarding coronary risk factors, and included positive correlations between high exertion and good health. They also found evidence of better health habits,

especially concerning smoking and diet, among those whose exertion was the highest.

There is a paucity of research comparing health beliefs, attitudes, or practices between runners and non-runners. Ibrahim (1983), in addressing the many unanswered questions, pointed out the need for tightly controlled, long-term prospective studies, in order to allow confident counseling and more effective treatment of the runner.

Recently, there have been some published studies which were designed with control subjects to enable comparisons. One was by Riddle (1980), who examined the attitudes, beliefs, behaviors, and intentions toward running, using a nonexperimental survey design based on Fishbein's Behavioral Intention Model (Fishbein & Ajzen, 1975). The study group consisted of 296 adult men and women, runners and non-runners. Riddle found that runners more often felt that running would yield positive effects, and valued those expected effects more highly than non-runners. No other differences were discovered.

In 1983, Yamamoto, Yano, and Rhoads published the results of some comparisons of demographic and health-related characteristics between runners and non-runners. Data used were taken from a prospective study begun in 1965 and completed in 1976. Within their total sample

of 6,621 men, derived from the Honolulu Heart Program, they found the 450 runners to be younger, better educated, to smoke less, and to be more likely to follow special diets. However, the validity of the research results has been questioned. Sachs (1983) cited poor definition of terms, a biased and nonrandom sample source, and the fact that data were drawn from old studies.

Blair and his colleagues (1981) compared dietary behavior in runners and controls. Sixty-one male and female runners were compared with 80 male and female non-runners. Subjects were between 35 and 59 years of age. The researchers measured fasting lipoprotein levels for each subject and analyzed dietary surveys and diaries which each subject submitted. Despite being leaner and having lower lipoprotein levels, runners had higher caloric intakes, ate more fat and carbohydrates, and were more likely to consume alcoholic beverages. They did, however, consume less starch, and less protein as a percentage of their total calories.

Summary

This review touched briefly on the majority of published works which focus on the benefits and hazards related to running, then surveyed the few previous studies which were found to examine health behaviors and attitudes

of runners and controls. From the paucity of studies cited, the need for more research of this nature is evident.

CHAPTER 3

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This nonexperimental, cross-sectional study examined a behavior, running, the independent variable, in relation to specific health beliefs and behaviors, the dependent variables. This study design was chosen considering ethical, economic, and time constraints, which rendered it unfeasible to assign subjects to running or non-running groups.

After the samples were chosen, identical questionnaires were mailed to all subjects. Results from the returned questionnaires were analyzed and compared for the two study groups, runners and non-runners.

Variables shown to influence health beliefs and behaviors were also examined. These included perception of personal health status, and demographic variables (Pender, 1982). Other potentially important variables included certain running history and training factors, as outlined in Section III of the questionnaire found in Appendix A (Kerner & D'Amico, 1983; Kirby & Valmassy, 1983; Riddle, 1980). Data were also collected on the personal value placed on health, which was one of the dependent variables. This was also an extraneous variable;

since the value placed on health may influence the performance of health-related behaviors (Pender, 1982).

Setting

This study was conducted in a major metropolitan area in the Southwestern United States, during March and April of 1984. Several characteristics of the geographic setting are potentially important to this study. The city has a warm climate and has recently experienced rapid growth (Chamber of Commerce, 1982). It is the site of a large international medical center, it houses a large proportion of persons who have prospered in the energy field, and its culture is strongly influenced by its diverse ethnic mixture.

Two sites, a university and a running club, were used in obtaining study subjects. The university is located within the city, has an enrollment of over 31,000 graduate and undergraduate students, and features a wide variety of programs. The running club has a membership of 165 persons who live throughout the city's metropolitan area. The members receive monthly newsletters, and the club sponsors several races of varying length throughout the year. Since mailed questionnaires were used, the specific setting for the study was the place where subjects received mail. In general, this site was the subjects' homes.

Population and Sample

There were two target populations. One was the membership of the running club, described above, which constituted the runners. A complete list of the club's membership was made available to the investigator. The other target population consisted of the students of the university, described above, who were listed in the most current Student Directory. This population constituted the non-runners. The Directory represented the most complete and readily available list of current enrollment, including both undergraduate and graduate levels; approximately 2% of the students who were enrolled declined to be listed in the Directory.

The runner sample included the entire running club membership, excluding only those who were randomly selected for the pilot study. The second sample was drawn at random from all entries in the Student Directory. This involved choosing a relatively small sample from a large list, and, for efficiency, a two-stage random sample was drawn (Levy & Lemeshow, 1980). Using a table of random digits, a sample of directory pages was first chosen, then a random sample of names from those pages was selected, again using the random digit table.

The samples each numbered 150, logistically and economically the maximum size feasible considering the

resources of the investigator. Studies of this nature generally have a 1:3 response rate, and so a minimum of 50 respondents was anticipated for each group (Kish, 1965; Levy & Lemeshow, 1980). It was hoped that certain efforts, described later, would cause an increase in the anticipated response rate, especially in light of reported rates by recent, similar study designs (Harris & Guten, 1979; Kerner & D'Amico, 1983; Riddle, 1980; Valliant, Bennie, & Valliant, 1981).

Since one sample consisted of the entire target population (the running club), and a random sample was obtained from the other target population (the Student Directory), they theoretically were representative of their target populations. However, there were several potential sources of bias. Those in the sample groups who did not respond may be quite different in unknown ways from those who did, so the respondents may not be representative of their target populations. The Student Directory sample may not be representative of the university enrollment in its entirety, since those who declined to be listed may be much different from those who are published.

Runners who belong to a running club may differ from runners who do not, in terms of commitment to their sport. Similarly, students enrolled at this university may be quite different from those attending other universities.

Further, it is not claimed that these study subjects represent the city or population at large. The majority of the general population does not run or jog. Also, students typically differ from non-students, particularly in terms of age, education, and income, and so could not be considered typical of non-runners in general. In addition, due to the unique characteristics of the overall metropolitan area in which the study was conducted, the samples may further differ from the population at large, in terms of health knowledge and customs, sports activity, and socioeconomic levels.

Protection of Human Subjects

This study was exempt from review by the Texas Woman's University Human Subjects Review Committee since the data were collected from adults using a survey questionnaire technique. Approval for the study was obtained from the Committee for the Protection of Human Subjects at the university from which the non-runner sample was drawn (Appendix B). Approval for the data collection was also obtained from the club director (Appendix B).

The investigator maintained the anonymity and confidentiality of the subjects' responses by coding the questionnaires. A cover letter (Appendix C) explicitly outlining the rights of the research subject prefaced

questionnaires mailed to each subject. Only the investigator had access to the completed questionnaires, and the information obtained was used solely on a group basis. After data collection, the completed questionnaires and sample lists were destroyed.

Instruments

The questionnaire consisted of a page eliciting demographic data, and three distinct segments regarding health and running (Appendix A). Section I is the Health Value Scale adapted from Rokeach by Wallston and her colleagues at the Vanderbilt University Health Care Research Project (cited by Pender, 1981). Permission to use this scale was obtained from Wallston (Appendix D). The scale was designed to determine the relative value an individual places on health, when compared to nine other terminal values. This is an ordinal scale, scored from 1 through 10, and scoring it places an individual into one of three groups: high, moderate, or low. If health is assigned a position of 1 through 4, a high value is placed on health. Similarly, moderate value is indicated by positioning it in the 5th through 7th places, and low value by the 8th through 10th places.

Wallston reported that content validity was established, and that she and her colleagues were in the

process of establishing construct validity (Wallston, personal communication, November 15, 1983). However, no measure of reliability had been undertaken. In this study, the scale was piloted and subjected to assessment of reliability via the test-retest method, described later.

Section II of the questionnaire is the investigator-designed Walsh Health Behaviors Questionnaire (WHBQ), synthesized from a variety of previously-used instruments (Evans, 1979; Glaves, 1982; Harris & Guten, 1979; Pender, 1982; Roberts & Lee, 1980; United States Public Health Service, 1981; Wiley & Camacho, 1980; Williams, Carter, & Eng, 1980). Items numbered 23-25, 38-41, and 45 were used very similarly to the way in which they were first presented in Healthstyle, a non-copyrighted pamphlet offered by the U. S. Public Health Service (1981) to the public.

The WHBQ consists of 60 items, each of which is to be circled by a respondent if it is generally true of the subject's lifestyle. The maximum score is 60, the minimum 0. Scoring places an individual into one of three groups, those performing high, moderate, or low numbers of health-related behaviors in their daily lives. The high group is designated by a score of from 41 to 60. Similarly, the moderate group scores 21-40 and the low group 1-20. This division was determined based on divisions used in other

studies previously mentioned, and were used for visual display of the WHBQ results by groups. However, this is an interval/ratio level tool, and was tested as such.

Content validity of the WHBQ was partially established by virtue of the fact that the majority of items were included, in some form, in the previously mentioned studies, and weighted similarly. However, the tool was also submitted to a panel of experts on health-related behaviors, including several professors within the Graduate Program in the College of Nursing at Texas Woman's University. Reliability was established by the test-retest method, described later.

The WHBQ contains six subsections: nutrition, exercise, drugs and addictive substances, psychological factors, safety factors, and medical awareness/self-care. These subsections, which were examined separately and collectively, were weighted similarly to those in tools used elsewhere.

Section III of the questionnaire was to be completed only by the runners, and was intended to describe the group in terms of extraneous variables which have appeared influential in other sports medicine studies (Kerner & D'Amico, 1983; Kirby & Valmassy, 1983; Riddle, 1980). Also included in this section were questions on both physical and psychological health-related behaviors which have been

highlighted in other studies, and which applied only to the group of runners (Morgan, 1979; Yates et al., 1983). Content validity was established for this section by a panel of experts, consisting of a group of psychiatrists and an orthopedic surgeon, all of whom specialize in sports medicine. It was also subjected to scrutiny by several local long distance runners and trainers, each experienced in the field for more than 10 years. Reliability was established by the test-retest method of determining stability over time.

For the entire packet, efforts were made to keep the format brief, simple to fill out, and professional in appearance, these efforts aimed at maximizing the response rate (Kish, 1965; Levy & Lemeshow, 1980). Kish (1965) also noted that arousal of interest and motivation of the potential respondent were factors which would increase response rates, so the cover letters and questionnaire were designed with this in mind.

Data Collection

Prior to the actual data collection from the study samples, the questionnaire was pilot tested. A pilot sample of 30 subjects was selected from the target populations, in the same manner as the random sample but using different persons. Fifteen were selected from each target population.

A minimum of 10 respondents from the pilot group was anticipated for both administrations. The pilot subjects received a questionnaire packet, with a cover letter (Appendix C) with additional information as follows:

In about two weeks, you will receive another form like this one. It is not an oversight or a duplication. You can help greatly by completing and returning this form also. By doing this, you will help add strength to the results of the study, by allowing evaluation of the form used to collect this information. Please fill in here _____ the number of minutes it takes you to fill out the questionnaire. Thank you.

Prior to mailing to the pilot group, the questionnaires were coded to assure anonymity. The first mailing included the questionnaire, standard cover letter, an additional sheet with the above quote, and a self-addressed, stamped envelope for return of the packet. Approximately two weeks later, the second, identical questionnaire with envelope and cover letter was mailed to those who responded. When the two questionnaires had been returned for each subject, they were scored.

Twelve subjects responded to both administrations of the questionnaire. The pilot indicated that an average of 11.25 minutes was required to complete the questionnaire; it was not deemed necessary to revise its length.

The percentage correlation between the first and second responses for each item in each section of the

questionnaire was calculated for the entire pilot group. Perfect correlation would be indicated by 100% agreement. A correlation of below 90% would indicate the need for revision of that item. However, none of the items on the questionnaire fell below a 91.67% correlation, and so none were revised. This pilot test and calculation of percentage correlation established test-retest reliability (Polit & Hungler, 1983).

Following the pilot test, the actual data collection was accomplished. This was done by mailing the questionnaire, cover letter, and a stamped, self-addressed envelope to each subject. After two weeks had passed, non-respondents were sent a follow-up letter, along with another questionnaire and envelope, in order to increase the response rate (Kish, 1965; Levy & Lemeshow, 1980).

Treatment of Data

A portion of the data was summarized using descriptive statistics. Demographic variables pertaining to both samples were summarized to report the absolute and relative frequencies in each category for runners and non-runners. The subjects' overall perception of personal health status were also summarized. The runners in the study were described in terms of the items outlined in Section III of the questionnaire (Appendix A). The variables measured

were described by reporting the absolute and relative frequencies in each category.

The relationship between running and the value placed on health was tested for significance using the Mann-Whitney U test, since two independent groups were being compared on a variable which was measured at the ordinal level (Pagano, 1981). The relationship between running and the quantity of health-related behaviors undertaken was tested with the two-sample t-test for independent samples (Pagano, 1981). In this case, comparisons were made between two independent groups on an interval/ratio level variable. Subsections of the WHBQ were also examined for each group to see if one or more particular subsections indicated a potential problem area, and means and standard deviations were compared.

The relationship between the quantity of health-related behaviors undertaken and potentially strong extraneous variables was also examined. These included demographic variables, perception of personal health status, and, for the runners, the number of years they have run, their motivation for running, weight level, severity of past injuries, and competitive history. These relationships were tested with Chi square tests. Finally, the influence of the above-mentioned extraneous variables on the relative value placed on health was examined, again using Chi square tests.

Summary

This chapter focused on the design of the study, in terms of data collection and analysis. The setting, sample, and target populations were thoroughly described, along with their limitations. The measures taken to ensure the protection of sample subjects were explained. The instruments used in this investigation were carefully critiqued and explicated, and the method with which they were applied was outlined. The pilot test, which indicated no need for revision of the instruments, was described and results reported. Finally, both data collection and treatment methods were explained.

CHAPTER 4

ANALYSIS OF DATA

This study was conducted to determine if a relationship existed between running and the value placed on personal health, or between running and the quantity of health-related behaviors undertaken. It was hypothesized that such relationships existed, although the direction was not specified. These relationships were measured using the Health Value Scale and the Walsh Health Behaviors Questionnaire (WHBQ), found in Sections I and II of the questionnaire (Appendix A). Potential extraneous variables were also assessed, as itemized in the demographic data section and Section III of the questionnaire.

In this chapter, the two samples are first described separately and collectively, in terms of demographic variables and perception of personal health status. Next, the variables which pertain only to the group of runners are outlined. Then the data from Sections I and II of the questionnaire (Appendix A) are reported, and the testing of the two hypotheses is detailed. Finally, the influence of potentially strong extraneous variables is assessed.

Description of Samples

Questionnaire packets were initially mailed to 300 subjects, 150 comprising each sample. Three weeks later, 196 questionnaires were remailed to non-respondents. A total of 140 usable questionnaires were returned, for an overall response rate of 46.7%. Of these usable responses, 77 (55%) were from the runner group and 63 (45%) from the non-runner group. Of the questionnaires received, 25 were not usable.

Age comparisons between groups are shown in Table 1. The runners tended to be older, with a mean age of 35.8 (SD 5.3) as compared to the non-runners' mean age of 27.5 (SD 3.2). Gender data are also presented in Table 1. The runner group was composed of substantially more males (71.4%) than the non-runner group (54%). Ethnicity of the respondents is also portrayed in Table 1. The modal category is white, with the majority of non-white ethnicities represented in the non-runner group. Marital status is also displayed in Table 1. The modal marital status category for runners was married (57.1%) and for non-runners, never married (55.5%).

The majority (57.1%) of runners reported gross annual household incomes of \$40,000 or more (Table 2). The modal income category (at 33.3%) for the non-runners was \$20,000-39,999. Educational data is presented also in Table 2.

Table 1

Frequencies and Percentages of Age, Gender,
 Ethnicity, and Marital Status of the
 Runner and Non-runner Respondents

Variables	<u>Runners</u>		<u>Non-runners</u>		<u>Both samples</u>	
	<u>n</u>	%	<u>n</u>	%	<u>n</u>	%
<u>Age in years:</u>						
30 and under	26	33.7	49	77.8	75	53.6
31-40	28	36.4	12	19.0	40	28.5
41-50	18	23.4	2	3.2	20	14.3
51 and over	<u>5</u>	<u>6.5</u>	<u>0</u>	<u>0.0</u>	<u>5</u>	<u>3.6</u>
Total	77	100.0	63	100.0	140	100.0
<u>Gender:</u>						
Male	55	71.4	34	54.0	89	63.6
Female	<u>22</u>	<u>28.6</u>	<u>29</u>	<u>46.0</u>	<u>51</u>	<u>36.4</u>
Total	77	100.0	63	100.0	140	100.0
<u>Ethnicity:</u>						
White,						
non-Hispanic	76	98.7	50	79.4	126	90.0
Black,						
non-Hispanic	1	1.3	2	3.2	3	2.1
Hispanic	0	0.0	4	6.3	4	2.9
Oriental/Asian	0	0.0	6	9.5	6	4.3
Other	<u>0</u>	<u>0.0</u>	<u>1</u>	<u>1.6</u>	<u>1</u>	<u>0.7</u>
Total	77	100.0	63	100.0	140	100.0
<u>Marital status:</u>						
Never married	16	20.8	35	55.5	51	36.4
Married	44	57.1	26	41.3	70	50.0
Divorced	14	18.2	2	3.2	16	11.5
Separated	<u>3</u>	<u>3.9</u>	<u>0</u>	<u>0.0</u>	<u>3</u>	<u>2.1</u>
Total	77	100.0	63	100.0	140	100.0

Table 2

Frequencies and Percentages of Gross Annual Household Income, Highest Educational Degree, and Perception of Personal Health Status of the Runner and Non-runner Respondents

Variables	<u>Runners</u>		<u>Non-runners</u>		<u>Both samples</u>	
	<u>n</u>	%	<u>n</u>	%	<u>n</u>	%
<u>Income:</u>						
Below \$10,000	6	7.8	9	14.3	15	10.7
\$10,000-19,999	6	7.8	17	27.0	23	16.4
\$20,000-39,999	21	27.3	21	33.3	42	30.0
\$40,000 and over	<u>44</u>	<u>57.1</u>	<u>16</u>	<u>25.4</u>	<u>60</u>	<u>42.9</u>
Total	77	100.0	63	100.0	140	100.0
<u>Degree:</u>						
High school	32	41.5	25	39.7	57	40.7
Two-year college	9	11.7	9	14.3	18	12.9
Four-year college	33	42.9	27	42.8	60	42.8
Graduate	<u>3</u>	<u>3.9</u>	<u>2</u>	<u>3.2</u>	<u>5</u>	<u>3.6</u>
Total	77	100.0	63	100.0	140	100.0
<u>Perception of health:</u>						
Fair	0	0.0	3	4.8	3	2.1
Good	9	11.7	37	58.7	46	32.9
Excellent	68	88.3	22	34.9	90	64.3
Missing	<u>0</u>	<u>0.0</u>	<u>1</u>	<u>1.6</u>	<u>1</u>	<u>0.7</u>
Total	77	100.0	63	100.0	140	100.0

The modal educational category for the runners was the attainment of a four-year college degree (42.9%), closely followed by a high school diploma (41.5%). The same modal and next most common categories held true for the non-runner

group, at 42.8% and 39.7%, respectively. As is also shown in Table 2, the runners reported better overall perceptions of personal health status, with 88.3% indicating excellent health. Only 34.9% of the non-runners reported excellent health.

For the group of runners, a number of additional variables were measured. The results were as follows: As a group, they had been running for a mean of 10.8 (SD 7.6) years. Forty-eight had been running 10 years or fewer, 18 between 11 and 20 years, and eight for more than 20 years.

The major reasons given for having originally begun to run are displayed in Table 3. They were: to improve overall health (36.3%), to compete (27.3%), to control weight (18.2%), for fun or socializing (6.5%), and to avoid heart or lung disease (3.9%). The major reasons for continuing to run are also displayed in Table 3. While the rankings changed very slightly, health improvement remained the prime consideration.

The runners reported that they run a mean of 6.3 (SD 0.9) days per week, with 42% running 5 or 6 days and 53% running 7 days a week. This group also reported running a mean of 49.5 (SD 19.3) miles per week, with 47% between 26 and 50 miles and 40% more than 50 miles weekly.

Table 3

Motivation for Having Begun to Run and for
Continuing to Run as Reported by
the Respondents

Variables	Runners	
	<u>n</u>	%
<u>Reason began running:</u>		
To improve overall health	28	36.3
To compete in races	21	27.3
To control weight	14	18.2
For fun or socializing	5	6.5
To avoid heart or lung disease	3	3.9
Other	5	6.5
Missing	<u>1</u>	<u>1.3</u>
Total	77	100.0
<u>Reason for continuing to run:</u>		
To improve overall health	29	37.6
To compete in races	27	35.1
To control weight	9	11.7
To avoid heart or lung disease	3	3.9
For fun or socializing	2	2.6
Other	4	5.2
Missing	<u>3</u>	<u>3.9</u>
Total	77	100.0

Forty percent of the runners said that they always warm up prior to running, with only 4% reporting that they never did this. While 35% reported that they always cooled down after a run, 9% said that they never did so.

Of the runners, 46% reported that they weigh less than the commonly accepted ideal for their height. Further, fully 17% said that they frequently increased the vigor

of their workouts following a perceived dietary indiscretion, and 32% did so sometimes.

The majority (78%) of the runners reported running competitively five or more times a year. Only 18% of the runners said that they never ran with pain or while ill. While 97% had experienced at least one running-related injury, 73% had sustained more than one. Table 3 shows that the most frequently occurring injuries were to the foot (49.4%) and the knee (45.5%). Of those who had sustained running-related injuries, 47% had to stop running entirely for a period of time and an additional 5% required hospitalization.

Table 4

Sites and Frequencies of Running-related Injuries
Reported by the Respondents

Variable	Runners	
	<u>n</u>	%
<u>Site of injury:</u>		
Foot	38	49.4
Knee	35	45.5
Upper leg	22	28.6
Lower leg	21	27.3
Ankle/Achilles tendon	20	26.0
Hip	19	24.7
Lower back	11	14.3
Groin	9	11.7
No injury	2	2.6

Finally, the runners were asked how they felt when they were unable to run, with responses shown in Table 5. More than half of them expressed feelings of anxiety, nervous energy, guilt, depression, and unhealthiness. Forty-two percent reported feeling fat or bloated.

Table 5
Typical Feelings When Unable to Run as Reported
by the Respondents

Variable	Runners	
	<u>n</u>	%
<u>Typical feeling:</u>		
Unhealthy, losing conditioning	56	72.7
Anxious, lots of nervous energy	45	58.4
Guilty, depressed	43	55.8
Fat, bloated	32	41.6
Other	6	7.8

Findings

The first hypothesis stated: There is a difference between runners and non-runners in the relative value placed on personal health. This was measured by the Health Value Scale, which is Section I of the questionnaire (Appendix A). For the combined samples, 112 placed a high value on personal health, 19 moderate value, and 9 low value. When the overall results are broken down into the two sample groups, differences can be seen (Table 6). Of

Table 6

Relative Value Placed on Health by Runner and
Non-runner Respondents

Variable	<u>Runners</u>	<u>Non-runners</u>	<u>Both samples</u>
	<u>n</u>	<u>n</u>	<u>n</u>
<u>Value placed on health:</u>			
High (score 1-4)	68	44	112
Moderate (score 5-7)	7	12	19
Low (score 8-10)	<u>2</u>	<u>7</u>	<u>9</u>
Total	77	63	140

Note. Relative value placed on health was measured by an ordinal scale, in which health is ranked against nine other terminal values, and may be assigned a position of from 1 through 10.

the runners, 68 valued health highly, 7 moderately, and 2 lowly. Examining the non-runner sample, 44 placed a high value on health, 12 moderate, and 7 low.

Although the results of the Health Value Scale measurements were grouped for display and reporting, it is an ordinal scale and therefore was tested with the Mann-Whitney U. The value of U was found to be 1876.5 and of U', 4990.5. The level of significance had been set at .05. The two-tailed p value calculated was .019, and therefore the null hypothesis was rejected: There was

a greater value placed on personal health by the group of runners in this study than by the non-runners.

The second hypothesis stated: There are differences in the number of specific health-related behaviors undertaken by runners and those undertaken by non-runners. This was measured by the WHBQ, which is Section II of the questionnaire (Appendix A). For the combined samples, the mean number of behaviors undertaken was 35.2 (SD 8.7). For the group of runners, the mean was 37.9 (SD 8.1) and for the non-runners, 31.9 (SD 8.4). The grouped results are displayed in Table 7.

Table 7

Health-Related Behaviors Routinely Undertaken
by the Runner and Non-runner Respondents

Variable	<u>Runners</u>	<u>Non-runners</u>	<u>Both samples</u>
	<u>n</u>	<u>n</u>	<u>n</u>
<u>Proportion of behaviors:</u>			
High (score 41-60)	24	10	34
Moderate (score 21-40)	52	46	98
Low (score 0-20)	<u>1</u>	<u>7</u>	<u>8</u>
Total	77	63	140

Note. Health-related behaviors were measured by a 60 item, interval/ratio level questionnaire, each item to be circled if it is generally true of the subject's lifestyle.

The data were grouped into categories of high (score 41-60), moderate (21-40), and low (0-20) quantities of behaviors. The combined samples broke down into 34 performing high numbers of behaviors, 98 moderate numbers, and 8 low numbers. Of the runners, 24 fell into the high category, 52 moderate, and 1 low. Examining the non-runner group, 10 were in the high category, 46 moderate, and 7 low.

Although the results of the WHBQ were grouped for display and reporting, it is an interval/ratio level tool, and was tested with the two-sample t-test for independent samples. The level of significance was set at .05. A t value of 4.34 was obtained, and at 138 degrees of freedom, it was found to be significant at p=.001. The null hypothesis was therefore rejected: There were greater quantities of health-related behaviors undertaken by the group of runners in this study than by the group of non-runners.

The subsections of the WHBQ were scrutinized, with three representing the major differences between groups. The nutrition subsection, containing 13 items, had a mean of 7.5 (SD 2.9) items for the runners and 5.7 (SD 2.7) for the non-runners. The exercise subsection, totalling 6 items, showed a mean of 4.6 (SD 1.1) in the runner group and 2.4 (SD 1.7) in the non-runner group. Finally, the medical awareness/self-care subsection, having 14 items,

showed a mean of 7.6 (SD 2.7) for the runners and 6.3 (SD 2.5) for the non-runners. The remaining subsections, drugs and addictive substances, psychological factors, and safety factors, did not reveal major differences.

Although both hypotheses tested out significantly and with positive correlations to running, the effects of potentially strong extraneous variables had to be assessed also. Demographic variables and perception of personal health status were first examined.

To summarize previous statements, the group of runners tended to be older, contained proportionately more males and fewer non-whites, were more likely to be married, and had higher household incomes than the non-runner group. The runners also perceived their personal health status to be better than did non-runners. There were no major differences found in proportions of educational degrees attained.

Using Chi-square tests ($\alpha=.05$), these variables were assessed for possible correlations with responses to the two measures used to collect data for the hypothesis testing, the Health Value Scale and the WHBQ. With one exception, none of the Chi-square tests indicated significant correlations. However, for the group of non-runners, the age of the respondent influenced responses on the WHBQ ($p=.001$). The majority of those non-runners aged

30 and under (81.6%) reported moderate numbers of health-related behaviors performed.

The variables measured by Section III of the questionnaire (Appendix A), which applied only to the group of runners, had some influence on responses to the study's two main measures. These correlations were assessed with Chi-square tests ($\alpha=.05$). Several significant correlations were found as follows.

Responses to the WHBQ were influenced by the respondents' motivation for continuing to run ($p=.001$). Most (81.5%) of those who run for competitive purposes reported moderate numbers of health-related behaviors. Similarly, 69% of those who run to improve overall health fell into the moderate category.

Responses to the WHBQ were also influenced by the number of days per week the respondents run ($p=.001$). Most (73.2%) of those who ran 7 days a week reported moderate numbers of health-related behaviors.

The remaining variable which influenced responses to the WHBQ was the frequency with which the individuals ran with pain or while feeling ill ($p=.003$). Of those who reported doing so sometimes, 79.1% fell into the moderate category.

In examining the responses to the Health Value Scale, significant correlations were found with the runners'

typical warming-up behavior ($p=.037$). Of those who stated that they always warmed up and stretched prior to running, 90.3% placed a high value on health.

Summary

This chapter described the analysis of data obtained in this study. The two samples were described in terms of demographic variables and personal perception of health. The measures used to test the two hypotheses were described. It was found that in each case the null hypothesis could be rejected, and that the runners in this study placed a higher value on personal health and performed more health-related behaviors than the non-runners. Finally, the analysis of potential influences from extraneous variables was outlined, and those few found to have statistically significant effects were identified.

CHAPTER 5

SUMMARY OF THE STUDY

This study was conducted to determine if runners differed from non-runners in selected health beliefs and behaviors. Two hypotheses were tested based on the problem of study. The first hypothesis was that there is a difference between runners and non-runners in the relative value placed on personal health. The second hypothesis was that there are differences in the number of specific health-related behaviors undertaken by runners and those undertaken by non-runners.

Summary

The samples for the study were drawn from a local running club and from the Student Directory of a local university. From the university, 150 subjects were randomly selected. From the running club, the entire membership was sampled, with the exception of 15 who were randomly selected to comprise a portion of the pilot group. This yielded a total of 150 from the running club.

The independent variable, the status of being a runner, was measured with initial items outlined in Section III of the questionnaire. These items determined the number of

days and miles per week the subjects ran. To meet the criteria defining a runner, the subject had to run a minimum of three days a week, two miles a session.

The first dependent variable, relative value placed on health, was measured using the Health Value Scale adapted from Rokeach by Wallston (cited by Pender, 1982). Each subject was asked to rank ten terminal values, including health. This yielded an ordinal score for each subject, and also placed each into one of three groups: high, moderate, or low value placed on health.

The second dependent variable, quantity of health-related behaviors undertaken, was measured using the investigator-designed Walsh Health Behaviors Questionnaire (WHBQ), which was synthesized from a variety of sources. The WHBQ consists of 60 items, each of which was to be circled by the subject if it was generally true of the individual's lifestyle. The items are positive behaviors which relate to six areas: nutrition, exercise, drugs and addictive substances, psychological factors, safety factors, and medical awareness/self-care. Tallying the number of responses by each subject yielded an interval/ratio score, and also placed each individual into one of three groups: those performing high, moderate, or low numbers of health-related behaviors.

The first hypothesis of the study, that runners place a different value on health than do non-runners, was tested using the Mann-Whitney U, and was statistically supported at the .05 level, $p=.019$. The second hypothesis, that runners perform a different number of health-related behaviors than do non-runners, was tested with the two-sample t-test for independent samples, and was also statistically supported at the .05 level, $p=.001$. Three subsections of the WHBQ represented the major differences in scores of the runner and non-runner groups: nutrition, exercise, and medical awareness/self-care.

Finally, the influence of potentially strong extraneous variables was examined, using Chi-square tests ($\alpha=.05$). Tested were demographic variables, perception of personal health status, and miscellaneous runner training factors. Within the group of non-runners, the age of the respondent influenced responses to the WHBQ ($p=.001$). Within the group of runners, one variable was found to significantly influence responses to the Health Value Scale, that being their typical warming-up behavior ($p=.037$). Several training factors significantly influenced responses of the runners to the WHBQ. They were the subject's motivation for continuing to run ($p=.001$), the number of days per week the individual runs ($p=.001$), and the frequency with which the person runs with pain or while feeling ill ($p=.003$).

Discussion of Findings

The stimulus for this study was the growing concern evidenced in the literature that runners, in some cases, are doing so to their detriment (Berson, 1978; Gumby, 1981; Hartung & Farge, 1981; Morgan, 1979; Norval, 1980; Yates, Leehey, & Shisslak, 1983). In comparing this study's group of runners with the group of non-runners, some of those concerns were borne out, others were not.

It was found that runners placed a significantly higher value on personal health than did the non-runners. No previous research, however, was found with which to compare this measurement.

It was also found that runners performed significantly greater numbers of health-related behaviors than did the non-runners. This might have been anticipated in light of the findings from the Framingham study (Dawber, 1980) and from the study by Paffenbarger and colleagues (1977). However, both of those studies focused on hypotheses that differed from this one, and the information derived from them regarding health behaviors of runners was limited and inferential at best. Also, one problem with the WHBQ was that the majority of the subjects fell into the moderate category. The test might have been more visually discriminative had the WHBQ been divided into four categories, rather than three.

Some researchers (Kerner & D'Amico, 1983; Kirby & Valmassy, 1983; Riddle, 1980) found that the training factors outlined in Section III of the questionnaire (Appendix A) influenced specific health behaviors. However, the few significant influences by the extraneous variables in this study may have been spurious. More confidence could be placed in these findings with replication and larger samples.

Section III of the questionnaire (Appendix A) yielded some information consistent with the value placed on health by runners. The runners most often said that they both began (36.3%) and continued (37.6%) to run in order to improve overall health. Other common reasons for running included weight control and avoidance of heart or lung disease, both of which can be related to placing a high value on health.

Several areas for concern can be identified. Fully 53.2% of the runners run every day of the week. Closely related was the finding that 79.2% run while ill or in pain at least some of the time. Only 2.6% had never sustained a running-related injury. Further, the majority felt anxious, guilty, depressed, and unhealthy when unable to run, and a large proportion reported that they felt fat or bloated under these circumstances. All of these findings are in keeping with descriptions of compulsion and

addiction to running within this population (Hartung & Farge, 1981; Morgan, 1979; Yates et al., 1983).

Most runners reported that they warmed up prior to running. However, 9.1% said that they never consciously cooled down afterwards, a practice which some researchers (Virmani, Robinowitz, & McAllister, 1982) have linked to atraumatic death from coronary factors following running.

Also within this group of runners, 46.1% weigh less than the commonly accepted ideal for their height, and 49.3% at least sometimes increased the vigor of their workout following a perceived dietary indiscretion. These two characteristics were identified by Yates and his colleagues (1983) in their descriptions of obligatory runners, when they pointed out the resemblance to female anorexics.

Finally, in examining the types of injuries this group of runners sustained, the most common ones (knee injuries at 45.5% and foot injuries at 49.4%) were the same as those reported in the literature (Kerner & D'Amico, 1983; Nilsson, 1982; Nix, 1982). Of the runners who reported having been injured, only 9.3% indicated that they did not have to limit their running because of the injury. This is comparable to incapacitation rates reported by Lutter (1982).

Although it might have been suspected that the runners in this study would represent the extreme ends of the scales in terms of mileage and other factors just outlined, this was not found to be the case where verifiable norms are available. The only way in which they differed from published averages was in the frequency of competition category. While 77.9% of this sample of runners reported running competitively five or more times annually, most runners do so only one to two times per year (Koplan et al., 1982). In terms of factors which have been measured and published, it appears that runners in this study were for the most part typical of runners across America.

It must also be noted that the non-runners in this study may have routinely pursued other forms of athleticism, such as swimming or bicycling. Similarly, there was no stipulation that the runners be limited to running as their sole form of exercise. Sampling frame alterations and more stringent controls might have produced differing results.

Conclusions and Implications

Based upon the findings of this study, the following conclusions were reached:

1. Persons who run regularly place a statistically significantly higher value on health than those who

do not.

2. Persons who run regularly perform statistically significantly greater numbers of health-related behaviors than those who do not.
3. Several areas of concern regarding runners included their neglect of a day off every week, the frequency with which they run while ill or in pain, the occurrence of running-related injuries, their feelings when unable to run, the neglect of a cool-down period, their weight levels, and the tendency to increase workouts after perceived dietary indiscretions.

These conclusions have several implications. In general, health practitioners perceive that the person who runs places a higher value on personal health and does more to achieve a healthy state. This seems to have been borne out by this study. However, the WHBQ measures basic health behaviors and does not address health habits which are specific to runners or other athletes. When such factors as those are considered, several maladaptive health behaviors can be identified. Therefore, the assumption that better overall health care routines exist in the running population should not be made.

The specific problem areas which were found in this study were also identified in other research previously mentioned, and therefore, confidence in the findings is

high. Each problem has implications for nursing, in terms of assessment and intervention.

It is very likely that the runner will require dietary practice assessment and counseling, since it is common to find an emphasis on leanness and strict weight control practices which may be hazardous. A period of convalescence following illness or injury, with its attendant weight gain, might stimulate the runner to resume running prematurely and so jeopardize recovery.

By virtue of its addictive nature, running might be seen as more rewarding than following a plan for activity limitation, whether the purpose of the plan is to prevent injury or facilitate recovery. This is especially important in light of the runner's tendency to run despite pain, in order to achieve mileage or other types of goals the individual has set. Any runner may require assistance in formulating and adhering to a reasonable training program, taking into account ability, health problems, motivation, and personal goals. The health care practitioner must often find creative ways in which to emphasize the importance of adhering to the plan, and the nurse should be aware of the signs of compulsion and obsession within this population.

Nurses who encounter runners or who can otherwise make an impact on their behavior, as with mass media

presentations, community health screenings, or pre-race events, should be conversant with abnormal signs and symptoms relating to early stages of injury and be able to communicate these to the runner. Stress fractures, for example, develop insidiously and often masquerade as simple strains or episodic overuse pain. Unless the differentiation is made, the injury may progress to the point where running is totally contraindicated until healing is well underway. The runner needs to know that running while ill creates more hazards than benefits. Similarly, the importance of the cool-down period following running is just beginning to be well communicated. The nurse involved in the screening or treatment of a runner, particularly one with coronary risk factors, should teach this to the runner. In dealing with negative feelings, the nurse can assess the runner and determine who might need counseling by a mental health professional experienced in sports medicine, and make the referral.

Recommendations

Based upon the conclusions and their implications, the following recommendations for further study are proposed:

1. Replication of this study using larger samples would add confidence to the findings.

2. Revision of the WHBQ scoring categories into four groups would make the test more visually discriminative, particularly in the center scores.
3. Replication of this study and comparing runners with other single-sport enthusiasts would help determine if similar health concerns exist in those groups as well.
4. Formulation and publication of more nursing research studies into health beliefs and behaviors of runners is vital to nursing practice, considering the popularity of running.

APPENDIX A
QUESTIONNAIRE

Demographic Information

Age: _____

Sex: _____

Ethnicity (check one):

_____ White (not of Hispanic origin)

_____ Black (not of Hispanic origin)

_____ Hispanic origin

_____ American Indian/Alaskan Native

_____ Oriental/Asian

_____ Other (specify): _____

Marital status (check one):

_____ Never married

_____ Married

_____ Divorced

_____ Widowed

_____ Separated

Gross annual household income (check one):

_____ Below \$10,000

_____ \$10,000 to \$19,999

_____ \$20,000 to \$39,999

_____ \$40,000 and over

In general, how would you describe your health? (check one):

_____ Poor

_____ Fair

_____ Good

_____ Excellent

Section I

Below is a list of ten values, in alphabetical order. Please arrange them in order of their importance to you, as guiding principles in your life. Pick out the value that is the most important to you, then write the number "1" next to it. Then pick out the value that is second-most important, and write the number "2" next to it. Continue similarly until you have numbered them all from 1 through 10. It might be difficult to distinguish the importance of some of the values, but please do your best. The end result should show how you truly feel.

- _____ A COMFORTABLE LIFE (a prosperous life)
- _____ AN EXCITING LIFE (a stimulating, active life)
- _____ A SENSE OF ACCOMPLISHMENT (lasting contribution)
- _____ FREEDOM (independence, free choice)
- _____ HAPPINESS (contentedness)
- _____ HEALTH (physical and mental well-being)
- _____ INNER HARMONY (freedom from inner conflict)
- _____ PLEASURE (an enjoyable, leisurely life)
- _____ SELF-RESPECT (self-esteem)
- _____ SOCIAL RECOGNITION (respect, admiration)

Section II

For each of the statements which follow, respond according to your usual day and what you normally do. If the item is true for you, circle the number. If the statement reflects what you rarely or never do, do not circle the number. Respond in a manner which reflects your lifestyle, and not what you think you should do. There is a section at the end for any comments you might wish to make.

1. I know what the basic four food groups consist of.
2. I plan and eat my daily meals based on the basic four food groups.
3. I limit the amount of fat and cholesterol in my diet.
4. I limit my intake of salt.
5. I limit the amount of sugar in my diet.
6. I limit my intake of caffeine(found in coffee, tea, many soft drinks, and over-the-counter medicines).

7. I maintain adequate roughage (fiber) in my diet.
8. I avoid eating meals at "fast food" restaurants.
9. I eat breakfast daily.
10. I do not snack between meals.
11. I take vitamins, but not in large doses.
12. I read the labels for ingredients in the foods I buy, and shop accordingly.
13. I maintain the desired weight for my height, avoiding both underweight and overweight.
14. I do some type of vigorous, aerobic exercise (running, walking, swimming, bicycling, rope-skipping, etc.) at least 3 times a week, at least 20 minutes each session.
15. I do some type of non-aerobic exercise (calisthenics, tennis, weight-lifting, etc.) at least 3 times a week, at least 20 minutes each session.
16. I perform stretching exercises at least 3 times a week, to increase flexibility.
17. I exercise consistently throughout the year, and not just portions of it.
18. Physical activity is a large part of my daily routine at work, home, school (walking, using stairs, lifting, etc.).
19. I maintain good posture when sitting or standing.
20. I do not smoke (tobacco, marijuana, etc.).
21. I have never smoked (tobacco, marijuana, etc.).
22. I drink no more than two alcoholic beverages per day.
23. I am careful not to drink alcohol while taking certain drugs (for sleeping, pain, colds, allergies, etc.).
24. I avoid using alcohol or other drugs as a way of handling stressful feelings or problems in my life.
25. I read and follow the label directions when using prescribed or over-the-counter medicines.
26. I destroy old or unused medicines.
27. I have close friends, relatives, or others with whom I can talk about personal matters or call on for help.
28. It doesn't bother me if tasks are leftover at day's end.
29. I have a job or other work which I enjoy.

30. I have taken at least 2 weeks vacation in the past year.
31. I don't worry too much about things which aren't important.
32. I don't easily become impatient if made to wait.
33. I find it easy to express my feelings freely.
34. I think I get enough relaxation.
35. I engage in hobbies I enjoy (music, reading, painting, sports, etc.) to help relieve stress and tension.
36. I am not often upset (depressed, angry, nervous, etc.).
37. I live by strong personal principles, religious or otherwise.
38. I wear a seat belt when riding in a car.
39. I obey traffic rules and the speed limit when driving.
40. I avoid driving while under the influence of alcohol or other drugs.
41. I do not smoke in bed.
42. I avoid parts of the city with a lot of crime.
43. I have a first aid kit in my home.
44. I keep emergency phone numbers near the phone.
45. I am careful when using potentially harmful products or substances (such as household cleaners, poisons, and electrical devices).
46. I check the condition of home appliances and cars, and have broken items fixed right away.
47. I see a doctor for a regular check-up.
48. I know the seven cancer warning signals.
49. I observe my body monthly for cancer danger signs.
50. I protect my skin from excessive sun exposure.
51. I avoid getting chilled.
52. I sleep 7 hours a night (not $1\frac{1}{2}$ more or less).
53. I do not take laxative medications.
54. I avoid areas with a lot of pollution.
55. I read articles or books about promoting health.
56. I am aware of what my blood pressure and pulse should be.

57. I see a dentist for a regular check-up.
58. I brush my teeth daily with a fluoride toothpaste and a soft toothbrush.
59. I use dental floss daily.
60. I have an eye examination on a regular basis.

Comments: _____

Note:

Please complete the remaining section if you run or jog at least 3 times a week, for a minimum of 2 miles each session.

THANK YOU very much for your help. Please return this form in the envelope provided. Remember to write any questions or requests for results on a separate piece of paper, with your name and address. The paper will be removed from this form prior to reading, thus protecting your identity.

Section III

Please complete these last questions if you run or jog at least 3 days a week, for a minimum of 2 miles each session. Answer the questions according to your usual running behavior. Do not take into account any special activity or training which you undertake infrequently. There is a section at the end for any comments you might wish to make.

1. How long have you been running? _____
2. What was the main reason you began running? (check one):
- _____ To improve overall health
 - _____ To avoid heart or lung disease
 - _____ To control weight
 - _____ For fun or socializing
 - _____ To compete in races
 - _____ Other (specify): _____
3. What is your main reason for continuing to run? (check one):
- _____ To improve overall health
 - _____ To avoid heart or lung disease
 - _____ To control weight
 - _____ For fun or socializing
 - _____ To compete in races
 - _____ Other (specify): _____
4. How many days a week do you run? _____

5. How many miles a week do you average? _____
6. Do you warm up and stretch prior to running?
 _____ Never _____ Sometimes _____ Usually _____ Always
7. Do you cool down and stretch after running?
 _____ Never _____ Sometimes _____ Usually _____ Always
8. Do you weigh less than the commonly accepted ideal level for your height? _____ Yes _____ No
9. Do you ever increase the vigor of your workout or your mileage when you feel you have overeaten?
 _____ Never _____ Sometimes _____ Frequently
10. How many times a year do you run competitively?
 _____ 0 _____ 1 - 2 _____ 3 - 4 _____ 5 or more
11. Do you run with pain or while ill?
 _____ Never _____ Sometimes _____ Frequently
12. In what body areas have you experienced running injuries? (check all that apply):
 _____ None _____ Hip _____ Upper leg _____ Knee
 _____ Lower leg _____ Ankle _____ Foot
 _____ Other (specify): _____
13. Were any of these injuries severe enough to require (check all that apply):
 _____ Hospitalization
 _____ No participation in running
 _____ Very limited participation in running
14. When you are unable to run, do you typically feel any of the following ways? (check all that apply):
 _____ Anxious, lots of nervous energy
 _____ Guilty, depressed
 _____ Fat, bloated
 _____ Unhealthy, losing conditioning
 _____ Other (specify): _____
- Comments: _____

Again, thank you for your help! Please return this form in the envelope provided. Remember to write any questions or requests for results on a separate piece of paper, with your name and address. The paper will be removed from this form prior to reading, thus protecting your identity.

APPENDIX B
AGENCY APPROVALS



University of Houston
Central Campus
 Houston, Texas 77004

Committee for the Protection
 of Human Subjects
 713-749-3412

January 9, 1984

Ms. Valerie R. Walsh
 7605 Phoenix Drive #630
 Houston, Texas 77030

Dear Ms. Walsh:

On December 15, 1983, the University of Houston Committee for the Protection of Human Subjects approved your request for exemption under category 3 for your proposal entitled, "Runners and Non-runners: Health Beliefs and Practices", pending modification of your proposed procedures/documents.

The changes you have made adequately meet the modification criteria made by the Committee. As long as you continue this project or the procedures described in this project, you do not have to reapply to this Committee for review. However, if you significantly change the procedures described in the above-referenced proposal, you should contact Ms. Laurel Kuhner Berker at x3412 prior to initiation of any changes in order to ascertain whether or not reapplication will be necessary.

If you have any additional questions, please contact Ms. Berker, Office of Sponsored Programs, at x3412.

Sincerely yours,

Stuart Feldman

Stuart Feldman, Chair
 University of Houston Committee
 for the Protection of Human
 Subjects

SF:ms

PLEASE NOTE: All subjects must receive a copy of the informed consent document. You must retain copies of informed consents which require subject signatures for a minimum of 5 years.

Approval from Director of running club:

Dec 1, 1983

Valerie,

Enclosed list of
Harrier members. You
probably should say in
your covering letter that
you have my permission
to obtain this info. from
club members.

Yours
Jim Melatchie

8818 Birdwood

~~Hauslin~~
7774

APPENDIX C
COVER LETTERS

Dear Runner:

Recently, there has been growing concern that runners may have health care needs that are not recognized, and therefore neglected. It is only by knowing what people are actually doing that steps can be taken to help.

That is why you are being invited to participate in a research study of health habits, being conducted by this nursing Master's student at Texas Woman's University. Your help will enable me to identify ways in which doctors and nurses can better serve your needs. You must be 18 years or age or over to participate.

Permission to gather this information has been given to me by the Director of your running club. You are asked to complete the enclosed form and return it in the stamped envelope which is included for your convenience. Since your time is valuable, every effort was made to keep the form brief and quick to fill out. Completion and return of the form are the only efforts which are asked of you, and will take at most 20 minutes.

Your help is purely voluntary, and you are free to decline. However, if you choose to participate, you will help a great deal. Some persons might feel uncomfortable with a couple of the questions. All responses will be kept anonymous and confidential. The information obtained will only be used for the purposes of this research project, and no one but myself will see the completed forms. The information will be used on a group basis only, with no one in any way identified. After the information is collected, the forms will be destroyed. This project has the approval of the Thesis Committee of Texas Woman's University, under the Human Subjects Review Committee guidelines.

In order to assure protection of your identity, do not sign or put any identifying marks on the form or the envelope. If you have any questions, write them down on a separate piece of paper, with your name and address, and return to me in the enclosed envelope. This piece of paper will be removed from the questionnaire before reading either, thus protecting your identity. Any questions will be promptly answered. Group results from this study will be communicated to your running club Director, in order that he may share them with you.

This study, like all research, depends on persons like you for help. You may also benefit more immediately by gaining some insight into your personal health habits. Thank you very much!

COMPLETION AND RETURN OF THIS FORM IMPLIES CONSENT TO PARTICIPATE IN THIS STUDY.

Valerie R. Walsh

Valerie R. Walsh, RN, BSN
7605 Phoenix Dr. #630, Houston, TX 77030

Dear Student:

Recently, there has been growing concern that certain groups of persons may have health care needs that are not recognized, and therefore neglected. Only by knowing what people are actually doing can we take steps to help.

That is why you are being invited to participate in a research study of health habits, being conducted by this nursing Master's student at Texas Woman's University. Your help will enable me identify ways in which doctors and nurses can better serve your needs. You must be 18 years of age or older to participate.

Your name was selected at random from the enrollment of your university. You are asked to complete the enclosed form and return it in the stamped envelope provided for your convenience. Since your time is valuable, every effort was made to keep the form brief and quick to fill out. Completion and return of the form are the only efforts which are asked of you, and will take at most 20 minutes.

Your help is purely voluntary, and you are free to decline. However, if you choose to participate, you will help a great deal. Some persons might feel uncomfortable with a couple of the questions. All responses will be kept anonymous and confidential. The information obtained will only be used for the purposes of this research project, and no one but myself will see the returned forms. The information will be used on a group basis only, with no one in any way identified. After the information is collected, the forms themselves and the list from which your name was drawn will be destroyed. This project has the approval of the Thesis Committee of Texas Woman's University, under the Human Subjects Review Committee guidelines.

In order to assure protection of your identity, do not sign or put any identifying marks on the form or the envelope. If you have any questions, write them down on a separate piece of paper, with your name and address, and return to me in the enclosed envelope. This piece of paper will be separated from the questionnaire before reading either, thus protecting your identity. Any questions will be promptly answered. If you wish to receive a copy of the group results from this study, let me know in a similar fashion. Finally, if you do not wish to fill out this form, it would be helpful if you would return it anyway, in the enclosed envelope.

This study, like all research, depends on persons like you for help. You may also benefit more immediately by gaining some insight into your personal health habits. Thank you very much!

COMPLETION AND RETURN OF THIS FORM IMPLIES CONSENT TO PARTICIPATE IN THIS STUDY.

Valerie R. Walsh
Valerie R. Walsh, RN, BSN
7605 Phoenix Dr. #630, Houston, TX 77030

APPENDIX D
INSTRUMENT PERMISSION

VANDERBILT UNIVERSITY



NASHVILLE, TENNESSEE 37240

TELEPHONE (615) 322-7311

Health Care Research Project • School of Nursing • Direct phone 322-2320

Dear Colleague:

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

You have our permission to utilize the scales in any health related research you are doing. Our only request is that you keep us informed of any results you obtain using the scales. In that way we hope to continue to serve as a clearinghouse for information about the scales.

We recommend using the more recently developed Multidimensional Health Locus of Control Scales (Health Education Monographs, 6, Spring, 1978, pp. 160-170) over the earlier, unidimensional HLC Scale (Journal of Consulting and Clinical Psychology, 1976, 44, 580-585), since the newer measures are psychometrically superior and potentially more useful.

If you wish to be added to our mailing list or want us to send you additional material, please complete the enclosed interest questionnaire. We hope to periodically send additional material related to use of these scales as it becomes available.

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

Sincerely,

Kenneth A. Wallston, Ph.D.
Professor of Psychology
in Nursing
School of Nursing
Vanderbilt University
Nashville, TN 37240
(615) 322-2813

Barbara Strudler Wallston, Ph.D.
Professor of Psychology
George Peabody College
of Vanderbilt University
Nashville, TN 37203
(615) 322-8220

What to do with the MHLC scores once you get them. KAW/March 1983

The whole purpose of the Multidimensional HLC Scales is that you do not end up with a single score indicative of internality or externality. Instead, you end up with three scores: IHLC, PHLC, & CHLC--the first assessing "internality," and the other two separate aspects of "externality." They should not be combined into one measure.

If it is important for your hypothesis to be able to classify someone as "internal" or "external," or if you wish to use analysis of variance to analyze your data, there are a couple of options available to you, none of which is necessarily the "best" way.

One option is to pick any one of the three scores--say, IHLC, for example--and split it at the median into two groups: e.g., "high internals" and "low internals" (note that this latter group is not necessarily "external," because it could contain some subjects who also score low on the PHLC and/or the CHLC). You could do this with any one of the three scales.

Another approach is to convert all your raw scale scores into standard (z or T) scores and label a given subject as an "internal," "powerful others external," or "chance external," depending on which of the subject's three standardized scores is the highest.

A third option, one that we are beginning to use with increasing frequency, is to do median splits on all three scales and to classify subjects into one of eight "types" depending on their pattern of being above ("high") or below ("low") the median of the scales. (This typology was first addressed in our chapter in the Sanders & Suls book, 1982.) Only one of these eight types (high on IHLC, low on both PHLC & CHLC) can be called "pure internal," but some of the other types which contain a mixture of internality and externality are theoretically quite interesting. At first glance, this third method appears to need a large number of subjects in order to be useful, but this turns out not to be the case. You don't, after all, need to include all eight types in your analysis.

Whichever method you choose to classify your subjects, remember that you can (and often should) analyze your data factorially by crossing HLC category with health value. Again, you can split health value anyway you wish, but we usually do a median split based on sample rank frequencies. (See our work on using the Value Survey to measure health value for further help with this.)

What if you wish to analyze your data using regression (i.e., correlational) statistics? In this case, you can treat each MHLC Scale as a continuous variable and use parametric statistics such as Pearson Product-Moment correlations or other applicable statistics. Multiple linear regression statistics are frequently employed with the three MHLC Scales as separate predictors.

Again, when appropriate, we advocate the use of a measure of health value in interaction with the MHLC scores when doing regression analyses. To create a multiplicative score between one of the MHLC scales and Health Value (HV), do it in the following manner (depending on which MHLC scale is being used and the population being studied). First, using the computer, standardize scores on all of the variables that will be multiplied. We use T-scores (rather than z-scores) to eliminate the negative signs (since two big negative numbers multiplied together result in one big positive product). Secondly, decide which way to score HV. (When multiplying IHLC and HV, the decision is to score HV so that Health, when ranked 1st, is "10." When CHLC is used, HV must be reversed, i.e., Health ranked 1st = "1"). The ambiguity is with PHLC. With "normal" subjects, treat PHLC as an "external" dimension and deal with it as CHLC: with subjects who have a chronic, long-term disease (such as arthritis, hypertension, diabetes) where it is important for the patient to work interdependently with health care providers and others, PHLC should be treated the same way as "internality" and should be multiplied by HV with high = "10." There is no absolute right way to do this.

REFERENCES

- Becker, M. H. (Ed.). (1974). The Health Belief Model and personal health behavior. Thorofare, NJ: Charles B. Slack.
- Becker, M. H., Haefner, D. P., Kasl, S. V., Kirscht, J. P., Maiman, L. A., & Rosenstock, I. M. (1977). Selected psychosocial models and correlates of individual health-related behaviors. Medical Care, 15(5 suppl.), 27-46.
- Berson, B. L. (1978, August 21). Woes of the weekend jock. Time, pp. 40, 50.
- Blair, S. N., Ellsworth, N. M., Haskell, W. L., Stern, M. P., Farquhar, J. W., & Wood, P. D. (1981). Comparison of nutrient intake in middle-aged men and women runners and controls. Medicine and Science in Sports and Exercise, 13, 310-315.
- Boileau, M., Fuchs, E., Barry, J. M., & Hodges, C. V. (1980). Stress hematuria: Athletic pseudonephritis in marathoners. Urology, 15, 471-474.
- Boyden, T. W., Pameter, R. W., Grosso, D., Stanforth, P., Rotkis, T., & Wilmore, J. H. (1982). Prolactin responses, menstrual cycles, and body composition of women runners. Journal of Clinical Endocrinology and Metabolism, 54, 711-714.
- Callen, K. E. (1983). Mental and emotional aspects of long-distance running. Psychosomatics, 24, 133-134, 139, 141, 144-145, 148-150.
- Cantu, R. C. (Ed.). (1981). Health maintenance through physical conditioning. Littleton, MA: PSG Publishing.
- Chamber of Commerce. (1983). Houston area population: 1960-2000. Houston, TX: Chamber of Commerce.
- Cherner, R. (1983, September 21). Texan's birthday present: Fifty marathons in 50 weeks. USA Today, p. 10C.

- Dawber, T. R. (1980). The Framingham Study: The epidemiology of atherosclerotic disease. Cambridge, MA: Harvard University Press.
- Evans, D. (1979). Physical fitness and the nurse today. Unpublished master's thesis, Texas Woman's University, Denton, TX.
- Fecteau, D. (1984). Athletic heart syndrome: Differentiating normal physiologic changes from pathologic changes. Dimensions of Critical Care Nursing, 3, 134-139.
- Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention, and behavior. Reading, MA: Addison-Wesley.
- Fogoros, R. N. (1980). "Runner's trots": Gastrointestinal disturbances in runners. Journal of the American Medical Association, 243, 1743-1744.
- Folkins, C. H., & Sime, W. E. (1981). Physical fitness training and mental health. American Psychologist, 36, 373-389.
- Glaves, J. F. (1982). The relationship between lifestyle practices and absenteeism. Unpublished master's thesis, Texas Woman's University, Denton, TX.
- Gumby, P. (1981). Increasing numbers of physical changes found in nation's runners. Journal of the American Medical Association, 245, 547-548.
- Harris, D. M., & Guten, S. (1979). Health protective behavior: An exploratory study. Journal of Health and Social Behavior, 20, 17-29.
- Hartung, G. H., & Farge, E. J. (1981). Compulsive or excess sports. In S. J. Mule (Ed.). Behavior in excess: An examination of the volitional disorders (pp. 297-309). New York: The Free Press.
- Hunding, A., Jordal, R., & Paulev, P. (1981). Runner's anemia and iron deficiency. Acta Medica Scandinavica, 209, 315-318.
- Ibrahim, M. A. (1983). In support of jogging. American Journal of Public Health, 73, 136-137.

- Kam, J. K. (1980). Carboxyhemoglobin levels between jogging and non-jogging smokers. Experientia, 36, 1397-1398.
- Kerner, J. A., & D'Amico, J. C. (1983). A statistical analysis of a group of runners. Journal of the American Podiatry Association, 73, 160-164.
- Kirby, K. A., & Valmassy, R. L. (1983). The runner-patient history: What to ask and why. Journal of the American Podiatry Association, 73, 39-43.
- Kish, L. (1965). Survey sampling. New York: John Wiley and Sons.
- Koplan, J. P., Powell, K. E., Sikes, R. K., Shirley, R. W., & Campbell, C. C. (1982). An epidemiologic study of the benefits and risks of running. Journal of the American Medical Association, 248, 3118-3121.
- Layman, E. M. (1974). Psychological effects of physical activity. Exercise and Sport Sciences Reviews, 2, 33-70.
- Levin, E. (1983, August 22). A lethal quest for the winning edge. People Weekly, pp. 18-23.
- Levy, P. S., & Lemeshow, S. (1980). Sampling for health professionals. Belmont, CA: Lifetime Learning Publications.
- Lutter, L. D. (1980). Foot-related knee problems in the long distance runner. Foot and Ankle, 1(2), 112-116.
- Moore, K. (1982, March 22). Possessed of a certain pride. Sports Illustrated, pp. 68-72, 74, 76, 78-80.
- Morgan, W. P. (1979). Negative addiction in runners. The Physician and Sportsmedicine, 7, 56-63, 67-70.
- Nilsson, S. (1982). Jogging injuries: An overview. Scandinavian Journal of Social Medicine [suppl.], 29, 171-178.
- Nix, R. A. (1982). Runner's injuries about the knee. Journal of the Arkansas Medical Society, 79, 200-205.
- Norval, J. D. (1980). Running anorexia. South African Medical Journal, 58, 1024.

- Paffenbarger, R. S., Jr., Hale, W. E., Brand, R. J., & Hyde, R. T. (1977). Work-energy level, personal characteristics, and fatal heart attack: A birth-cohort effect. American Journal of Epidemiology, 105, 200-213.
- Pagano, R. R. (1981). Understanding statistics in the behavioral sciences. St. Paul, MN: West Publishing.
- Pender, N. J. (1982). Health promotion in nursing practice. Norwalk, CT: Appleton-Century-Crofts.
- Pilcher, J. (1983, May 16). His name says it all: Onetime executive Don Marathon is running as fast as he can. People Weekly, pp. 92, 97.
- Polit, D., & Hungler, B. (1983). Nursing research: Principles and methods (2nd Ed.). Philadelphia: J. B. Lippincott.
- Riddle, P. K. (1980). Attitudes, beliefs, behavioral intentions, and behaviors of women and men toward regular jogging. Research Quarterly for Exercise and Sport, 51, 663-674.
- Roberts, R. E., & Lee, E. S. (1980). Health practices among Mexican Americans: Further evidence from the human population laboratory studies. Preventive Medicine, 9, 675-688.
- Sachs, M. L. (1983). Generalizability of jogger study group. American Journal of Public Health, 73, 1103.
- Smith, S. L., Stewart, T. O., & Brown, B. A. (1980). Open-ended participation questions in sport and physical recreation surveys: A possible sex bias. Research Quarterly for Exercise and Sport, 51, 732-737.
- Sutton, J. R., & Bar-Or, O. (1980). Thermal illness in fun running. American Heart Journal, 100, 778-781.
- Talan, D. A., Bauernfeind, R. A., Ashley, W. W., Kanakis, C., Jr., & Rosen, K. M. (1982). Twenty-four hour continuous ECG recordings in long-distance runners. Chest, 82, 19-24.
- Thompson, R. D., Funk, E. J., Carleton, R. A., & Sturner, W. Q. (1982). Incidence of death during jogging in Rhode Island from 1975 through 1980. Journal of the American Medical Association, 247, 2535-2538.

Todd, T. (1983, August 1). The steroid predicament. Sports Illustrated, pp. 62-78.

United States Public Health Service. (1979). Healthy people: The Surgeon General's report on health promotion and disease prevention (Publication No. 79-55071). Washington, DC: Department of Health, Education, and Welfare, United States Public Health Service.

United States Public Health Service. (1981). Healthstyle: A self test (DHHS Publication No. (PHS) 81-50155). Washington, DC: United States Department of Health and Human Services, United States Public Health Service.

Valliant, P. M., Bennie, F. A. B., & Valliant, J. J. (1981). Do marathoners differ from joggers in personality profile: A sports psychology approach. Journal of Sports Medicine and Physical Fitness, 21, 62-67.

Virmani, R., Robinowitz, M., & McAllister, H. A., Jr. (1982). Nontraumatic death in joggers: A series of 30 patients at autopsy. American Journal of Medicine, 72, 874-882.

Wiley, J. A., & Camacho, T. C. (1980). Lifestyle and future health: Evidence from the Alameda County study. Preventive Medicine, 9, 1-21.

Williams, C. L., Carter, B. J., & Eng, A. (1980). The "Know Your Body" Program: A developmental approach to health education and disease prevention. Preventive Medicine, 9, 371-383.

Yamamoto, L., Yano, K., & Rhoads, G. G. (1983). Characteristics of joggers among Japanese men in Hawaii. American Journal of Public Health, 73, 147-152.

Yates, A., Leehey, K., & Shisslak, C. M. (1983). Running: An analogue of anorexia? New England Journal of Medicine, 308, 251-255.