ATTITUDE-BEHAVIOR RELATIONSHIP: A COMPARATIVE ANALYSIS USING

THE

HEALTH BELIEF MODEL AND THE THEORY OF REASONED ACTION

By

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DEDICATION

This thesis is dedicated to God, my guide, to my parents Jose Santos and Anita who supported me in every possible way, and to my friends in Delaware who made me feel at home.
CONTENTS

TABLES ................................................................. vii
FIGURES ................................................................. viii
ABSTRACT ............................................................... ix

CHAPTER 1: THEORETICAL BACKGROUND AND REVIEW OF RESEARCH ............................................. 1

1.1 Rationale ............................................................. 1
1.2 Purpose of the study .............................................. 5
1.3 Introduction of the models ...................................... 5
  1.3.1 Health Belief Model-Theoretical Background .......... 5
  1.3.2 Theory of Reasoned Action-Theoretical Background .... 7
  1.3.3 Similarities and differences between the Health Belief Model and the Theory of Reasoned Action .......... 9
    1.3.3.1 Health Belief Model Methodological Issues .......... 12
    1.3.3.2 Theory of Reasoned Action Methodological Issues .... 14
1.4 Review of Research on the two models ....................... 16
  1.4.1 Health Belief Model ....................................... 16
  1.4.2 Theory of Reasoned Action ................................ 21
1.5 Summary ........................................................... 24
1.6 Overview ........................................................... 25

CHAPTER 2: RESEARCH METHODOLOGY .................................................. 27

2.1 Participants ....................................................... 27
2.2 Preliminary Questionnaire ...................................... 28
  2.2.1 Preliminary Questionnaires Results ..................... 30
2.3 Questionnaire .................................................... 34
  2.3.1 The Health Belief Model .................................. 35
  2.3.2 The Theory of Reasoned Action ......................... 37
2.4 Procedure .......................................................... 38
2.5 Measurement ....................................................... 39
  2.5.1 Behavioral measure - dependent variable ............... 40
CHAPTER 3: ANALYSIS OF DATA ........................................ 42

3.1 Evaluation measures ........................................... 43
3.2 Demographics .................................................. 44
3.3 Reliabilities .................................................... 54
3.4 Regression and Correlational Analyses ......................... 56
3.5 Summary ........................................................ 59

CHAPTER 4: CONCLUSIONS ........................................ 60

4.1 Discussion of Results .......................................... 60
4.2 Limitations of the Study ....................................... 62
4.3 Practical Applications ......................................... 64
4.4 Conclusions ..................................................... 65

REFERENCES .................................................................. 68

APPENDIX A: PRELIMINARY QUESTIONNAIRE I .................. 70

APPENDIX B: PRELIMINARY QUESTIONNAIRE II .................. 72

APPENDIX C: FINAL QUESTIONNAIRE I ......................... 74

APPENDIX D: FINAL QUESTIONNAIRE II ......................... 83

APPENDIX E: AEROBIC PROGRAM ANNOUNCEMENT ............ 84
TABLES

1. Belief Responses to the Initial Survey .................................................. 32
2. Normative Responses from the Initial Survey ........................................... 33
3. Evaluation of Participating in the Aerobics Class ...................................... 44
4. Motivation ...................................................................................................... 46
5. Susceptibility and Severity ........................................................................... 47
6. Benefits ........................................................................................................ 48
7. Structural Variables ..................................................................................... 49
8. Enabling Factors .......................................................................................... 50
9. Attitude toward behavior ............................................................................ 51
10. Normative Beliefs ....................................................................................... 52
11. Motivation to Comply with others ............................................................. 53
12. Beliefs ........................................................................................................ 54
13. Health Belief Model (HBM) ...................................................................... 55
14. Theory of Reasoned Action (TRA) ............................................................. 56
FIGURES

1. Summary of the HBM and the TRA ............................. 11
ABSTRACT

The purpose of this study was to investigate the predictive abilities of two theoretical models of the attitude-behavior relationships. The first, the Health Belief Model, predicts health-related behaviors by assessing individuals' motivations, perceptions of susceptibility to an illness, perceptions of the severity of the illness, beliefs about the likelihood that the behavior will prevent the illness, and perceived barriers that prohibit taking the action. The Theory of Reasoned Action predicts behavior by assessing individuals' beliefs about the consequences of the behavior, evaluations of those beliefs, and the perceptions that important others endorse performing the behavior.

The health behavior that was investigated was participation in an employees' aerobics class. A questionnaire was designed to measure the relevant components of each model and was mailed to a random sample of potential participants. The responses on the returned questionnaires were analyzed, for each model, using regression analyses. The resulting equations were used to formulate predictions for each participant's behavior and these predictions were then correlated with the participant's actual behavior (signing up or not signing up for the aerobic program). Both models achieved a correlation coefficient of .76.

Despite the fairly high correlation coefficients, the results of this study do not support totally the predictive abilities of the HBM. For example, one factor that negates the predictive ability of the HBM is the finding that only one
of the five subscales was found to be associated with the participants' behavior (signing up for the aerobics class). Overall the variables suggested by the HBM were not well supported in this study.

In general the TRA was supported, but looking at it in association with the HBM, a flaw is suggested. In this study, when assessing salient modal beliefs and normative beliefs, beliefs about the program were omitted in the final questionnaire because they did not reflect beliefs about the consequences of performing the behavior. This suggests that the Theory of Reasoned Action could increase its ability to predict behavior if it were to incorporate beliefs about the behavior, as well as beliefs about the consequences of performing the behavior.
Chapter 1

THEORETICAL BACKGROUND AND REVIEW OF RESEARCH

Despite the importance of preventive health care, many people do not behave in a manner that will protect their own well-being. Persuasive campaigns concerned with wellness behavior have been carried out, but such campaigns have not usually been effective. Two theories that are relevant to this issue have been advanced and each claims to predict overt behavior. This study is an attempt to compare two models, the Health Belief Model (HBM) and the Theory of Reasoned Action (TRA) in order to assess which of the models is more accurate in behavior prediction. This first chapter includes a theoretical background and a review of the research of the general attitudes people have toward exercising and toward their own health care.

1.1 Rationale

The ideal of a sound mind in a sound body has remained constant for over 2,000 years. While most Americans would agree with Cooper (1968, p. 10) that "fitness is a desirable state for anyone who wants to lead a zestful and productive life," few Americans, of any age, devote much time to exercising. When a person starts smoking, drinking or practicing poor nutrition, the effects are cumulative and are not noticed immediately (Taylor, 1986). Yet mainstream Americans appear to be interested in health education and the prevention of poor health.
Indeed, Somers, Anlyan, and Ashley (1976) report that the plea from consumers for health information of all types is striking. They point out that the rising number of health food stores, health literature, fitness centers, commercial health spas, and active sport clubs across the United States is the consequence of this concern.

Changing bad health habits into good ones is labeled by Taylor (1986) as a task of "primary prevention," meaning that illness factors are to be combated before an illness has a chance to develop. She explains that some strategies used for preventing illness are: (a) to employ behavior-changing methods in order to help people alter problematic health behaviors; and (b) to keep people from developing bad habits. One primary prevention method for achieving health and fitness is cardiovascular exercise. Cooper, who is a medical doctor, states that regular participation in aerobics programs, with the approval of physicians, in conjunction with weight control and tobacco elimination, will help an individual to live a more healthful life. Cooper believes that "aerobic exercise is not a panacea; but its essentiality is in the building of good physical conditions" (1968, p. 11).

Given the emphasis on healthy lifestyles in this culture, and the contribution that an aerobics fitness program can make to wellness, a number of scholars have attempted to discover the factors that influence participation in aerobics programs. Wilmoth (1986), for example, stated that the biggest challenge to fulfill participants' needs (fitness goals, improving health, and so on) through aerobics programs is to motivate participants to continue with a program after they have first enrolled. He stated that the biggest problem aerobic programs confront is dropouts. He pointed out biological, psychological, and situational influences
function as determinant factors when a person decides to exercise. According to Wilmoth, two kinds of participants can be identified: one type is the participant who will continue with the program because he or she has an ideal figure and because he or she thinks doing exercise will prevent, to a certain point, the predisposition to coronary heart disease; the second kind of participant is the overweight person who is more likely to benefit from the aerobics program, but the one more likely to drop out. He then explains that situational factors have been used to motivate the participants, because personality and biological factors are more difficult to alter. To handle the situational factor, Wilmoth states that the setting and the atmosphere where the class is conducted are important variables. He says that assisting participants in setting their personal goals and giving them some motivation for attending classes systematically is very helpful to reinforce the idea of making exercise a life-time habit. Wilmoth also stresses the importance of taking some time apart (i.e., ten minutes per class) to get to know the participants' fitness goals, jobs, and interests. He emphasizes the relevance of helping individuals to establish realistic exercise goals. He also mentions that participants should be warned in a positive manner about the most likely drop-out factors such as pain, hard work, and time commitment. He stresses the fact that some participants may need more than exercise to accomplish their goals: they will also need to follow a diet to maintain weight loss and they should be aware of that.

In this respect, Long and Haney (1986) conducted a study to assess the efficacy of counseling sessions on the initiation of a physically active lifestyle, by comparing an experimental group to a waitlist group. The sample for the study
consisted of 75 sedentary women who were randomly assigned to one-hour counseling interviews or to a waitlist control. A total of seven women dropped out of the study, one of whom was from the waitlist group, three were from the information group, and the remaining three were from the no-information group. Due to these findings, Long and Haney (1986) quoted Godin, Cox, and Shephard (1983), who suggested that information is one of the external variables which influences participation.

Regarding the importance of assessing attitudes and beliefs to predict behavior, Taylor (1986, p. 76) states that "attitude-change [sic] such as instilling fear or providing information, do not suffice to alter health habits." She explains that these techniques could motivate a change; however, he continues, such techniques might not provide the skills to change and maintain health behavior. Changing behavior involves changing bad habits or learning and incorporating responses into a person's behavioral repertoire. Taylor suggests that some people generate internal negative monologues about the behavior change and that unless this negative thinking is modified it is less likely for the individual to initiate behavior change and maintain it over time. As can be seen in the brief discussion above, a number of factors are believed to influence exercising behavior, yet cognitive factors (attitudes and beliefs) may be central to the process. In fact, attempts to influence cognitive factors may be the most fruitful direction for persuasive campaigns to take because, as Wilmoth (1986) pointed out, biological and structural factors are difficult to alter, as are many of the demographic variables that have been investigated.
1.2  Purpose of the study

The purpose of this study is to examine the predictions made by two cognitive models: the Health Belief Model and the Theory of Reasoned Action. Both models attempt to link people's beliefs and attitudes with their subsequent behaviors. This study attempts to examine the link between attitudes toward health and exercising and exercising behavior. The study will use the Theory of Reasoned Action (Ajzen & Fishbein, 1980) and the Health Belief Model (Becker, 1974) to predict whether or not participants sign up for a six-week aerobics program offered to employees at the University of Delaware. The efforts of the study will be concentrated on the exercise variable as a preventive disease behavior.

1.3  Introduction of the models

A brief theoretical background of the Health Belief Model and the Theory of Reasoned Action will be presented in the two following sections. Each model will be discussed individually.

1.3.1  The Health Belief Model-Theoretical Background

The Health Belief Model is based on motivation and the perceptual world of the behaving individual (Becker, 1974). It analyzes an individual's motivation to act as a function of (a) the desire to maintain a good state of health and (b) the individual's estimate of the probability of success. Becker (1974, pp. 21-22) explains that

The Health Belief Model assumes that motivation is a necessary condition for action and that motives determine an individual's
perceptions of the environment. The concept of motivation is operationalized in this model as the psychological state of readiness to take specific action and the extent to which a particular course of action is believed to be beneficial in reducing the threat.

As described by Becker (1974), the model is an attempt to describe the decision-making process under conditions of uncertainty. The person's choice, Becker explains, is ego-related in terms of benefits minus costs or probability of success. He states that a particular action is a function of two variables presented in the model: (a) perceived susceptibility to sickness (subjective risk of contracting a condition) and (b) perceived benefits of taking action (success). The Health Belief Model proposes the following theoretical conditions and components:

1. The individual's psychological "readiness to take action" relative to a particular health condition, determined by both the person's perceived "susceptibility" or vulnerability to the particular condition, and his perception of severity of the consequences of contracting the condition; and

2. The individual's evaluation of the advocated health action in terms of its feasibility and efficaciousness (i.e., his estimate of the action's potential "benefits" reducing actual or perceived susceptibility and/or severity).

3. A "stimulus," either "internal" (e.g., perception of bodily states) or "external" (e.g., interpersonal interactions, mass communication, personal knowledge of someone affected by the condition) to trigger the appropriate health behavior (Becker, 1974, pp. 21-22).

Becker (1974) also claims that the model is relevant to three different kinds of health behavior. It distinguishes illness behavior and sick-role behavior from health behavior. Illness behavior is defined as "any activity undertaken by persons who feel ill to discover what is wrong, and what can be done." Sick-role behavior is "any activity undertaken by persons who consider themselves to be ill with the purpose of getting well." Health behavior is "any activity undertaken by
persons who believe themselves to be healthy, but who want to detect or prevent any asymptomatic illness." The authors of the model claim that the model can be used to explain all three kinds of health-related behavior. Becker also included sociopsychological and structural variables as modifying factors (stimuli), which affect the individual's perception and his or her likelihood to take action. Within the sociopsychological variables, personality, social class, and peer and reference group pressure are included. Knowledge about the disease and prior contact with the disease are considered structural variables in the model. Becker stated that there is no evidence to indicate whether the improvement of health in an already healthy person does have some motivating force in influencing action.

The model also focuses on the influence of mass media campaigns, advice from others, reminder postcards from physician or dentist, illness of family members or friends, and newspaper or magazine articles as cues to action (i.e., that one or several of these factors will motivate a person to change his or her attitude and behavior toward health). This shows that communication is considered an important factor in the model.

1.3.2 Theory of Reasoned Action—Theoretical Background

The goals of the Theory of Reasoned Action are to predict behavior and to understand the determinants of actual behavior. The theory is based on the assumptions that the majority of actions of social relevance are under volitional control and that humans are rational animals who systematically process the information available to them in order to arrive at a reasonable behavioral decision. According to this theory, the immediate determinant of a person's overt
behavior is the person's intention to perform the behavior. Ajzen and Fishbein argue that a person's intention can be predicted by knowing (a) the person's attitude toward the behavior and (b) the person's subjective norm regarding the behavior. According to the Theory of Reasoned Action, attitudes are a result of the information that a person holds about the attitude object. It is possible to assess a person's attitude toward performing some behavior by asking the person to rate the performance of the behavior on a series of evaluative semantic differential scales. A person's attitude toward performing a behavior is a function of his or her salient beliefs that the action will bring about particular positive or negative consequences. Similarly, the subjective norm is measured by assessing the person's beliefs that important others would approve of him or her performing the behavior.

The Theory of Reasoned Action proposes the integration of attitudinal and behavioral factors. It explains that intentions predict the behavior. As Fishbein and Ajzen (1976) explain, attitudes toward the action and subjective norms regarding the appropriateness of the action shape behavioral intentions. The Theory of Reasoned Action has been widely used in marketing to evaluate the criteria consumers use when purchasing a product (Ajzen & Fishbein, 1980). In the area of health psychology, Taylor (1986) states that Fishbein and Ajzen's approach, applied to health care situations such as smoking, alcohol, drug use, and family planning has been found to predict behaviors, providing in this way a useful understanding of a number of health actions.
The necessity of knowing people's salient primary beliefs on which their attitudes toward a given behavior are based in order to assess people's attitude change has been widely recognized. Available literature revealed that the Theory of Reasoned Action developed by Fishbein and Ajzen (1975) was used in studies attempting to measure the likelihood of alcoholics to sign up for treatment, and in studies that attempted to predict, and to understand weight loss (Ajzen & Fishbein, 1980).

1.3.3 Similarities and differences between the Health Belief Model and the Theory of Reasoned Action

The Health Belief Model and the Theory of Reasoned Action are similar in that both presume human decision making to be governed by rational principles. Thus both are concerned with the relationship between attitudes and behavior. In addition, both are concerned with the relative influence of the same or similar variables (e.g., demographic factors, beliefs about a behavior, effectiveness, etc.). Yet each differs in a number of ways as well.

Perhaps the most fundamental difference between the two models concerns the way in which attitudes and beliefs are assessed. On the one hand, the Health Belief Model assesses attitudes about general health and a specific illness, beliefs about susceptibility to disease and the benefits of medical care. Each of these variables is assumed to independently influence the performance of some health-related behavior. In addition, demographic variables that are assumed to influence such attitudes and beliefs are also assessed. The Theory of Reasoned Action, on the other hand, assesses the individual's attitude toward performing a
specific behavior and the individual's perception that important others believe that he or she should (or should not) perform that behavior (see Figure 1). Thus according to the TRA, general attitudes toward health and illness are not relevant to behavioral prediction; nor are beliefs about an illness assumed to be influential unless they are found (in preliminary analysis) to shape the attitude toward performing the behavior. Moreover demographic factors are not assessed; they are presumed to have only an indirect influence on the beliefs that shape attitudes.

An examination of the research methods used with each model will highlight these distinctions.
<table>
<thead>
<tr>
<th>Health Belief Model (HBM)</th>
<th>Theory of Reasoned Action (TRA)</th>
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</thead>
<tbody>
<tr>
<td>1. Motivation variables (concerns about maintaining health and avoiding illness).</td>
<td>1. Attitude toward participation in the aerobics class.</td>
</tr>
<tr>
<td></td>
<td>a) Beliefs about the consequences of participation.</td>
</tr>
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<td></td>
<td>b) Evaluations of the consequences of participation.</td>
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<tr>
<td>2. Susceptibility variables (perceptions regarding susceptibility to illness).</td>
<td>2. Subjective norm</td>
</tr>
<tr>
<td></td>
<td>a) Beliefs that important others endorse participation.</td>
</tr>
<tr>
<td></td>
<td>b) Motivation to comply with important others.</td>
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<tr>
<td>3. Severity variables (perceptions regarding the severity of illness).</td>
<td>3. Intention to participate</td>
</tr>
<tr>
<td>4. Benefit variables (perceptions regarding the helpfulness of medical care).</td>
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<tr>
<td>5. Barrier variables (perceptions regarding the recommended health procedure).</td>
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<tr>
<td>6. Relevant demographic variables.</td>
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**Figure 1:** Summary of the HBM and the TRA
1.3.3.1 Health Belief Model Methodological Issues

Because of the nature of the variables used in the Health Belief Model, the general procedure used with this model is difficult to discuss. For that reason an example method from the literature will be outlined. In a study by Becker, Mainman, Kirscht, Haefner, and Drachman (1977) to be discussed in a later section of this paper, the predictive ability of the HBM was tested. The participants in this study were mothers and obese children who were referred to a dietary clinic where the children were to follow a prescribed weight loss program. The attitudinal and belief factors that were assessed prior to the behavioral measures included (a) motivation variables, (b) susceptibility variables, (c) severity variables, (d) benefit variables, (e) barrier variables, and (f) demographic variables. The motivational factor included an index of the mothers' self-reported concerns about their children's general health; their children's health relative to other children; their estimate of the chance their children would get well without medical care; their concern about their own health, and their perceived chance of helping their children follow the diet. The susceptibility factor included an index of the mothers' estimate of how easily their children get sick; the chance that their children would develop a number of specific illnesses including strep throat, rheumatic fever, heart trouble, and hardening of the arteries; and the chance that their children would be overweight or smoke; and the estimate of the mother's worry about taking good care of their children's illnesses both in general and about the specific illnesses named above. It also included indices of the mothers' perceptions that these illnesses would be severe and would interfere with their children's activities. Finally, the severity factor assessed the mothers' perceptions that being
overweight would interfere with their children's activities, would cause serious illnesses, and how much they worried about their children being overweight. The benefits factor assessed the mothers' perception that their children would get illnesses that medical care could not help and that old remedies sometimes worked better than professional medical care, as well as estimates of how helpful the clinic's information was, beliefs about things that might prevent heart disease, how much control the program would afford over their children's weights, and the extent to which the mothers attributed their children's overweight to fate rather than personal factors. The barrier factor assessed the mothers' beliefs about the safety of the diet, the difficulty of affecting weight, whether the child had dieted before, the ease of the diet compared to others, the extent to which the family experienced problems, the ease or difficulty of getting through the day, and whether or not they (children in the company of their mother or the person responsible for the child's care) would have reasons to miss an appointment. Finally, a number of demographic variables were assessed including the ages of the children, the ages of the mothers, the sex of the children, the race of the children, the number of siblings in the family, the mothers' marital status and educational level, the number of people in the home, and the family income.

Each individual index was subsequently correlated with the mothers' and children's appointment keeping.
1.3.3.2 Theory of Reasoned Action Methodological Issues

A very different procedure is used to predict behavior when using the Theory of Reasoned Action, and a general description of the research procedure can be stated more easily. The first step is to determine the specific behavior of interest to study. Once this is done, a preliminary survey must be constructed and completed by a sub-set of the population of interest in order to assess the modal salient beliefs about the consequences of performing the behavior and to discover the salient others who would approve or disapprove of performing the behavior. Once the modal salient beliefs and salient others are identified, the final questionnaire is constructed. First, participants are asked to rate the likelihood that performing the behavior in question will result in the consequences stated (taken from the initial survey). The participants are also asked to evaluate those consequences. The sum of ratings of the behavioral consequences multiplied by the evaluation of those consequences is an index of the attitude toward the behavior. Second, the sum of ratings of who would favor (or not favor) the participant's behavior is multiplied by the participant's motivation to comply with each referent yields an index of the subjective norm. The relative weights of the attitude and subjective norm are determined using regression analysis. Once the relative weights are determined, the attitude multiplied by its weight and the subjective norm multiplied by its weight result in an index of the participant's intention to perform the behavior.

From the descriptions above, it is clear that general attitudes about some topics (e.g., general health or a specified illness) are central to predicting
behavior within the Health Belief Model, but are irrelevant to behavioral prediction from the Theory of Reasoned Action. The TRA focuses only on attitudes about performing a specified behavior. Both concern themselves with beliefs about the consequences of performing a specific behavior; however, the salient beliefs are predetermined in the HBM, while the TRA identifies the salient beliefs it measures from a sample of the participant population. Moreover, only the TRA allows participants to evaluate those consequences. Although it has been suggested that social influence should be added to the list of variables assessed by the HBM (Becker and Ma'iman, 1975), only the TRA has been attentive to participants' willingness to comply with such social referents. Finally, from the perspective of the TRA, demographic variables are assumed to have little or no systematic influence on behavioral prediction; hence they are not assessed when this model is used. The HBM assesses beliefs about the behavior; however, the TRA only assesses beliefs about the consequences of performing the behavior. Thus the HBM assesses beliefs about costs, the amount of time involved, etc. These factors would be overlooked in an assessment using the TRA.

As was explained at the beginning of the chapter, this study is an attempt to compare the Health Belief Model and the Theory of Reasoned Action in order to assess which of the models is a better predictor of behavior. The Health Belief Model is based on motivation and the perceptual world of the behaving individual. It analyzes the individual's motivation to act as a function of the desire to keep a good state of health and the individual's estimate of the probability of success. In contrast, the Theory of Reasoned Action is based on the assumptions that the majority of actions of social relevance are under the
volitional control of the behaving individual. Both models attempt to link people's beliefs and attitudes with their subsequent behavior. Furthermore, both are concerned with the influence of similar variables. It seems that the difference between the two models is based on the order of the factors and the importance given to each one of them within each of the models. The literature researched shows that few Americans devote much time to exercising; however, mainstream Americans still seem to be interested in health education and the prevention of poor health. On this basis, this study attempts to examine the relationship between attitudes toward exercising and exercising behavior.

1.4 Review of Research on the two models

This section includes a literature review about attitude-behavior relationship studies of the theory of reasoned action and the health belief model.

1.4.1 Health Belief Model

The Health Belief Model is commonly discussed in secondary sources such as Taylor (1986). Despite the ease of finding summary descriptions, it is very difficult to find the actual research papers on which many of the summaries are based. For example, Taylor mentioned the findings of two studies performed by Cummings, Jette, and Rosenstock, respectively, that indicated that the HBM was able to predict health activities such as flu immunizations and physical examinations. As it was impossible to find description of these studies, only one investigation of the HBM is described in the following review.
The previously mentioned study by Becker et al. (1977) regarding obesity and compliance behavior utilizes the HBM. These scholars state that there is a consistent finding that patients and physicians are pessimistic about the possibility of successful weight reduction, however, their literature review suggests a positive relationship between a mother's interest in health matters and her child’s attention to symptoms. In order to test these ideas with the HBM, Becker et al. conducted a study from July 1973 to July 1975 at a low income ambulatory pediatric clinic. One hundred and eighty-two mothers of children who had been recently identified as obese by the clinic physicians were referred to the clinic dietitian for instruction and a weight-reduction program. They were also invited to participate in a project in order to learn more about each person’s health opinions and concerns. The real objective of the research was focused upon the mother’s health motives and perceptions as predictors of her child’s weight loss. They were first interviewed concerning their beliefs, concerns, and motives related to health in general and particularly to obesity.

Every two weeks for two consecutive months the dietitian would obtain data on weight changes. For the initial two-week measures, 18 of the 182 subjects did not return leaving a total of 164 subjects. At the second follow-up visit, 19 more subjects did not return. Twenty more subjects failed to return for the third visit, leaving a total of 125 subjects. At the final visit, 12 more subjects did not attend, leaving a total of 113 subjects.

"T-tests and Analyses Of Variance (ANOVA) were performed to evaluate possible deleterious effects of between-visit subject loss on various
interpretations of the data" (Becker, et al., 1977, p. 352). Results of the T-tests suggested that mortality had probably little influence on the findings. Analysis Of Variance (ANOVA) and Least Significant Difference Test results assured that there was not a significant difference between the experimental groups in terms of the amount of overweight on the first visit (follow-up visit ranged from gains of over 5 pounds to losses of over 6 pounds).

Several questions assessed the mothers' motivation to comply with the clinic's instructions, and the mothers' responses to these questions suggested that motivation was a good predictor of weight loss and long-run appointment keeping. Intention (one index of motivation) was measured indirectly by requesting that each subject estimate her likelihood to be able to keep the child on the prescribed diet. This variable had the best overall correlation with weight change. Of the other motivation measures, general concern about the child's health was the only one significantly related with long-run appointment keeping.

The mothers' perception of their children's susceptibility to illness was also a good predictor of weight loss and long-run appointment keeping. For example, each mother's perception of how easily her child gets sick was consistently correlated with weight loss across the follow-up visits, and it was a good predictor of long-run appointment keeping. An index of eight conditions or sicknesses was given, and mothers were asked to indicate the probability that their children would ever develop each of the conditions or sicknesses. The results showed that mothers' high ratings on items regarding possible heart and circulatory threats had positive associations with weight loss. The only illness included in the list that
was not significantly correlated with long-run appointment keeping was "reumatic fever."

In general, mothers' perceptions of the severity of obesity were also good predictors of weight loss and long-run appointment keeping. To assess the mothers' perceptions of severity, the previously mentioned list of eight conditions or sicknesses was used to measure the degree of concern. For example, mothers were asked how worried they thought they would be if their overweight child would get each of the illnesses included in the list. The best compliers were mothers who were strongly aroused by the idea of what a specific illness could do to their child. These items were significantly related to long-run appointment keeping. The other variables regarding severity involved perception of threat specific to obesity. Extent of agreement with the statement "being overweight could cause serious illness" was correlated with weight loss and long-run appointment keeping. Worry about the child's being overweight was also correlated with weight loss.

The perceived benefits of the program and the faith mothers had in medical information and care were not good predictors of weight loss or appointment keeping. This factor in the HBM was operationalized through three variables: (a) child gets illnesses which medical doctors cannot help; (b) old remedies sometimes are better compared to medical threatment; and (c) the information provided by the dietitian was helpful. None of these variables was significantly correlated to weight loss.
The barriers dimension of the HBM received mixed results. The measures for perceived safety of the diet were assessed according to the degree of agreement or disagreement with the sentence, "Sometimes I worry that going on a diet can cause health problems." This measure was significantly correlated with long-run appointment keeping. Problems in following the diet, however, (e.g., the diet was expensive, hard to prepare, caused problems eating out, necessitated preparing separate meals) were not significantly correlated with weight loss. The participation of the child in a previous diet was not significantly correlated with weight loss until the last follow-up visit. "No excuse" for missing an appointment and weight loss were significantly correlated after the first follow-up visit and positively associated with long-run appointment keeping.

Demographic variables across the four follow-up visits did not show any significant differences. Multiple regression analyses using weight change measures against belief indexes were used to evaluate the model as a whole. It was found that the mothers' general health concerns and threat perceptions regarding the child's health predicted weight loss. Nevertheless, concerns and feelings about weight add precision to the findings. In conclusion, Becker et al. (1977) suggest that the HBM seems to explain and to predict a mother's adherence to a diet regimen prescribed for her child. It also seemed to explain and to predict the likelihood that mothers would keep the follow-up appointments made for their children.

However, the utility of the HBM in predicting health related behaviors was only partially demonstrated. Although Becker et al. reported that many of the components within the HBM were correlated with either long-run clinic
appointment keeping, overall weight loss, or both, several factors were not. The exceptions were beliefs about the diet itself (e.g., expense, difficulty of meal preparation, etc.), attitudes toward (faith in) medical care, and demographic factors.

While the HBM specifically focuses on attitudes about health, illness, and related factors, the TRA outlines a more generalized relationship between cognitions and behaviors. Thus the TRA, unlike the HBM, may be employed in a variety of contexts. For example, the TRA has been used successfully to predict voting behaviors, and family planning behaviors, as well as health related activities such as dieting, participating in alcohol treatment programs, and intentions to quit smoking (Ajzen & Fishbein 1980). Of these studies, one is of particular relevance here because it investigated both the components of the TRA and two important variables within the HBM. This study is outlined below.

1.4.2 Theory of Reasoned Action

A comparative study by Beck and Davis (1980) about the prediction of smoking intentions and behavior from attitudes, normative beliefs, and emotional arousal by threat communications about smoking was based in Leventhal (1970) and Mewborn's (1976) studies. Leventhal and Mewborn delineated specific cognitions about the health threat that influence the likelihood of taking preventive action. Beck and Davis explain that in both studies subjects were exposed to distinctive versions of a series of messages about the health threat created to manipulate beliefs about the severity of the health threat, the likelihood of the threat occurrence, and the recommended threat-coping effectiveness.
In developing the experiment to compare the prediction of smoking intentions and behavior from attitudes, normative beliefs, and emotional arousal, Beck and Davis used a sample of 240 undergraduate students (120 were smokers and 120 nonsmokers) who had stated in a poll that they had never smoked or that they were currently smokers. The study anticipated that attitudes and normative beliefs would predict intentions, which at the same time were assumed to predict behavior. Beck and Davis reported in their literature review that emotional arousal seemed to be indirectly related to people's motivations to engage in health-related activity. Their experiment anticipated that emotional arousal would, therefore, indirectly influence intentions and behaviors. Rather than subjective norms, attitudes were the main measure toward smoking. It was assumed that both attitudes and subjective norms would predict intentions and intentions would predict behaviors.

The cover story for the experiment was that the researchers were interested in people's reactions to persuasive communication regarding effects of smoking. The communicative messages included a series of photo slides containing various belief statements relating smoking to negative health consequences like cancer and death. Another series of photo slides included belief statements relating nonsmoking with positive health consequences like greater longevity. Each communicative appeal lasted five minutes and subjects were asked to complete a post-experiment questionnaire.

Attitudes toward smoking were measured by semantic differential scales (harmful-beneficial). Subjective norms that were assessed included the
subjects' perception of their family's and friends' attitudes toward smoking. In measuring normative beliefs, semantic differential scales were also used. This part of the questionnaire included statements such as: "a majority of my immediate family thinks that smoking is harmful/beneficial" and "most of my friends think that smoking is wise/foolish."

Behavioral intentions were assessed by a series of seven-dimension Likert scales showing intent to "cut down" and "stop smoking altogether." Measures of reported behavior were taken within one to two weeks after the experiment. From the original sample, 201 subjects were contacted by telephone and their answers were treated dichotomously. Each intention of performing a behavior was treated as a criterion. Arousal measures, attitude, family, and friends were used as predictors. Beck and Davis' (1973) findings suggest that attitudes toward smoking were related in a significant way to the intentions to reduce the amount smoked, to quit smoking altogether, to discussion with others the effects of smoking, and to urge others to quit. These intentions increased as the attitude toward smoking was more negative.

Regarding the participants' subjective norms, the intention to cut down in smoking was associated with a negative family attitude toward smoking, although family attitudes failed to achieve a significant relation with intentions to urge others to quit. According to Beck and Davis (1980), the intention to cut down the amount smoked and the intention to stop smoking were predicted by family attitudes toward smoking. The findings indicated that attitudes were more strongly associated with intentions than were subjective norms, however,
normative beliefs were highly correlated to intentions. The findings indicate that the impact of one's family's attitude can be significant in motivating an individual to quit smoking or at least to decrease the amount of smoking.

Turning to an examination of the effects regarding the use of a fear arousing message, the results showed that there was no relationship between the degree of fear generated by the communications and the intention of engaging in the recommended actions. The emotional arousal just affected the extent of seriousness with which the threat was seen. According to Beck and Davis, (1980) the results supported the Fishbein Model by showing that attitudes toward the recommended action had a strong relationship with the intentions to engage in that specific action, which was highly related to the actual behavior. Moreover, these findings tend to dispute some of the ideas presented in the HBM. Specifically, these findings contradict the notions that a stimulus cue will trigger a change in behavior, and that perceptions of an illness's severity will necessarily influence the performance of behavior to prevent the illness.

1.5 Summary

Even though different, the HBM and the TRA have certain things in common. Basically, both theories have been formulated to explain and to predict behavior, and they both can be used to change behavior. Both incorporate many of the same variables including the attitudes and beliefs of the individual, and either subjective norms or advice from others. Finally, both emphasize the individual's perception and cognitive reasoning.
The more prominent difference between the HBM and the TRA is the order and importance given to the factors which predict behavior. For example, the HBM model states that a person's beliefs are determined by motivations, perceived threats, and perceived probability of illness. External variables can then modify the person's readiness to undertake a given behavior. The TRA considers it possible that external variables may influence the person's beliefs and the relative importance of attitudinal and normative beliefs; however, external variables are not expected to be systematically related to either behavioral or normative beliefs.

A final difference is that, in the HBM, behavioral intentions are measured at a more general level, while the TRA measures behavioral intentions at a very specific level. That is, the HBM might ask whether the individual intends to lose weight, but the TRA would ask whether the individual intends to perform specific behaviors such as refusing desserts, skipping between-meal snacks, etc.

1.6 Overview

This first chapter included the description, similarities, and differences of both the Health Belief Model and the Theory of Reasoned Action. In general, both models claim to predict and to understand behavior. However, one of the gaps between them is the order of the elements described in order to predict and to understand overt behavior. In addition, the Theory of Reasoned Action claims to predict and to understand behavior at a most specific level while the Health Belief Model seems to fulfill the same tasks, but at a more general level. Another important aspect to be mentioned is that both models can be used to change behavior since both include relevant advice from others.
Both the Theory of Reasoned Action and the Health Belief Model predict behavior. But which of the models predicts behavior in a more accurate way? The goal of this thesis is to investigate the accuracy of the two models predictive abilities. The second chapter will include a detail of methodology, sample, and procedures in the development of this experiment.
Chapter 2

RESEARCH METHODOLOGY

This second chapter describes the methodology used in the development of this study, the sample, the questionnaire, the procedure, and measurement to be utilized in the data analysis of this study.

2.1 Participants

The aerobic fitness dance program at the University of Delaware (UD) is offered to staff and faculty members. The program is an in-house fitness program (i.e., the facilities for exercise and changing are located within UD). It is organized by the College of Physical Education, Athletics and Recreation together with Employee Relations. This program is conducted every semester and each participant is charged a $15 fee per eight-week session. UD employees may use their Physical Exam/Optical Form to pay for this class. The aerobic class meets three times per week (Monday, Wednesday, and Friday) and participants can attend any of the offered sessions (either noon or evening sessions).

The HBM and the TRA claim to predict behavior in almost any kind of situation. This study attempts to determine which of the models (HBM or TRA) predicts behavior in a more accurate way. The fact that there is an ongoing aerobics program every semester at the UD made this program an ideal candidate for
this study in terms of access to potential participants and therefore, this study would probably prompt people in answering the questionnaires.

2.2 Preliminary Questionnaire

Because the TRA requires an initial assessment of salient behavioral beliefs and subjective norms, two preliminary questionnaires were constructed, and the final questionnaire was constructed on the basis of their results (see Appendices A and B). In order to assess behavioral beliefs, the first questionnaire included open-ended questions concerning the respondents' beliefs about the advantages and disadvantages of signing up for the aerobic fitness dance program. Other beliefs associated with this behavior (signing up for the aerobic fitness dance program) were also added. The second questionnaire included questions to assess the subjective norms of individuals. This questionnaire also included open-ended questions. The participants' subjective norms were assessed by asking them to list the people (significant others) that they thought would respond positively or negatively to their behavior (signing up for the aerobic fitness dance program). Respondents were asked not to include names, but to use titles such as daughter, father, mother, neighbor, wife, husband or other. The reason why respondents were asked to include titles and not names was because in this way it would be easier to establish the salient group of significant people. Respondents were asked to include separately people whom they thought would respond negatively to their behavior (signing up for the aerobic fitness dance program) from the ones they thought would respond in a positive way.
The questionnaires were sent to two different random samples of 50 university employees. The sample for each preliminary questionnaire was selected randomly from the University of Delaware telephone directory and campus mailing guide 1987-88 to avoid any bias. However, employees who do not have a direct telephone number were not included in this guide. For the first questionnaire two names were selected every third page. The names appearing at the right top of every first and second pages were selected. Every third page was skipped except the last page. The sample for the second questionnaire was selected in the same way as the first sample. However, the names chosen were the ones at the bottom of the first and second pages. A cover letter, explaining the purpose of the study, and a self addressed envelope, along with instructions regarding the return of the questionnaire, were attached to each questionnaire. Because the information was confidential, each questionnaire also included instructions about not including names (see Appendices A and B).

As noted above, this study drew its sample from the University of Delaware because there is an ongoing aerobic "fitness" dance program for university employees every semester. Due to the extent of media coverage over the last decade, it was assumed that people in this population would probably have heard about the advantages of exercising in order to have a healthier lifestyle. Furthermore, all staff and faculty members of the University of Delaware were notified about the aerobic exercise program (see Appendix E). This could serve as the stimulus cue discussed in the HBM. Therefore, faculty members as well as administrative personnel of various levels were included in the sample. This method also allowed a wide range of ages, staff positions, and both sexes to participate.
2.2.1 Preliminary Questionnaires Results

As noted above, before the final questionnaire could be designed, the TRA requires that a preliminary survey be conducted to assess the salient modal beliefs held within a population regarding the favorable or unfavorable consequences of performing the target behavior (signing up for an aerobics fitness dance program) and to assess the population's normative considerations with regard to performing the target behavior.

The preliminary surveys were mailed on June 24th and 29th respectively to two random samples of 50 employees at the University of Delaware. An envelope preaddressed to the researcher was enclosed to facilitate the return of the preliminary questionnaire. The results of the preliminary questionnaire were used to construct the final questionnaire. Two weeks after the preliminary questionnaire had been sent a total of 32 questionnaires was returned. From this number, 14 of the returned questionnaires corresponded to the first sample, of which 11 were completed and three were not filled out. The other 18 corresponded to the second sample. Of these, only 15 questionnaires were filled out, while three were not completed.

In order to be included in the final questionnaire, the beliefs about the advantages and disadvantages of signing up for the aerobics class had to meet two criteria. First, the TRA is concerned only with beliefs about the consequences of performing the behavior, hence any belief that concerned the behavior itself, rather than its consequences, was eliminated from the final list. Second, the beliefs had to represent the important beliefs of the population. Due to the
relatively small number of beliefs stated in the returned questionnaires, all consequential advantages and disadvantages were included. As can be seen from Table 1, this left only seven modal salient beliefs for inclusion in the final questionnaire.
## Table 1: Belief Responses to the Initial Survey.

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convenient location</td>
<td>5</td>
</tr>
<tr>
<td>*Cardiovascular health</td>
<td>3</td>
</tr>
<tr>
<td>Reasonable price</td>
<td>3</td>
</tr>
<tr>
<td>Paid by physical exam insurance</td>
<td>2</td>
</tr>
<tr>
<td>Convenient time</td>
<td>2</td>
</tr>
<tr>
<td>*Reduces stress</td>
<td>2</td>
</tr>
<tr>
<td>*Strengthening and firming muscles</td>
<td>2</td>
</tr>
<tr>
<td>*Keeping in good shape</td>
<td>2</td>
</tr>
<tr>
<td>Instructors will know who you</td>
<td>1</td>
</tr>
<tr>
<td>*General health benefits</td>
<td>1</td>
</tr>
</tbody>
</table>

### DISADVANTAGES

<table>
<thead>
<tr>
<th>DISADVANTAGES</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Too much hurrying</td>
<td>2</td>
</tr>
<tr>
<td>Start and finish late</td>
<td>2</td>
</tr>
<tr>
<td>Would like more information on the muscles being worked on</td>
<td>1</td>
</tr>
<tr>
<td>*Someone who is not in physical shape could injure themselves - knee problems, shin splints</td>
<td>2</td>
</tr>
<tr>
<td>Classes are too large</td>
<td>1</td>
</tr>
<tr>
<td>No privacy for showering</td>
<td>1</td>
</tr>
<tr>
<td>You will be expected to participate</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note.**

\[ N = 14 \]

* Indicates responses included in the final questionnaire.
### Table 2: Normative Responses from the Initial Survey

**PEOPLE WHO BELIEVE THE PARTICIPANTS SHOULD BE INVOLVED IN THE AEROBIC PROGRAM**

<table>
<thead>
<tr>
<th>Role</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daughter</td>
<td>3</td>
</tr>
<tr>
<td>Wife</td>
<td>2</td>
</tr>
<tr>
<td>Husband</td>
<td>2</td>
</tr>
<tr>
<td>Girlfriend</td>
<td>1</td>
</tr>
</tbody>
</table>

**PEOPLE WHO BELIEVE THE PARTICIPANTS SHOULD NOT BE INVOLVED IN THE AEROBIC PROGRAM**

<table>
<thead>
<tr>
<th>Role</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Husband</td>
<td>1</td>
</tr>
<tr>
<td>Wife</td>
<td>1</td>
</tr>
<tr>
<td>Son</td>
<td>1</td>
</tr>
<tr>
<td>Daughter</td>
<td>1</td>
</tr>
<tr>
<td>Brother</td>
<td>1</td>
</tr>
<tr>
<td>Father</td>
<td>1</td>
</tr>
<tr>
<td>Doctor</td>
<td>1</td>
</tr>
<tr>
<td>Employer</td>
<td>1</td>
</tr>
</tbody>
</table>

N = 18
Table 2 shows the results of the survey that assessed normative responses. Because so few respondents listed the same persons, all the people named on the initial survey were used in the final questionnaire. Only one person stated that it would be his or her own decision to participate in the aerobic program. These responses correspond to the second preliminary questionnaire. Fifty questionnaires were sent out and 18 were returned; three of these were not filled out.

2.3 Questionnaire

A written questionnaire was constructed which attempted to measure different constructs of each of the two separate models (the HBM and the TRA). The first part of the questionnaire was concerned with the HBM. Respondents were asked to check the categories which applied to them in a combination of dichotomous and Likert-scale items. Example of these questions are:

Have you recently considered participating in an aerobics program?
   — Yes
   — No

If yes, did any of the following factors cause you to consider participation?
   (Check all that apply).
   — Physical symptoms or sensations
   — Advice from doctor
   — Advice from family and friends
   — Exposure to health related information in the media
   — Other - please specify -

The second section of the questionnaire was concerned with the TRA. Respondents were asked to circle the number of value (from 1 through 7) that best described their attitude regarding a given statement. For example:
The Health Belief Model

As previously mentioned, the HBM consists of three main aspects: (a) readiness to undertake recommended compliance behaviors; (b) modifying and enabling factors; and (c) compliant behaviors. Readiness to undertake a recommended compliance behavior is subdivided in three different factors. The first of these factors, motivations, includes specific issues such as concerns about health matters, willingness to seek and accept medical direction, intention to comply, and positive health activities. The second factor, the value of illness threat reduction, includes subjective estimates of susceptibility, vulnerability to illness in general, extent of possible bodily harm, extent of possible interference with social roles, and the presence of symptoms. The last factor is the probability that compliant behavior will reduce the threat, which includes subjective estimates of the proposed regimen's safety, and the regimen's efficacy to prevent, delay or cure.

The modifying and enabling factors include demographic and structural variables (age, cost, duration, side effects, etc.). They also include attitudinal factors (satisfaction with clinic procedures, facilities, staff), interactional (length and depth of expectation, doctor-patient relationship), and enabling factors (prior experience with action, illness or regimen, source of advice, and referral).
The last aspect that the HBM is concerned with is compliant behaviors. This has to do with the likelihood of compliance with preventive health recommendations and prescribed regimens such as immunizations, diet, exercise, personal and work habits, entering or continuing a treatment program, referrals, and follow-up appointments.

Each of these areas was addressed in the final questionnaire, using Becker et al. (1977) study as a model for survey design. As can be seen on the questionnaire (Appendix C), the first section consists of six questions regarding general demographic variables (range of age, sex, education, economic status) and whether the respondents had ever participated in the aerobic exercising program. Questions seven through ten were designed to measure the participants' motivations or concerns about health matters in general and their willingness to comply with positive health activities. Participants' susceptibility to sickness was measured through questions 11, 12, and 13. The severity of the problem that the participants thought the disease would cause if they did not perform the given behavior was assessed through questions 14 and 15. The benefits that exercising would give them if they performed it were assessed through questions 16, 17, and 18.

Questions 19 to 30 assessed the participants' perceptions of modifying and enabling factors such as the cost of performing a given action (exercising), the duration of the program, its complexity, the side effects, its accessibility, relationship with the staff, source of advice, interaction, and other factors such as social pressure (Appendix C).
2.3.2 The Theory of Reasoned Action

As was previously mentioned, preliminary questionnaires were sent out to two different samples in order to assess the salient and subjective beliefs about signing up for the UD aerobics fitness class.

Ajzen and Fishbein recommended the use of Likert scale questions to assess beliefs, attitudes, subjective norms, and intentions. For this reason, all the questions from the TRA were formulated on a seven-point Likert scale. As can be seen on the questionnaire (Appendix C), the items related to the TRA begin with number 31 and continue through number 60. As directed by Ajzen and Fishbein (1976), items #31, 32, and 33 directly assess the participants' intentions, attitudes toward performing the behavior, and subjective norms. Items #34 through 43 assess the participants' normative beliefs in regard to the important others who were identified on the preliminary survey. Items #44 to 53 assess the participants' motivation to comply with others. Questions #54 to 60 assess the participants' beliefs about the consequences of performing the behavior.

Due to an oversight on the part of the research team, the seven questions that should have assessed the participants' evaluations of the consequences of performing the behavior were omitted from the questionnaire. This is an important component of Ajzen and Fishbein's (1980) model; however, because participants' responses to the questionnaire were anonymous, it was impossible to return to the original population and administer the additional questions. In order to correct the error a second questionnaire was designed to assess the evaluation of performing the behavior. This questionnaire included the seven questions
regarding evaluation of the behavior that were omitted from the other questionnaire. The responses were also rated from 1 through 7. The sample for this questionnaire was a group of 15 students who attended a senior class in the Communication department. Results from this questionnaire showed the average thinking (of people) regarding health care. In order to get the average (mean) of the responses to this second questionnaire responses for each question were summed and then this total number was divided by the value given to each alternative.

2.4 Procedure

In order to compare behavioral intention with behavior, a list of the participants in the aerobic exercise program was required. After getting the consent of the Director of the Aerobic Dance Fitness Program for access to the list of persons who had signed up for the autumn program the self-administered final questionnaires were sent out. The mailing process was done through the University mail during the third week of classes (September 21 and 22), two weeks after participants had signed up for the aerobic program so that they would not relate the research to the aerobic program. Another reason for sending the questionnaire out only two weeks after the aerobic program had been announced was the compromise between the need to have the lapse of time and the need to gather the data promptly.

The questionnaire was mailed to 618 employees of the UD along with a brief cover letter explaining the nature and purpose of the study. The cover letter urged the participants to fill out the questionnaire and asked for their consent to
participate in the study (Appendix C). All employees had already received an announcement regarding their opportunity to participate in the aerobics fitness dance program about two weeks before (see Appendix E). The list of participants' names has been required to compare participants' beliefs, motivations, and intentions with actual behavior. Five-hundred and forty-five of the participants were chosen from the Telephone Directory of the University (every sixth person). Questionnaires were also mailed to 73 of the participants of the aerobic program. There were 87 people participating in the program; however, some of them were not working for the University of Delaware any longer which made it impossible to get their addresses. A cover letter was attached to each one of the questionnaires explaining the purpose of the study, giving instructions, and asking the participant's consent to be part of the study. Again, an envelope preaddressed to the researcher was included to facilitate the return of the questionnaires.

The supplementary evaluations questionnaire (Appendix D) was given on November second to a group of fifteen students in a senior class in the Communication Department. These students did not know about the existence of the aerobic fitness program since it is available only for UD employees. However, their responses were included as an average of the evaluation of the outcome.

2.5 Measurement

Each subscale of the HBM and the TRA portions of the questionnaire were checked for reliability using Cronbach's alpha. Following the tests for reliability, two regression analyses were run, one to establish the predictive equation for the HBM, and the other to establish the predictive equation of the TRA. Once
the regression equations were established, predictions regarding each individual participant's behavior were made. These predictions were then correlated with the participants' actual behavior. By comparing the final correlation coefficients, the predictive power of each model could be assessed.

2.5.1 Behavioral measure - dependent variable

The dependent variables of this study are behavioral intention and behavior. For the purpose of this study, behavioral intention is defined according to Ajzen and Fishbein (1980) as the likelihood that a person will or will not engage in a given behavior. Each participants' stated intention served as the dependent variable in the regression equation. The participants' actual behavior served as the dependent variable in the correlation analyses. Each model has different independent variables and is represented by different kind of questions. The independent variables in the HBM are the person's motivation, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Every one of these independents variables is represented in the questionnaire, which was intended to predict behavioral intention based on these independent variables.

A different set of independent variables is included by the TRA: the person's beliefs that certain behavior leads to certain outcomes; the person's evaluation of the outcomes; the person's beliefs that specific referents think he or she should or should not perform the behavior; the person's motivation to comply with the specific referents. In addition, the person's attitude toward the behavior and the person's subjective norms are assessed. From these factors the person's view of the relative importance of attitudinal and normative components; and the per-
son's intention to perform the behavior can be determined. Such independent variables are represented in the questionnaire by a different set of questions than the HBM in order to predict behavioral intention.

The participants' behavior was intended to be predicted by whether or not the participants of the study signed up for the aerobic program in comparison with their responses on the questionnaire.

The third chapter describes the data collected and presents an analysis according the methodology described in this chapter.
Chapter 3

ANALYSIS OF DATA

This third chapter includes the description and analysis of the collected data according to the methodology presented in the second chapter.

It was previously mentioned that the TRA requires the use of a preliminary questionnaire in order to assess the most salient beliefs that a determined population holds regarding the favorable or unfavorable consequences of performing a given behavior. This preliminary questionnaire also allows the assessment of the population's normative considerations regarding the execution of the behavior. Therefore, for the purposes of this study, two preliminary questionnaires were mailed to two random sample from the UD employees (UD employees were the population for this study).

On the basis of these findings and the variables suggested by the HBM, a final questionnaire was constructed. The purpose of this final questionnaire was to discover which of the models (the HBM or the TRA) is a better predictor of behavior. The first 30 questions were aimed at predicting behavior according to the HBM. The remaining questions were included to predict behavior according to the TRA.

42
3.1 Evaluation measures

In order to get an average for the evaluation of the outcomes needed for the Theory of Reasoned Action another questionnaire was designed. This questionnaire was given to a group of 15 students of a senior class in the Communication Department. This questionnaire included seven items regarding the evaluation of consequences that participating in the aerobics class would have. The evaluation items were assessed using a 7-point Likert scale with values ranging from (1) extremely good to (7) extremely bad. The results of this assessment are shown in Table 1.

The average responses obtained from this questionnaire were added as a constant to the original data. Sex, age, educational level, and income variables were not considered either for the construction of the questionnaire or the analysis of this data (i.e., group of students in the Communication Department). Persons filling out this questionnaire were either unaware of the existence of the aerobic exercise program or they could not participate in it. The members of this sample were not given any information regarding the study; they were only asked to evaluate the seven consequences (see Table 3).
Table 3: Evaluation of Participating in the Aerobics Class.

<table>
<thead>
<tr>
<th>Indexes</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having good cardiovascular health is:</td>
<td>1</td>
</tr>
<tr>
<td>Improved general health is:</td>
<td>1</td>
</tr>
<tr>
<td>Reducing stress and relaxing is:</td>
<td>1</td>
</tr>
<tr>
<td>Strengthening and firming muscles is:</td>
<td>2</td>
</tr>
<tr>
<td>Keeping in good shape is:</td>
<td>1</td>
</tr>
<tr>
<td>Physical injuries such as: shin splints and knee problems are:</td>
<td>6</td>
</tr>
<tr>
<td>Having to hurry back and forth to work from an aerobics class is:</td>
<td>4</td>
</tr>
<tr>
<td>N = 15</td>
<td></td>
</tr>
</tbody>
</table>

3.2 Demographics

Participants for this study were employees at the UD. Of the 618 mailed questionnaires, 148 were completed and returned. Forty-three of them belonged to employees who were participating in the aerobics program at the UD at the moment of the study. The other 105 participants were not participating in the aerobics program at the moment of the study.
From the 148 participants, 49 were male, 98 were female, and one of the participants failed to respond to this item. Participants ranged in ages from 20 to 69. Twenty-one respondents fell into the age category 20-29, 57 corresponded to age the category 30-39, 45 participants' ages ranged from 40-49, and 19 reported themselves to range from 50 to 59. Only 6 fell into the category 60-69.

Thirty-four participants reported that a high school diploma was the last degree obtained, and 31 reported bachelor degree as the last obtained degree. Given the nature of this sample, in which a large proportion of the population are highly educated, it is not surprising that 29 had obtained master's degree and 43 had obtained Ph.Ds, and 11 reported to have earned some other kind of degree.

Regarding income, two participants reported they had an annual income under $10,000. Forty-six reported an annual income ranging from $10,000 to $20,000. An annual income ranging from $20,000 to $30,000 was reported by 41 of the participants, 21 reported their annual income ranged from $30,000 to $40,000, and 37 reported to earn $40,000 and over per year. Only one person did not report an annual income.

Tables 3 through 12 have been included in order to describe the data. A 7-point Likert scale was used in throughout the questionnaire. In order to aid in the interpretation of the data the values from the questionnaire (1) strongly agree to (7) strongly disagree were recoded, so that the negative values (i. e., strongly disagree and extremely bad) were computed as the lowest value (1), and positive values (i. e., strongly agree and extremely good) were computed as the highest
value. By doing this, a high value for any variable or scale indicates a strong, positive response by the participants, and a low value indicates a strong negative response. It is important to mention that values in these descriptive tables have been rounded.

Table 4: Motivation.

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concern with participation.</td>
<td>1</td>
<td>6.27</td>
<td>.903</td>
</tr>
<tr>
<td>Trust to doctors' advice.</td>
<td>1</td>
<td>5.60</td>
<td>1.05</td>
</tr>
<tr>
<td>Compliance with doctors'</td>
<td>1</td>
<td>5.67</td>
<td>.924</td>
</tr>
<tr>
<td>recommendation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation of health</td>
<td>1</td>
<td>4.92</td>
<td>1.49</td>
</tr>
<tr>
<td>preventive measures.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 148
Table 5: Susceptibility and Severity.

<table>
<thead>
<tr>
<th>Perceived severity to cardiovascular diseases.</th>
<th>Number Missing</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived susceptibility to illness.</td>
<td>0</td>
<td>2.83</td>
<td>1.67</td>
</tr>
<tr>
<td>Perceived vulnerability to illnesses.</td>
<td>0</td>
<td>4.81</td>
<td>1.57</td>
</tr>
<tr>
<td>Perceived seriousness of cardiovascular diseases.</td>
<td>2</td>
<td>6.39</td>
<td>1.19</td>
</tr>
<tr>
<td>Consideration about cardiovascular diseases.</td>
<td>1</td>
<td>3.38</td>
<td>1.64</td>
</tr>
</tbody>
</table>

*N = 148*
Table 6: Benefits.

Perception that compliant behavior will reduce threat.

<table>
<thead>
<tr>
<th>Number</th>
<th>Missing</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consideration of the UD program benefits.</td>
<td>0</td>
<td>5.08</td>
<td>1.22</td>
</tr>
<tr>
<td>Perceived control over their general health.</td>
<td>0</td>
<td>6.15</td>
<td>1.07</td>
</tr>
<tr>
<td>Consideration about the effects of their actions on their general health.</td>
<td>3</td>
<td>5.41</td>
<td>1.80</td>
</tr>
</tbody>
</table>

N = 148
Table 7: Structural Variables.

Beliefs about the program.

<table>
<thead>
<tr>
<th>Consideration about...</th>
<th>Number Missing</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cost of the program.</td>
<td>3</td>
<td>5.70</td>
<td>1.40</td>
</tr>
<tr>
<td>Time period of the program.</td>
<td>1</td>
<td>5.39</td>
<td>1.39</td>
</tr>
<tr>
<td>Willingness to participate in the aerobic UD program.</td>
<td>1</td>
<td>3.27</td>
<td>1.91</td>
</tr>
<tr>
<td>Side effects.</td>
<td>0</td>
<td>5.83</td>
<td>1.34</td>
</tr>
<tr>
<td>Convenience of location of UD aerobic program.</td>
<td>2</td>
<td>4.87</td>
<td>1.79</td>
</tr>
<tr>
<td>Inconveniences of participating in the UD program.</td>
<td>1</td>
<td>3.76</td>
<td>1.90</td>
</tr>
<tr>
<td>Staff members of aerobic program as being friendly.</td>
<td>2</td>
<td>5.40</td>
<td>1.20</td>
</tr>
<tr>
<td>Staff members of the UD program as being efficient.</td>
<td>3</td>
<td>5.35</td>
<td>1.18</td>
</tr>
<tr>
<td>Staff members of the UD program as being concern for participants.</td>
<td>3</td>
<td>5.00</td>
<td>1.23</td>
</tr>
</tbody>
</table>

N = 148
### Table 8: Enabling Factors

<table>
<thead>
<tr>
<th>Enabling Factors</th>
<th>Number Missing</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience with cardiovascular diseases in the past.</td>
<td>0</td>
<td>2.03</td>
<td>1.55</td>
</tr>
<tr>
<td>Influence of important others to encourage participation in the aerobic program.</td>
<td>1</td>
<td>2.82</td>
<td>1.73</td>
</tr>
<tr>
<td>Consideration of potential health risks if participating in aerobic programs.</td>
<td>0</td>
<td>3.88</td>
<td>1.74</td>
</tr>
</tbody>
</table>

*N = 148*
Table 9: Attitude toward behavior.

<table>
<thead>
<tr>
<th>Respondents' intention to sign up for program.</th>
<th>Number Missing</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3.43</td>
<td>2.44</td>
</tr>
</tbody>
</table>

| Respondents' attitude toward signing up.     | 1              | 4.15 | 2.25    |

| Respondents' perception of others wanting him/her to participate in the program. | 2              | 3.20 | 1.69    |

N = 148
Table 10: Normative Beliefs.

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spouse</td>
<td>8</td>
<td>3.16</td>
<td>1.77</td>
</tr>
<tr>
<td>Boyfriend or girlfriend</td>
<td>11</td>
<td>3.06</td>
<td>1.61</td>
</tr>
<tr>
<td>Children</td>
<td>8</td>
<td>3.11</td>
<td>1.68</td>
</tr>
<tr>
<td>Employer</td>
<td>2</td>
<td>3.14</td>
<td>1.59</td>
</tr>
<tr>
<td>Colleagues</td>
<td>3</td>
<td>3.26</td>
<td>1.57</td>
</tr>
<tr>
<td>Doctor</td>
<td>3</td>
<td>3.43</td>
<td>1.66</td>
</tr>
<tr>
<td>Mother</td>
<td>8</td>
<td>3.11</td>
<td>1.60</td>
</tr>
<tr>
<td>Father</td>
<td>11</td>
<td>3.02</td>
<td>1.52</td>
</tr>
<tr>
<td>Sister</td>
<td>9</td>
<td>3.20</td>
<td>1.63</td>
</tr>
<tr>
<td>Brother</td>
<td>10</td>
<td>3.12</td>
<td>1.51</td>
</tr>
<tr>
<td>N = 148</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 11: Motivation to Comply with others.

<table>
<thead>
<tr>
<th>Willingness to comply with</th>
<th>Number Missing</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>spouse</td>
<td>14</td>
<td>4.52</td>
<td>1.64</td>
</tr>
<tr>
<td>boyfriend or girlfriend</td>
<td>21</td>
<td>4.04</td>
<td>1.34</td>
</tr>
<tr>
<td>children</td>
<td>15</td>
<td>4.33</td>
<td>1.33</td>
</tr>
<tr>
<td>employer</td>
<td>6</td>
<td>4.44</td>
<td>1.31</td>
</tr>
<tr>
<td>colleagues</td>
<td>6</td>
<td>4.14</td>
<td>1.15</td>
</tr>
<tr>
<td>doctor</td>
<td>4</td>
<td>4.65</td>
<td>1.58</td>
</tr>
<tr>
<td>mother</td>
<td>9</td>
<td>4.28</td>
<td>1.29</td>
</tr>
<tr>
<td>father</td>
<td>13</td>
<td>4.14</td>
<td>1.28</td>
</tr>
<tr>
<td>sister</td>
<td>13</td>
<td>4.05</td>
<td>1.28</td>
</tr>
<tr>
<td>brother</td>
<td>16</td>
<td>3.98</td>
<td>1.23</td>
</tr>
</tbody>
</table>

N = 148
### Table 12: Beliefs

<table>
<thead>
<tr>
<th>Consideration that signing up for the program will...</th>
<th>Number Missing</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve his/her cardiovascular health.</td>
<td>2</td>
<td>5.69</td>
<td>1.37</td>
</tr>
<tr>
<td>Improve his/her general health.</td>
<td>3</td>
<td>5.77</td>
<td>1.36</td>
</tr>
<tr>
<td>Reduce stress.</td>
<td>2</td>
<td>5.43</td>
<td>1.53</td>
</tr>
<tr>
<td>Strengthen and firm muscles.</td>
<td>0</td>
<td>5.83</td>
<td>1.33</td>
</tr>
<tr>
<td>Help him/her to be in good shape.</td>
<td>0</td>
<td>5.74</td>
<td>1.29</td>
</tr>
<tr>
<td>Lead him/her to physical injury.</td>
<td>1</td>
<td>4.65</td>
<td>1.71</td>
</tr>
<tr>
<td>Cause him/her to hurry back and forth from the job.</td>
<td>0</td>
<td>2.72</td>
<td>1.99</td>
</tr>
<tr>
<td>N = 148</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3.3 Reliabilities

As a preliminary step in the data analysis process, it was necessary to test the reliability of the subscales within the HBM and the TRA portions of the questionnaire. Cronbach's alpha, a simple test that assesses the internal consistency of a scale or subscale was chosen (see Carmines & Zeller, 1979).
The results of the reliability checks for the HBM are shown in Table 13. Because only two questions assessed the participants' perceptions of the severity of cardiovascular illnesses, perceptions of susceptibility and severity were combined into a single scale. As can be seen in Table 13, only the subscale that assessed the participants' beliefs about the aerobics program reflected a high level of internal consistency (alpha = .81). The second most internally consistent subscale concerned motivational factors (alpha = .65). The three remaining subscales all had low alpha coefficients, indicating poor internal consistency.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation</td>
<td>.65</td>
</tr>
<tr>
<td>Susceptibility and severity</td>
<td>.18</td>
</tr>
<tr>
<td>Benefits</td>
<td>.16</td>
</tr>
<tr>
<td>Beliefs about the program</td>
<td>.81</td>
</tr>
<tr>
<td>Enabling factors</td>
<td>.25</td>
</tr>
<tr>
<td>N = 148</td>
<td></td>
</tr>
</tbody>
</table>

An assessment of internal consistency was also conducted for the subscales of the TRA. In this case, reasonably high alpha coefficients were found for each scale (see Table 14). No alpha coefficient is reported for the subscale that assessed the participants' evaluations of their beliefs about the consequences of
signing up for the aerobics class. Recall that the average evaluative response from a second sample of participants was used for this subscale. Thus, there was perfect internal consistency for the scale; however, this statistic is not meaningful in light of the method from which it was obtained.

Table 14: Theory of Reasoned Action (TRA).
Cronbach's Alpha for the Subscales of the Theory of Reasoned Action.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral beliefs</td>
<td>.70</td>
</tr>
<tr>
<td>Evaluations of consequences</td>
<td></td>
</tr>
<tr>
<td>Normative beliefs</td>
<td>.98</td>
</tr>
<tr>
<td>Motivation to comply</td>
<td>.89</td>
</tr>
</tbody>
</table>

Note.
N = 148
* Because a constant was used, this scale has zero variance.

3.4 Regression and Correlational Analyses

An initial regression analysis was run to test the ability of the HBM to predict the participants' intention to sign up for the aerobics class. Because a positive linear effect was anticipated, a one-tailed analysis was performed. Despite the poor alpha coefficients found when assessing the internal consistency of the subscales, the participants' intentions to sign up for the class were regressed on the motivation, susceptibility and severity, benefits, beliefs about
the program, and enabling factors subscales. This choice was made because the number of independent variables would prohibit meaningful results if each question was regressed independently.

For this analysis, the five factors listed above were entered without specifying an order or direction. This method allows the data themselves to dictate the final order outcomes. The results from this analysis showed a significant overall effect \[ F(df = 5, 140) = 14.24, p < .0001 \], and the r-squared indicated that 34% of the variance was accounted for.

Turning to an examination of the contributions made by each subscale, only the Beliefs about the Program subscale was significant \( (F = 66.79, p < .0001) \). This result is not surprising, given the poor reliabilities discussed above for the other subscales. The regression equation that follows from these results then, would contain only the Beliefs about the Program subscale, and an individual's intention to sign up for the aerobics program would be predicted with the individual's score from that subscale multiplied times the beta weight of .62.

Following the regression analysis of the HBM factors, a correlational analysis was conducted to test the ability of the regression equation to predict behavior. For this analysis, each individual's predicted behavior score was computed using the regression equation and correlated with the dichotomous behavioral variable of "did sign up for the aerobic class" or "did not sign up for the aerobic class." The results of this analysis yielded a correlation coefficient of .76.
A second regression analysis was run to discover the regression equation and predictive ability of the TRA. Again, a one tailed test was specified because a positive linear effect was anticipated. As specified by Ajzen and Fishbein (1980), the subscales discussed above were not entered into the equation as four independent factors, but were entered as two factors, attitudes and subjective norms. The attitude factor was computed by multiplying each individual's belief that a particular consequence would result from signing up for the aerobics class, with the constant evaluative index for that belief. The subjective norm factor was computed by multiplying each individual's perception of support from an important other by his or her estimate of his or her desire to comply with each important other. After the attitudes and subjective norms were computed, each was regressed on the individuals' intention to sign up for the aerobics class. As with the regression analysis for the HBM, the attitude and subjective norm components were entered without a specified order or direction so that the data themselves would determine the outcome.

The overall regression analysis was significant \( F(\text{df} = 2, 105) = 21.77, p < .0001 \), and the \( r \)-squared indicated that approximately 29% of the variance was accounted for.

Examining the contributions of the attitude and subjective norm factors, both were found to contribute almost equally to the resulting equation. That is, the subjective norm factor was significant \( F = 16.34, p < .0001 \) and produced a beta weight of .34, and the attitude factor was also significant \( F = 16.40, p < .0001 \) and produced a beta weight of .34. Thus, the resulting regression equation
that would be used to predict behavior would multiply each individual's attitude score by .34 and add that figure to the product of each individual's subjective norm score multiplied by .34.

As with the HBM, a correlational analysis was conducted to test behavior. Thus again, each individual's predicted behavioral score was correlated with his or her actual behavior (signed up, or did not sign up for the aerobics class). The correlation coefficient that resulted from this analysis was again .76.

3.5 Summary

Overall, it appears that the HBM and the TRA are equally likely to predict an individual's performance of health related behaviors. Interestingly, these similar results followed from an examination of differing variables. A comparison of the variables involved, as well as a discussion of the limitations of this study and final conclusions will be discussed in the following chapter.
Chapter 4

CONCLUSIONS

4.1 Discussion of Results

The purpose of this study was to examine the predictive abilities of the Health Belief Model and the Theory of Reasoned Action. Both models identify a number of cognitive and social variables that are assumed to relate to behavior, although each emphasizes a different set of these factors. The HBM proposes that one's health-related activities will be predicted from the individual's motivations and his or her perceptions of susceptibility to illness, severity of illness, and the probability that a behavioral change will reduce the risks of illness. The TRA suggests that health-related activities will be predicted from one's beliefs about the consequences of performing a specific activity, one's positive or negative evaluations of those consequences, one's perception that important others support the performance of the behavior, and one's motivation to comply with those others. Each of these factors was investigated using a questionnaire; regression analyses were then conducted to establish a predictive equation for each model, and finally each participant's predicted behavior was correlated with his or her actual behavior. The results of these analyses indicated that the predictions from both the HBM and the TRA regression equations, when compared with actually signing up for the aerobics program, produced a correlation coefficient of .76.
Looking solely at the correlational analysis, one might be tempted to state that the HBM and the TRA predicted behavior equally well. There are a number of factors that make this claim inappropriate, however. One factor that negates the predictive ability of the HBM is the finding that only one of the five subscales it defines was found to be reliable, and it was only this subscale that entered into the final regression equation. Thus in this study, neither motivation, perceived susceptibility and perceived severity of cardiovascular illness, enabling factors, or benefits appeared to be associated with the participants' behavior (signing up for the aerobics class). As noted above, only the participants' beliefs about the program itself (its cost, duration, satisfaction with procedures and staff facilities) contributed to the model's predictive ability. Overall then, the variables suggested by the HBM were not well supported in this study.

In general the TRA was supported, but looking at it in association with the HBM, a flaw is suggested. Recall from the presentation of the findings relevant to the initial survey (in which modal salient beliefs and normative expectations were assessed) that a few of the most commonly listed advantages and disadvantages of signing up for the aerobics class concerned the class itself, and not the consequences of taking the class. Because these beliefs did not reflect consequences, they were omitted from the final questionnaire (see Ajzen & Fishbein, 1980). Interestingly, however, it was this class of factors that made up the only scale within the HBM that had predictive ability. This then suggests that the TRA could increase its ability to predict behavior if it were to incorporate beliefs about the behavior, as well as beliefs about the consequences of performing the behavior.
Finally, it should be stressed that although the regression equations that resulted from this analysis were highly correlated with behavior, neither the set of factors that make up the HBM nor the set of factors that make up the TRA accounted for a large proportion of the variance in behavior. Obviously then factors other than those investigated here influence the decision to participate in an aerobics fitness program. In defense of the two models; however, a correlation coefficient of .76 is quite high, particularly in investigations of the attitude behavior relationship (see Petty & Cacciopo, 1981).

4.2 Limitations of the Study

As always, the claims that can be made from a single investigation are limited, due to the unique set of circumstances in which the study is conducted. In that light, there are several important factors relevant to this investigation that require some discussion. First, recall that the seven items on which the participants should have provided estimates of their evaluations of the consequences of signing up for the aerobics class were accidentally omitted from the questionnaires. Had the participants been contacted a second time and asked to respond to the seven items, it still would have been impossible to match the new responses to the old. Hence a second sample was asked to evaluate the consequences and the average of their ratings for each item was added, as a constant, to the data record of each participant.

The seven omitted items concerned the positive or negative value of having good health, being in shape, reducing stress, improving general health, strengthening and firming muscles, having physical injuries, and hurrying back and
forth to work. It is clear from this list that five of the items are highly valued within this culture, and two are likely to be evaluated quite negatively. Because extreme variation, at least intuitively, was unlikely, the results of the final analyses are probably representative of those that would have been obtained had the seven items been included. Nonetheless, both samples were different in age, education, and socioeconomic status, thus this error necessarily reduced the precision of the measurements and analyses, and therefore must be kept in mind when examining the results.

A second limitation of this study is reflected in the poor reliabilities found among the subscales of the HBM, and may be related to a flaw in the model itself. As noted in the description of the two models in chapter one, only the TRA allows a subsample of the population to determine those beliefs that are relevant to the specific behavior in question. When using the HBM, the researcher creates and/or defines those variables based on his or her assumptions about which factors are relevant. For the purpose of this study, the items that made up the five subscales of the HBM were modeled from those used by Becker et al. (1977). The findings from the reliability analyses indicated that the subscales created for the TRA were acceptable, yet only one subscale created for the HBM was acceptable. The problem with this finding is that due to the method by which the items were created for the HBM, one cannot be sure if it was the class of variables that had no predictive power, or whether the items used did not represent that class.

A third limitation of this study concerns the time frame in which the assessments were made. Originally, the data collection procedure was designed so
that the participants would receive their questionnaires about two weeks before they would be presented with the opportunity to sign-up for the autumn aerobics class. This time frame was upset; however, when members of the research team received through campus mail the announcement of the class, along with a registration form, several weeks earlier than anticipated. This resulted in a change in the procedural time table such that the questionnaires were mailed two weeks after the announcement, rather than two weeks prior to the announcement. While this should have little impact on the theoretical relationships established in the models, it does suggest that behavior may have been influencing cognitions, rather than cognitions influencing behavior.

The final limitation to be discussed concerns the method by which the sample was selected. Because the aerobics program is addressed to the UD employees, the sample for this study was chosen from the University of Delaware telephone directory and campus mailing guide 1987-88. However, this does not seem to be the best way to chose the sample because employees who do not appear in this telephone directory were omitted, resulting in a somewhat biased sample.

4.3 Practical Applications

Despite the limitations of this study, a great deal of information was gained that could be used in one of two applied areas. First, those beliefs about the aerobics class that were found to prohibit participation (such as fear of injury and/or having too little time to shower before returning to work) could be used to implement changes in the program’s design. However, such changes may be
impractical or impossible (e.g., it may not be possible to achieve a full workout and have time to shower on one's lunch hour, and a lack of injuries cannot be guaranteed). Thus, the information gained in this study may be used in a second way; to guide the development of a persuasive campaign.

Recall that three factors across the two models were found to predict behavior. These were (a) beliefs about the aerobics program, (b) attitudes toward participation (beliefs about the consequences of participating in the program and the evaluations of those beliefs), and (c) subjective norms (the belief that important others endorse participation and the motivation to comply with those others). A persuasive campaign, then, could be built around these factors, and should be aimed at changing the salient beliefs that encourage participation, while reinforcing the salient beliefs that prohibit participation. Thus, one persuasive message in this campaign might emphasize the low probability of injury from participation, or better still, might explain that the aerobics instructors are trained to help prevent injuries. Similarly, the persuasive campaign might include testimonial messages from regular participants who experience the benefits of good muscle tone, good health, and/or reduced stress.

4.4 Conclusions

Ajzen and Fishbein (1980) argue persuasively that the poor attitude-behavior relationship that is so often reported in the literature may have its roots in two measurement issues. The first concerns the level of specificity on which behavior is defined, and the second concerns the correspondence between the attitude target and the behavior. Regarding the level of behavioral definition,
Ajzen and Fishbein suggest, for example, that a measure of weight loss may not accurately reflect the extent to which a person has followed a diet. Thus, one must be careful to insure that the outcome assessed is a genuine measure of the behavior that is predicted. To insure that this requirement was met, both for the HBM and the TRA, the behavior that was investigated in this study was signing up for the aerobics program.

The second problem noted by Ajzen and Fishbein (1980) is that of insuring a correspondence between the attitude target and behavior, and this issue was of theoretical importance in this investigation. This is because the HBM uses scales that assess what Ajzen and Fishbein would label "attitudes toward an object or event," while the TRA measures attitudes toward performing a behavior. According to Ajzen and Fishbein, attitudes toward objects may have little systematic relationship with behavior. They state, for example, that one may have an extremely positive attitude toward Mercedes cars, but due to the budgetary consequences of paying for one, hold an extremely negative attitude about buying one. Similarly in this study, one may have an extremely positive attitude toward good health and general fitness, yet hold an extremely negative attitude toward participating in an aerobics fitness program. It is on this issue where the two models under investigation differ, and final conclusions can be stated.

As can be seen in the overview of the HBM presented in chapter one, it is clear that attitudes toward health, illness, medical care, etc., are central to behavior prediction. Yet as Ajzen and Fishbein would have predicted, none of these items was found to be associated with signing-up for the aerobics class.
This finding then adds additional credibility to Ajzen and Fishbein's (1980) theoretical position.

Findings from the HBM, while not disputing Ajzen and Fishbein's (1980) thinking, suggest an area where the TRA might be elaborated. That is, beliefs about the object (the aerobics class) were found to be highly associated with behavior. Yet as noted above, such beliefs, because they do not reflect consequences of the behavior, were omitted from the TRA portion of the questionnaire. Thus the results of this analysis suggest that these beliefs (which, when evaluated yield attitudes) may increase the predictive power of the TRA. Hopefully this idea will be the topic of future investigations.
REFERENCES


Appendix A

PRELIMINARY QUESTIONNAIRE

Department of Communication
301 Ewing Hall
Newark, Delaware 19716
451-8041
June 24, 1988

Dear Associate:

I am a master's student in the Department of Communication here at the University of Delaware, and I am currently working on a thesis concerning health care activities. The focus of this thesis is the aerobics dance fitness program that is offered here at the university, and I am very much interested in learning what you think about it.

Would you please take a few minutes to jot down your thoughts about the aerobics dance fitness program on the following page? Five minutes of your time is all that it will require. If you would, please do it now before it slips your mind. I have enclosed a self-addressed envelop so that you can return it to me conveniently and without delay.

Thank you very much for your willingness to help in this project!

Sincerely yours,

Mireya Binda
PLEASE DO NOT PUT YOUR NAME ON THIS FORM. Please briefly respond to the following questions. Thank you!

1. What do you believe are the advantages of signing up for the aerobics fitness dance program, offered to University of Delaware employees through the College of Physical Education, Athletics, and Recreation, in the autumn semester, 1988?

2. What do you believe are the disadvantages of signing up for the aerobics fitness dance program, offered to the University of Delaware employees through the College of Physical Education, Athletics, and Recreation, in the autumn semester, 1988?

3. What else do you associate with signing up for the aerobics fitness dance program, offered to University of Delaware employees through the College of Physical Education, Athletics, and Recreation, in the autumn semester, 1988?

Thank you!
Appendix B

PRELIMINARY QUESTIONNAIRE II

Department of Communication
301 Ewing Hall
Newark, Delaware 19716
451-8041
June 24, 1988

Dear Associate:

I am a master's student in the Department of Communication here at the University of Delaware, and I am currently working on a thesis concerning health care activities. The focus of this thesis is the aerobics dance fitness program that is offered here at the university, and I am very much interested in learning what you think about it.

Would you please take a few minutes to jot down your thoughts about the aerobics fitness dance program on the following page? Five minutes of your time is all that it will require. If you would, please do it now before it slips your mind. I have enclosed a self-addressed envelop so that you can return it to me conveniently and without delay.

Thank you very much for your willingness to help in this project!

Sincerely yours,

Mireya Binda
PLEASE DO NOT PUT YOUR NAME ON THIS FORM. Please briefly respond to the following questions. Thank you!

1. If you were considering signing up for the aerobics fitness dance program, offered to University of Delaware employees through the College of Physical Education, Athletics, and Recreation, in the autumn semester, 1988, there might be individuals or groups who think that you should perform this behavior. If any such individuals come to mind when you consider signing up for the aerobic fitness dance program, please list them below.

(No names, please. Use titles such as daughter, father, neighbor, wife or husband, etc.)

2. If you were considering signing up for the aerobics fitness dance program, offered to University of Delaware employees through the College of Physical Education, Athletics, and Recreation, in the autumn semester, 1988, there might be individuals or groups who think that you should NOT perform this behavior. If any such individuals come to mind when you consider signing up for the aerobic fitness dance program, please list them below.

(No names, please. Use titles such as daughter, father, neighbor, wife or husband, etc.)

Thank you!
Appendix C

FINAL QUESTIONNAIRE I

The purpose of this study is to explore the way in which people think about the concept of exercising as a preventive health behavior. You are requested to judge the likelihood that a person with a given particular situation would behave in a particular way. Please base your judgements on a scale from 1 (if you feel that the person would definitely behave in that manner) to 7 (if you feel that the person would not behave in that manner at all). Feel free to use any number between 1 and 7.

EXAMPLE:

The weather in Delaware is ____________________________ 1 2 3 4 5 6 7
Good 1/_____ 2/_____ 3/_____ 4/_____ 5/_____ 6/_____ 7/_____ Bad

If you think the Weather in Delaware is extremely good, then you would choose number one.

The weather in Delaware is ____________________________ 1 2 3 4 5 6 7
Good 1/_____ 2/_____ 3/_____ 4/_____ 5/_____ 6/_____ 7/_____ Bad

If you think the Weather in Delaware is quite bad, then you would choose number six (circle it). Please be sure to make judgements on every item. If you do not have certain knowledge about an item, give the best estimate that you can. I will answer any inquiries you may have concerning this study. The results of this study will contribute to our scientific knowledge, but will probably not have direct benefits or risks to you as a participant. Filling out the questionnaire will take you about 20 minutes. All responses will be confidential.

Note. The numbers corresponding to the given scale respond to the following values (1) extremely good (2) quite good (3) slightly good (4) neither good or bad (5) slightly bad (6) quite bad (7) extremely bad.
While I must ask you to sign this sheet, do not enter your name or social security number on the questionnaire. In all probability the responses will be used in publications and research reports presenting statistical data, but all personally identifying material will be removed. You are free to discontinue participation at any time prior to the completion of the project.

Mireya Binda
Project Director
Department of Communication

I have read the above and give my consent to participate in this study.

Name ___________________________ Date ____________________
The questionnaire you are about to complete consists of four different sections. In the first section you are asked to check the category which applies to you. The questions included in the following sections make use of a seven-space rating scale. In these sections you are asked to circle (1) the number of the value that best describes your attitude.

(1) Be sure you answer all items - please do not omit any. (2) Never put more than one check mark on a single scale.

SECTION I.
Please check the category which applies to you.
Do not check more than one category.
1. Please check the appropriate age category
   ___ 20-29
   ___ 30-39
   ___ 40-49
   ___ 50-59
   ___ 60-69
   ___ other

2. Please check the appropriate category
   ___ Male
   ___ Female

3. Please check last degree obtained
   ___ High school
   ___ B.A degree
   ___ Master's degree
   ___ Ph.D
   ___ other
   ___ none

4. Please check the appropriate annual income category
   ___ under $10,000
   ___ $10,000 - $20,000
   ___ $20,000 - $30,000
   ___ $30,000 - $40,000
   ___ $40,000 and over

5. I have participated in the UD aerobics fitness dance program
   ___ never before
   ___ once before
   ___ twice before
   ___ three times before
   ___ four or more times
6. Have you recently considered participating in an aerobics program?
   ___ yes
   ___ no

   If yes, did any of the following factors cause you to consider participation? (Check all that apply).
   ___ physical symptoms or sensations
   ___ advice from doctor
   ___ advice from family or friends
   ___ exposure to health related information in the media
   ___ other -please specify

The following sections include questions which make use of a seven-space rating scale. You are to circle (1) the number of the value that best describes your attitude. For example, if you were asked to rate "The weather in Delaware" on such a scale the seven spaces would be interpreted as follows:

Circle the number which indicates your favorite choice.
The weather in Delaware is
Good 1/___ 2/____ 3/______ 4/_______ 5/_______ 6/_______ 7/_______/Bad

Note. This scale indicate the following values (1) extremely good (2) quite good (3) slightly good (4) neither good or bad (5) slightly bad (6) quite bad (7) extremely bad.

SECTION II.

Please check one of the numbers for each question according to the following scale. Be sure to answer all items - please do not omit any. Never put more than one check mark on a single scale. Circle the number which indicate your favorite choice.

1/______ 2/___ 3/______ 4/_______ 5/_______ 6/_______ 7/_______

Note. Numbers in this scale indicate the following values: (1) strongly agree (2) agree (3) slightly agree (4) neither agree or disagree (5) slightly disagree (6) disagree (7) strongly disagree.

7. I am very concerned with maintaining my general health. 1 2 3 4 5 6 7

8. I trust my doctor's advice. 1 2 3 4 5 6 7

Note. Values in the scale are: (1) strongly agree (2) agree (3) slightly agree (4) neither agree or disagree (5) slightly disagree (6) disagree (7) strongly disagree.

9. I follow my doctor's recommendations and suggestions.  
   1 2 3 4 5 6 7

10. I do more things to safeguard my health than most people.  
    1 2 3 4 5 6 7

11. I worry about developing cardiovascular diseases.  
    1 2 3 4 5 6 7

12. I feel that I am particularly susceptible to illnesses.  
    1 2 3 4 5 6 7

13. I am not vulnerable to cardiovascular diseases.  
    1 2 3 4 5 6 7

14. Cardiovascular diseases are extremely serious.  
    1 2 3 4 5 6 7

15. People with cardiovascular illnesses are seldom able to lead normal lives.  
    1 2 3 4 5 6 7

16. Attending an aerobic fitness dance program greatly reduces the chances of developing cardiovascular illnesses.  
    1 2 3 4 5 6 7

17. I feel that I have little control over my general health.  
    1 2 3 4 5 6 7

18. The actions I take (or do not take) will not affect the chances of developing cardiovascular diseases.  
    1 2 3 4 5 6 7

19. The cost (price in dollars) of participating in the aerobic fitness dance program at the UD is much too high.  
    1 2 3 4 5 6 7

20. The number of weeks/months of aerobic exercise that are necessary to produce improved health is too long.  
    1 2 3 4 5 6 7

21. It is really no bother to work an aerobics fitness class into my weekly routine.  
    1 2 3 4 5 6 7
Note. Values in the scale are: (1) strongly agree (2) agree (3) slightly agree (4) neither agree or disagree (5) slightly disagree (6) disagree (7) strongly disagree.

22. The side effects of participating in an aerobics fitness class are positive. 1 2 3 4 5 6 7

23. The location of the aerobics fitness dance program at UD is convenient. 1 2 3 4 5 6 7

24. Participating in the aerobics fitness dance program at UD would cause problematic changes in my normal routine. 1 2 3 4 5 6 7

25. The staff who run the aerobics fitness dance program at the UD are friendly (if you have no experience with them please give your best guess). 1 2 3 4 5 6 7

26. The staff who run the aerobics fitness dance program at UD are efficient (if you have no experience with them please give your best guess). 1 2 3 4 5 6 7

27. The staff who run the aerobics fitness dance program at UD are concerned about each individual who participates (if you have no experience with them please give your best guess). 1 2 3 4 5 6 7

28. I have experienced cardiovascular difficulties in the past. 1 2 3 4 5 6 7

29. I have been encouraged to participate in an aerobics fitness class by my friends and/or family. 1 2 3 4 5 6 7

30. Participating in an aerobics fitness program poses no potential health risks. 1 2 3 4 5 6 7

31. I intend to sign up for the aerobics fitness dance program, offered to UD employees through the college of Physical Education, Athletics and Recreation, Autumn, 1988. 1 2 3 4 5 6 7

32. I have a favorable attitude toward signing up for the UD aerobics fitness dance program in autumn semester 1988. 1 2 3 4 5 6 7
Note. Values in the scale are: (1) strongly agree (2) agree (3) slightly agree (4) neither agree or disagree (5) slightly disagree (6) disagree (7) strongly disagree.

33. Most people who are important to me think I should sign up for the UD Aerobic Fitness Dance Program in Autumn Semester, 1988. 1 2 3 4 5 6 7

34. My spouse thinks I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

35. My boyfriend or girlfriend thinks I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

36. My children think I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

37. My employer thinks I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

38. My colleagues think I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

39. My doctor thinks I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

40. My mother thinks I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

41. My father thinks I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

42. My sister thinks I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7

43. My brother thinks I should sign up for the UD Aerobics Fitness Dance Program for Autumn Semester 1988. 1 2 3 4 5 6 7
SECTION III.

Please check one of the numbers for each question according to the following scale. Circle the number which indicates your favorite choice. Never put more than one check mark on a single scale.

Not at all 1/234567 Very much

Note. Values in the scale are: (1) extremely (2) quite (3) slightly (4) neither (5) slightly (6) quite (7) extremely. Notice the concept given in the extremes of the scale.

44. Generally thinking, how much do you want to do what your spouse thinks you should do? 1 2 3 4 5 6 7

45. Generally thinking, how much do you want to do what your boyfriend or girlfriend thinks you should do? 1 2 3 4 5 6 7

46. Generally thinking, how much do you want to do what your children think you should do? 1 2 3 4 5 6 7

47. Generally thinking, how much do you want to do what your employer thinks you should do? 1 2 3 4 5 6 7

48. Generally thinking, how much do you want to do what your colleagues think you should do? 1 2 3 4 5 6 7

49. Generally thinking, how much do you want to do what your doctor thinks you should do? 1 2 3 4 5 6 7

50. Generally thinking, how much do you want to do what your mother thinks you should do? 1 2 3 4 5 6 7

51. Generally thinking, how much do you want to do what your father thinks you should do? 1 2 3 4 5 6 7

52. Generally thinking, how much do you want to do what your sister thinks you should do? 1 2 3 4 5 6 7

53. Generally thinking, how much do you want to do what your brother thinks you should do? 1 2 3 4 5 6 7
SECTION IV.

Please check one of the numbers for each question according to the following scale. Circle the number which indicates your favorite choice. Be sure to answer all items - please do not omit any. Never put more than one check mark on a single scale.

1/  2/  3/  4/  5/  6/  7/

Note. Values in the scale are: (1) very likely (2) likely (3) slightly likely (4) neither likely or unlikely (5) slightly unlikely (6) unlikely (7) very unlikely.

54. My signing up for the UD aerobic fitness dance program for autumn semester 1988 would improve my cardiovascular health.  
55. My signing up for the UD aerobic fitness dance program for autumn semester 1988 would improve my general health.  
56. My signing up for the UD aerobic fitness dance program for autumn semester 1988 would reduce stress and help me relax.  
57. My signing up for the UD aerobic fitness dance program for autumn semester 1988 would strength and firm my muscles.  
58. My signing up for the UD aerobic fitness dance program for autumn semester 1988 would keep me in good shape.  
59. My signing up for the UD aerobic fitness dance program for autumn semester 1988 would lead to physical injury such as shin splints or knee problems.  
60. My signing up for the UD aerobic fitness dance program for autumn semester 1988 would cause me to have to hurry back and forth to my work.
Appendix D

FINAL QUESTIONNAIRE II

Please mark the response that best represents your evaluation.

1. Having good cardiovascular health is:
   Good ______/_______/_______/_______/_______/_______ Bad
   Extremely Quite Slightly Neither Slightly Quite Extremely

2. Improved general health is:
   Good ______/_______/_______/_______/_______/_______ Bad
   Extremely Quite Slightly Neither Slightly Quite Extremely

3. Reducing stress and relaxing is:
   Good ______/_______/_______/_______/_______/_______ Bad
   Extremely Quite Slightly Neither Slightly Quite Extremely

4. Strengthening and firming muscles is:
   Good ______/_______/_______/_______/_______/_______ Bad
   Extremely Quite Slightly Neither Slightly Quite Extremely

5. Keeping in good shape is:
   Good ______/_______/_______/_______/_______/_______ Bad
   Extremely Quite Slightly Neither Slightly Quite Extremely

6. Physical injuries such as shin splints and knee problems are:
   Good ______/_______/_______/_______/_______/_______ Bad
   Extremely Quite Slightly Neither Slightly Quite Extremely

7. Having to hurry back and forth to work from an aerobics class is:
   Good ______/_______/_______/_______/_______/_______ Bad
   Extremely Quite Slightly Neither Slightly Quite Extremely
Appendix E

AEROBIC PROGRAM ANNOUNCEMENT

*************************************************************************
AEROBIC 'FITNESS' DANCE PROGRAM
*************************************************************************

The College of Physical Education, Athletics and Recreation together with Employee Relations announce the beginning of a new session Monday, Wednesday and Friday evening aerobic classes for University employees. This session will begin on June 13, 1988 and end July 29, 1988 for a cost of $15 per person. Please note that there will only be an evening session.

University employees may use their Physical Exam/Optical Form to pay for this class. If you choose this option of payment, you must continue to pay the Recreation Department and submit your Physical Exam/Optical form AND receipt to the Benefits Office for reimbursement (check below).

Please detach the registration form and check payable to the University of Delaware to:
CYNTHI HALEY, Room 103, Carpenter Sports Building
Guidelines for Aerobic Dance

1. During an aerobic class your heart rate should be maintained at a rate of 70-85% of your maximum heart rate for safety and maintenance of a training level. This will be explained to you at the beginning of the session.

2. You should have a physical if you are unsure of your state of health or are over 35 years of age.

3. If you have problems with routines or have an injury, you are encouraged to discuss this with the instructors.
4. Wear comfortable, loose fitting clothes and a good pair of aerobic shoes - instructors can advise you on this. Shorts, sweats (not in hot weather), and leotards are all acceptable.

5. You are invited to share ideas and concerns for the program with the instructors or Cynthia Haley, the program coordinator, at any time.

NAME: ____________________________

DEPARTMENT: _____________________ PHONE: _________________________

Please check:

_____ Evening Aerobics (5:05 - 6:00, Newark Hall)

_____ Check Enclosed   _____ Receipt Requested

Session: 6/13/88 - 7/29/88