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THE RELATIONSHIP AMONG HEALTH LOCUS OF
CONTROL, VALUE OF HEALTH, AND HEALTH
BEHAVIOR IN ADOLESCENTS

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of the requirements for the degree of
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Phyllis K. More
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ABSTRACT

This study explores selected personality factors which may explain part of the variance in health behavior in adolescents. Theoretical and empirical evidence suggested that internal health expectancy and high value of health should be related to adolescents' choices of health behavior. Health expectancy was measured by the Multidimensional Health Locus of Control Scales (Wallston, Wallston & DeVellis, 1978), value of health by the Value Survey (Wallston, Maides & Wallston, 1976), and adolescent health behavior by the Student Lifestyle Survey (McKillip & Taylor, 1979). The Student Lifestyle Survey measures ten components of health behavior as follows: (1) alcohol use, (2) smoking, (3) caffeine use, (4) sexual intercourse, (5) adequacy of sleep, (6) hours worked, (7) exercise frequency, (8) amount studied, (9) stress level, and (10) drug use. Factor analysis of the scale using principal factors with varimax rotation yielded four factors as follows: Factor #1 - alcohol use, drug use, sexual intercourse and smoking; Factor #2 - sleep and alcohol use; Factor #3 - exercise; and, Factor #4 - caffeine use and hours studied. Four hundred and twenty-two adolescents aged 14 through 18 who live in the New York Metropolitan area participated in the study. Hypothesized relationships among internal health locus of control, high value of health and lifestyle factors three and four were not

supported. Using canonical correlation, all of the variables in this investigation together contributed to explaining 8.5% of the variance in adolescent health behavior. However, as less than 10% of shared variance existed between the two sets of variables, this relationship was treated as not meaningful. The major finding was a correlation between powerful others' health locus of control and lifestyle factor #1 ($r = .20$, $p < .01$).

Approved: _____

Professor Ardis Swanson,
Chairperson

CHAPTER I

THE PROBLEM

Introduction

Adolescence is a period of marked growth and development during which the individual begins to view self and family in a broad social context (Lidz, 1968). During this stage, ego identity and choice of lifestyle become critical themes while at the same time the adolescent experiences pressure to conform to standards and expectations of the peer group (Bruhn & Cordova, 1978).

Among lifestyle choices, the adolescent has numerous options. Many behaviors available to the adolescent may engender a high level of health, while other behaviors, sometimes supported by the peer group, may have detrimental effects on health.

Despite the large number of adolescents and the current visibility of health related topics in the media, there is a dearth of information regarding adolescent health behavior. One out of every five persons in the United States is aged 10 to 19, totaling about 40 million adolescents (US Bureau of Census, 1979). In an era in which active participation in one's own health has become a dominant theme, there is little empirical evidence about the range of health behaviors of adolescents, much less theory that adequately explains adolescents' choices.

Various theories have been developed for an exploration of learned behavior in general. Two of these theories have been further utilized to explore the nature of health behavior as a learned phenomenon, Social Learning Theory (Rotter, 1954) and Value Theory (Rokeach, 1973). However, these theories have not been applied to examine health behavior in adolescents.

This study investigated the utility of the personality characteristics health locus of control, originating from Social Learning Theory, and value of health, a derivative of Rokeach's Value Theory, in understanding adolescents' choices of health behaviors.

It is hoped that the results of the study will enhance the knowledge base regarding adolescents' health behavior. Selected personality characteristics of health locus of control and value of health have been explored as independent variables.

Problem

What is the relation among health locus of control, the value of health as perceived by adolescents, and health behavior in adolescents aged 14-18?

Subproblems

1. What is the relation between internal health locus of control and adolescent health behavior?
2. What is the relation between chance health locus of control and adolescent health behavior?
3. What is the relation between powerful others' health locus of control and adolescent health behavior?

4. What is the relation between value of health and adolescent health behavior?

5. What is the relation of multidimensional health locus of control and value of health to adolescent health behavior?

Definitions of Terms

Health: experiencing comprehensive well being which reflects the fullest development of a person's abilities, character and quality of life (Smith, 1983).

Health locus of control: the degree to which individuals believe that their health is controlled by their own behavior or by external forces. Health locus of control has three dimensions.

Internal health locus of control: the belief that the factors which determine health are moderated by the individual's own choice.

Chance health locus of control: the belief that the factors which determine health are a matter of fate, luck or chance.

Powerful others' health locus of control: the belief that one's health is determined by powerful other people such as doctors, nurses, family or friends.

The individual choice dimension is measured by the Internal Health Locus of Control (IHLC) Scale, the chance dimension by the Chance Health Locus of Control (CHLC) Scale, and the powerful others' dimension by the Powerful Others' Health Locus of Control (PHLC) Scale. (Wallston, Wallston & DeVellis, 1978). (See Appendix A.)

Value of health: an enduring prescriptive or proscriptive belief that a specific end state of existence is preferred and serves as a guide to achieving the preferred end state of existence. Value of health is measured by a modified version of Rokeach's (1973) Value Survey. (Wallston, Maides & Wallston, 1976). (See Appendix B.)

Health behavior: activities generally assumed to be related to health and over which adolescents have a choice. Health behavior is measured by the Student Lifestyle Survey (McKillip & Taylor, 1979) with minor modification of two items. (See Appendix C.)

Studious lifestyle (adolescent health behavior factor #3): the number of hours spent in study per week.

Active lifestyle (adolescent health behavior factor #4): the frequency of engaging in eight types of strenuous physical activities.

Theoretical Rationale

There is some evidence of a paradigm shift in the health care system from traditional concepts of mechanistic care and cure to alternative concepts of a health model which is posited on the belief that every person is a unique individual with the capacity for strength, health, and numerous untapped resources (Smith, 1983). A fundamental premise of this model is that the responsibility for health rests within the individual for what he has done, continues to do, and chooses to do in the future.

Supporting the model, there is an expanding body of empirical studies with adult subjects that supports a relationship between lifestyle elements of stress control, self-responsibility, nutrition,

and physical fitness and the level of health achieved (Belloc & Breslow, 1972; McCamy & Presley, 1975). Some assert that such lifestyle patterns may well be influenced by learned behavior patterns (Hoyman, 1974; Knowles, 1977).

The question of why some individuals undertake health promoting behavior while other individuals do not is perplexing to health care providers, especially in a society that has increasingly adopted a eudaimonistic model of health (Smith, 1983). Within the eudaimonistic model, health is viewed as a lifelong process of growth that results in humans who are joyful and creative. As envisioned earlier by Maslow (1962), such individuals function at optimum physiologic levels, experience psychological safety, fulfill the need for love and affection, experience self-esteem, and have energy and vitality to fulfill higher level needs of creativity and self-actualization.

Health, within this context, is related to myriad intrapersonal, interpersonal and environmental factors that affect the individual's experience and growth process. Although all persons are born with an inherent potential and capacity for continuous personal growth, environment and experience modify the course of development and may impede or facilitate movement toward self actualization and health.

A substantial portion of human experience occurs within the scope of individual choice. An explanation regarding the choice an individual makes from the range of behaviors potentially available has been explored by Rotter (1954, 1966). The framework of Social Learning Theory proposes that behavior is based on how the individual

perceives the situation, the individual's locus of control (expectancy that attainment of a desired goal is or is not contingent upon one's own behavior) and the reinforcement value (the degree to which the individual values that goal or outcome).

Rotter asserts that locus of control has both static and dynamic properties in the following ways. In general, outcomes serve to strengthen an expectancy that a particular behavior will be followed by the outcome in the future. Thus, when outcome is seen as contingent upon one's behavior, as is the case in internal locus of control, the outcome serves to reinforce the locus of control. However, when outcome is not seen as contingent upon one's behavior, as is the case in chance locus of control and powerful others' locus of control, then the outcome tends not to reinforce the locus of control. Empirical support is offered by several therapy studies, all using college students as subjects, where change has been induced from an external to a more internal position (Dua, 1970; Foulds, 1971; Parks, Becker, Chamberlain & Crandall, 1975).

While there have been numerous studies investigating the relationship of the generalized expectancy locus of control to health behavior, results have been inconsistent. It was believed that prediction of health behavior would be enhanced by using a more specific expectancy measure, health locus of control, rather than the measure of generalized expectancy developed by Rotter (1966). Support for this contention is found in studies by Kaplan and Cowles (1978), Lewis, Morisky and Flynn (1978), Wallston, Maides and Wallston (1976),

Wallston, Wallston, Kaplan and Maides (1976), and, Wildman, Rosenbaum, Framer, Keane and Johnson (1979). All of these researchers reported a relationship between internal health locus of control and a variety of health behaviors. However, none of these studies investigated adolescent subjects. Therefore, it was unknown whether comparable relationships exist in a younger population.

Factor analysis of the Health Locus of Control Scale, conducted by Wallston, Wallston and DeVellis (1978), revealed that the scale represented three dimensions of health locus of control rather than the two dimensions originally conceptualized. A new Multidimensional Health Locus of Control Scale was developed (Wallston, Wallston & DeVellis, 1978) to reflect the three dimensions for the control of reinforcement - internal health locus of control, chance health locus of control, and powerful others' health locus of control.

Research with the new tool has been limited and the results reported are not consistent, though they are generally in the theoretically predicted direction (Anderson, 1980; Hallal, 1980; Pill & Stott, 1981). Based on the existing research which tends to support a relationship between internality and health behavior, the writer hypothesized that there would be a correlation between internal health locus of control and studious lifestyle (adolescent health behavior factor #3) and a correlation between internal health locus of control and active lifestyle (adolescent health behavior factor #4). As there is little empirical evidence regarding the relationships of chance health locus of control and powerful others health locus of control to health behavior, no hypotheses were made and the potential

relationships were explored as research questions.

Furthermore, it must also be considered that studies which have failed to support a relationship between health locus of control and health behavior often did not consider another important determinant of health behavior, reinforcement value. Rotter (1975) emphasizes that behavior is a function of locus of control (i.e. expectancy) and reinforcement value and that prediction of behavior from the locus of control concept will be strengthened by concomitant measurement of the reinforcement value of the behavior being studied. There is empirical support for this proposition in several studies which have investigated the value of health in conjunction with locus of control to better understand and predict health behavior (DeVito, Bogdanovich & Reznikoff, 1982; Kaplan & Cowles, 1978; Saltzer, 1978, 1981; Wallston, Maides & Wallston, 1976; Wallston, Wallston, Kaplan & Maides, 1976). All of the above cited reported consistent support for the relationship between internal health locus of control and high value of health to a variety of health behaviors. However, none of the studies investigated the relationships in adolescents and it was unknown whether comparable relationships exist in the adolescent population.

This study hypothesized that there would be a correlation between high value of health and studious lifestyle (adolescent health behavior factor #3) and a correlation between high value of health and active lifestyle (adolescent health behavior factor #4). In addition, it was hypothesized that high value of health and internal

health locus of control would be better predictors of studious lifestyle and active lifestyle than either variable alone.

Adolescent health behavior is undoubtedly a complex phenomenon and several factors may be determinants of such behavior. This study explored the interaction of health locus of control and value of health in understanding and predicting adolescent health behavior. It was anticipated that adolescents who hold internal health locus of control expectancies and who value health highly would undertake different health behavior than adolescents who hold external chance or powerful others' health locus of control expectancies and who value health less.

Hypotheses

1. There will be a significant correlation between internal health locus of control and studious lifestyle (adolescent health behavior factor #3).
2. There will be a significant correlation between internal health locus of control and active lifestyle (adolescent health behavior factor #4).
3. There will be a significant correlation between high value of health and studious lifestyle (adolescent health behavior factor #3).
4. There will be a significant correlation between high value of health and active lifestyle (adolescent health behavior factor #4).
5. The R^2 change will be significantly greater when studious lifestyle (adolescent health behavior factor #3) is regressed on

both internal health locus of control and value of health than when studious lifestyle is regressed on either internal health locus of control or value of health alone.

6. The R^2 change will be significantly greater when active lifestyle (adolescent health behavior factor #4) is regressed on both internal health locus of control and value of health than when active lifestyle is regressed on either internal health locus of control or value of health alone.

7. There will be at least one significant relationship among personality measures of internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health and measures of adolescent health behavior (stressful lifestyle - factor #1, hedonic lifestyle - factor #2, studious lifestyle - factor #3, active lifestyle - factor #4).

Research Questions

The following questions were posed as research questions because there was insufficient reason to predict the direction of the relationships.

1. What is the relation among four personality measures (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and stressful lifestyle (adolescent health behavior factor #1)?

2. What is the relation among four personality measures (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and

hedonic lifestyle (adolescent health behavior factor #2)?

3. What is the relation among four personality measures (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and studious lifestyle (adolescent health behavior factor #3)?

4. What is the relation among four personality measures (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and active lifestyle (adolescent health behavior factor #4)?

Significance of the Study

Despite their apparent physical health, many adolescents' behavior places them at risk for both incidental and potential long term effects that could negatively influence health. Annually, nearly 1.2 million female teenagers become pregnant. Most of such pregnancies are unintentional (74%), in single females (66%), and 30,000 occur in girls less than 15 years of age (Guttmacher Institute, 1981). Approximately one third of the 400,000 abortions performed annually in the United States involve teenagers (Cates, 1980). Sexually transmitted diseases among 15-19 year olds increased 21% from 1960 to 1978 (CDC, 1981). Cigarette smoking and substance abuse are prevalent. For adolescents 12 to 17 years old, 71% have used cigarettes and 21% are daily smokers. Marijuana has been used by 57% and 5.5% use it daily. Stimulants have been used by 35% and 16% have used cocaine (Johnson, Bachman & O'Malley, 1984). Alcohol use has also been increasing in teenagers. About 80% report having had a drink and of this group, 50% drink at least once a

month and nearly 6% drink on a daily basis (Richmond, 1979). One outcome is that more than 5000 teenagers are killed yearly in auto accidents due to driving while intoxicated (Singer, 1985).

These behaviors are all within the personal choice of adolescents. However, at this time, there is a paucity of information regarding antecedents of such behaviors. Little is known about why some adolescents choose behaviors that place them at risk while others choose health promoting behaviors.

Studies of adults suggest that one probable antecedent of health behavior is the individual's locus of control (expectancy regarding control of reinforcement). It has been demonstrated that individuals holding internal locus of control expectancies, i.e., a belief that the individual alone has control over outcomes of behavior are more likely to keep themselves healthy than those holding external locus of control expectancies, i.e., a belief that forces beyond the control of the individual such as chance, fate and powerful others have control over outcomes of behavior (Dabbs & Kirscht, 1971; James, Woodruff & Werner, 1965; Naditch, 1973).

A second probable antecedent of health behavior in adults is the importance placed on health in relation to other terminal values. When one considers how the individual ranks value of health compared to other terminal values, it has generally been found that individuals ranking health high tend to demonstrate more health behaviors (Kaplan & Cowles, 1978; Wallston, Maides & Wallston, 1976). However, it is not known whether the aforementioned antecedents influence adolescent health behavior in a fashion similar to adults.

Since adolescence is a period of rapid physical growth coupled with profound emotional changes, it is a time not only to learn more about how to stay healthy, but also to assume health promoting behaviors. By establishing relations among an adolescent's health locus of control, value of health, and health behavior, the health care system and particularly nursing, might use the data to improve health care delivery to this population.

A fundamental goal of nursing is the maintenance and promotion of health of all people. This aim is most difficult to achieve with adolescents due to the limited knowledge base regarding antecedents of their health behavior. While human behavior is viewed as a major factor that influences health, there is a deficit in understanding why some adolescents choose health promoting behaviors while others do not.

Findings of this study have implications beyond nursing. In the United States, over \$200 billion (more than 10% of the country's annual gross national product) is spent yearly on health care (Matarazzo, 1982). Human and fiscal resources are being allocated for the treatment of currently preventable health problems such as lung cancer, some cardiovascular illnesses, and substance abuse. Substantial sums are used for health education programs, marketing, and health policy planning. It is believed that efforts should be dedicated to helping currently healthy individuals remain healthy by establishing and maintaining health promoting behaviors. Yet the anticipated outcome of better health experienced by more individuals in the society has not been fully realized.

If more were understood about the correlates of health behavior

in adolescence, specific intervention approaches could be designed.

Better understanding of the relations among health locus of control and value of health to adolescents' health behavior could contribute to more resource allocation aimed at enhancing the health of the adolescent segment of our population.

Delimitations

1. The study was limited to adolescents who have at least an eighth grade education and have no teacher identified barrier to reading English.

2. The study was limited to adolescents who are free of any major diagnosed chronic disease as such adolescents may have medical regimens to follow that would modify health behavior substantially from that of adolescents in general good health.

CHAPTER II

REVIEW OF THE LITERATURE

The following review discusses literature pertinent to the study. The review is presented in three parts: adolescent health behavior; health locus of control; and value of health.

Health Behavior

Introduction

The concept of health behavior as a significant factor that contributes to the individual's level of health or illness has been discussed in the literature for the past 20-25 years. From a previous historical perspective where responsibility for health or illness has been attributed to gods, demons, forces of nature, or luck, there has been a progression to the recognition that what the individual does in lifestyle, the patterns of eating, drinking, smoking, exercise and rest, and coping with environmental hazards are the major known modifiable causes of illness in America today (Belloc & Breslow, 1972; Haggerty, 1977).

Of greater interest to this study is the theoretical view, supported by a limited body of researched evidence, that health behavior has effects on the current level of health the individual experiences and cumulative effects on health or illness over time. Moreover, it is asserted that health behavior evidenced in adulthood is not a

spontaneous phenomenon but rather a result of learning and experiences which occur from childhood on. Some believe that adolescence is the critical period in the development of health behavior, for, as described by Brum and Cordova (1978, p. 17):

... at this stage, ego identity and choice of lifestyle can easily be directed and molded by prevailing social expectations. Moreover, an individual is expected to emerge from the period of adolescence as an integrated personality with specific goals to pursue.

However, despite the evidence of a relationship between health behavior and level of health or illness, there are relatively few studies that have examined health behavior in adolescents and even fewer which have attempted to investigate correlates of health behavior. This study was designed to do so.

This section of the review of the literature examines studies of both adults and adolescents in which health behavior has been the major variable investigated.

Adult Health Behavior

The initial evidence that health behavior is related to physical health was established in an extensive study done by Belloc and Breslow (1972). They examined the relationship between common health practices (a term synonymous with health behavior) and physical health status in a probability sample of 6,928 adults in Alameda County, California in 1965. Investigator designed questionnaires measured common health practices of hours of sleep, regularity of meals, physical activity,

and smoking and drinking behavior, and also measured physical health status by questions about disability, chronic conditions, impairments, illness symptoms, and energy level. Statistically significant differences (Chi-square test at .05) in the expected direction were found for every item in the following areas: sleeping 7-8 hours per night; eating only regular meals; weight within the normal range for height; having moderate physical activity and exercise; avoidance of excessive drinking; and not smoking. In addition, Belloc and Breslow demonstrated that the effects of health practices were cumulative, and that those individuals who reported all or many of these health promoting practices were in better physical health, even though chronologically older, than a younger cohort who followed fewer such practices. The relationships found were independent of economic status.

Confirmation of Belloc and Breslow's findings was reported by Reed (1983) in a study of 542 individuals aged 17-68. Physical health status was measured in five categories: complaints, symptoms, activity limitation, chronic conditions, and mobility limitations. A fixed format precoded interview schedule was utilized. Health practices, which included the same indices as Belloc and Breslow with the addition of health examinations when asymptomatic, were also measured in the interview. Data were analyzed using the 'ridit' (Relative to an Identified Distribution) and findings were that physical exercise, amount of sleep, regular eating habits, non-smoking and normal weight are factors affecting physical health status. In addition, though none in the sample reported all six good health practices, the effects

of the number of good health practices on physical health status was found to be additive with each additional health practice associated with an increase in physical health status (up to three practices).

Similar findings were reported by Pill and Stott (1981) who examined the relationship between lifestyle factors, i.e., behaviors that the individual regards as a result of personal choice such as diet and exercise and health. The sample consisted of 41 women aged 30-35 years living in South Wales, U.K. and both variables were measured by a semistructured interview format. For the sample, the greater the number of lifestyle factors present, the more likely the woman reported a view of health as a dynamic relationship in which the individual has some control (Chi-square = 10.3, df = 2, p < .01).

Two studies have explored the concept of the dimensions of health behavior. Langlie (1979) questioned whether preventive health behavior is unidimensional, composed of unrelated behaviors, or multidimensional. Using a sample of 383 randomly selected adults, the investigator focused on behavior subject to the respondents' control, e.g., exercise, nutrition, and use of seat belts. An investigator designed questionnaire was used and findings were that 37 of 55 intercorrelation coefficients were both positive and significant thus rejecting the hypothesis that preventative health behaviors are independent of one another. This is of significance to the current study which investigated adolescent health behavior as measured by ten personal health habits.

Similarly, Harris and Guten (1979) questioned what activities individuals engage in that are health protective, i.e., "any behavior performed by a person, regardless of health status, in order to protect, promote or maintain health whether or not such behavior is objectively effective toward that end," p. 18, and what the empirical dimensions of such behavior are. They interviewed a sample of 842 adults aged 18 and older and determined that almost all adults do perform some health protective behaviors. Of a maximum score of 30 activities, the mean score was 12.0 and the median was 11.0. The six most common behaviors of a total of fifteen reported by respondents in decreasing frequencies were: nutrition and eating habits (70%); sleep, rest and relaxation (46%); exercise and recreation (35.5%); contact with or compliance with professionals in the health care system (18.8%); attention to psychological, mental or emotional well being (12.6%); and watching one's weight (9.7%). In addition, cluster analysis yielded a dendrogram in which five clusters evolved containing 18 of the 30 behaviors. Two of these clusters termed health practices and harmful substance avoidance by Harris and Guten include behaviors identical to the behaviors which were investigated in the present study.

It has been shown that health behavior is related to physical health and that there is an additive relationship between the number of health behaviors and health, that health behavior is multidimensional, and that most adults do engage in some health behaviors.

Adolescent Health Behavior

As this study investigated adolescent health behavior, it is relevant to consider epidemiologic data regarding selected health behaviors among adolescents aged 12-17 in the United States. There is evidence that many adolescents engage in behaviors that place them at risk of illness.

Zelnick and Kanter (1981) have documented a steady increase in the rate of premarital intercourse from 30% of all surveyed in 1971, to 43% in 1976 and 50% in 1979. Teenage pregnancy is considered by some to be of "epidemic" proportions and now occur at a level of approximately 1.2 million a year (Guttmacher Institute, 1981). Increases in rates of intercourse and pregnancy have led to a multiplicity of problems including increased incidence of sexually transmitted diseases, increased rate of pregnancy related illnesses, increased rate of school drop-outs, and, a repeat pregnancy rate of 40% within two years (Zabin, Hirsch & Smith, 1984).

According to annual surveys by the University of Michigan's Institute for Social Research, alcohol use and substance abuse are prevalent. They found that 64% of teenagers have tried at least one illicit drug before completing high school, and on a daily basis, one out of 16 high school seniors smokes marijuana or drinks alcohol (Johnson, Bachman & O'Malley, 1982). Kovar (1978) citing unpublished data from the National Center for Health Statistics reports that while overall illness and death rates for adolescents are low compared to other age groups, 70% of the deaths result from

accidents or violence and that of this 36% are related to motor vehicles.

Despite the evidence that many adolescents engage in behavior that not only places them at risk for future health and illness problems but also diminishes the current level of health experienced, relatively few studies have investigated adolescent health behavior as a multidimensional phenomenon. No studies have been found which have researched such behavior and its relation to health locus of control and value of health which is the purpose of the current study.

Self-Reported Adolescent Health Behavior

McKillip and Taylor (1979) investigated personal health habits and relationship to perceived illness and use of medical services. A random sample of 893 university students (ages not reported) was selected and 400 responded to the Student Lifestyle Survey, a mailed questionnaire. The scale for personal health habits measured the following behaviors: smoking, average daily cigarette consumption; alcohol use; caffeine consumption; sexual activity; frequency of 12 stress related behaviors; frequency of adequate sleep; frequency of exercise; number of hours worked at a job; and, percent overweight. Positive correlations were found between smoking, caffeine consumption, sexual activity, overweight and use of health services. A negative correlation was found between adequate sleep, exercise and perceived illness. Moreover, factor analysis yielded the following three factors:

Factor 1 (Stressful Lifestyle)

stress (+)
hours worked (+)
adequate sleep (-)
exercise (-)

Factor 2 (Hedonic Lifestyle)

smoking (+)
alcohol use (+)
caffeine use (+)
sexual activity (+)

Factor 3 (Studious Lifestyle)

study (+)
secondary loadings: coffee consumption (+)
exercise (+)
alcohol use (-)

The authors suggest that one implication of these lifestyle factors is that prevention programs for college students should be aimed at clusters of personal health habits rather than at changing single habits.

Two additional studies utilized self reported behavior in investigating adolescent health behavior. Wolfgang and Dennison (1982) explored the relationship between self reported behavior and biomedical risk factors. A questionnaire was used to assess smoking frequency and dietary fat intake and biomedical measures were made of carbon monoxide blood levels (an indicator of smoking) and blood cholesterol (an indicator of fat consumption). In a sample of 138, with a mean age of 17.03 years, statistically significant correlations were found between self reported smoking and carbon monoxide blood level ($r = .687$) and between smoking and cholesterol ($r = .212$). The correlation between reported dietary fat and blood cholesterol of

r = .11 approached significance (critical value needed at $\alpha = .05$ is .164, N = 138, df = 137). Self reported behavior of adolescents has utility for predicting biomedical status of adolescents.

Nader, Perry, Maccoby, Solomon, Killen, Telch and Alexander (1982) also used self reported behavior in their investigation of adolescents' perceptions of their current health practices and needs and their level of satisfaction with their personal health. An opportunistic sample of 168 tenth graders in California was used. They responded to a pre-coded, pretested investigator designed questionnaire which measured smoking, drug use, perception of own health behavior, assessment of own health needs, exercise and eating behavior, and perception of stress and how it was dealt with. Most findings were reported as percentages and are as follows: smoked tobacco within the past 24 hours (12.5%); high from alcohol within the previous week (17.9%); high from marijuana within the previous week (8.3%); estimated self to be overweight (17%); no moderately vigorous physical activity within the past three months (3.6%); and, used excessive salt in food (40%). Adolescents' perception of stress was measured on a 12 point scale and most felt tense 'occasionally' (mean 4.3, mode 5.0) and felt pressed for time 'half to most of the time' (mean 6.8, mode 5.0). Following initial (pre-test) data collection, subjects attended a health education course focused on modifying cardiovascular risk factors, e.g., smoking, overweight, cholesterol intake, lack of exercise, and stress. A post-test was

administered three months after the pre-test and used the same instrument. Though no post-test data is reported, the authors state there were no significant differences after treatment. This also held for the subjects' pre-test to post-test assessment of own health needs which in decreasing order of frequency related to: diet (22.6%); diet and exercise (17.3%); exercise (15.5%); diet, exercise and stress (10.1%); and, stress (8.9%). This study is notable due to the lack of adolescents' behavioral change following health education. Perhaps such failure is related to fundamental lack of knowledge regarding the antecedents of health behavior which may influence response to any intervention modality. The current study investigated two possible antecedents of adolescent health behavior - health locus of control and value of health.

A similar study was undertaken by Radius, Dillman, Becker, Rosenstock and Horvath (1960) to investigate health related attitudes and practices. A probability sample of 112 youths aged 12-18 was obtained. Twenty minute interviews were conducted to elicit data about concern for health, belief in personal responsibility for health, frequency of illness, current assessment of level of health, and expectations of health in the future. The authors state a range of health behaviors were measured, but they chose to report only the concern greatest to the subjects - alcohol consumption. They claim a measure of association (not reported) between frequent drinking and two factors, headaches and the belief that the person is doing something not good for health, but this was not statistically

significant. For the most part, these adolescents did see themselves as healthy and expected to remain so in the future, yet only about one-third of the sample acknowledged personal responsibility for their health. This is of interest to the current study which investigated two possible correlates of adolescent health behavior, health locus of control and value of health.

Benedict, Lundden and Morr (1981) investigated the relationship between grade level and self perceived health problems and needs. In a sample of 125 students in the seventh and tenth grades, tenth graders were found to be significantly more concerned ($p < .05$) than seventh graders in ten areas. These were: psychological and social difficulties (78%); problems in family health history (61%); persistent personal health problems such as diabetes or injuries (49%); allergies (43%); general health concerns such as weight problems (40%); skeletal problems (37%); eye problems (36%); upper respiratory problems (32%); problems with teeth (30%); and neurological problems such as headaches and fainting (26%). The above data were obtained by self administered questionnaires developed by Alexiou. The mean number of perceived health problems was 3.26 for seventh graders and 5.00 for tenth graders ($F = 4.59$, $df = 1$, $N = 125$). The mean number of health problems reported by girls was 11.75, and by boys was 7.25 ($F = 11.02$, $df = 1$, $N = 124$) which was also a significant difference. It may well be that the period of early adolescence is the time when both girls and boys begin to notice health problems and that the period of middle adolescence is the time when girls start to report

increased numbers of health concerns and start to use the health care system to a greater extent than boys.

Changing Adolescent Health Behavior

Despite the fact that little is currently known about adolescent health behavior, the following two studies indicate a recent trend that includes a prescription to change such behaviors.

Wilson, Wingender, Redican and Hettler (1980) investigated the effects of a health hazard appraisal inventory on the health practices of college students. They utilized a random sample of 170 undergraduates who completed the University of Wisconsin Lifestyle Assessment Questionnaire. A response rate of 52.7% yielded 89 completed inventories. For these subjects, an information session was held six weeks later during which time they received computer analyses of the inventories and booklets of information on improving lifestyles. Twenty-seven subjects completed this step and the remaining 62 served as a control group. One month later the subjects were contacted by phone and questioned about any changes in specific risk related health practices, e.g., smoking, drinking, wearing seat belts. Results showed no statistically significant differences in either of the three risk related health practices. In addition, greater change was found in the control than in the study group. The authors concluded that the Health Hazard Appraisal is not an effective free standing tool with a college age population.

A similar study was undertaken by Moody and Rienzo (1981); however, the study design was far more complex. The experiment

involved 307 adolescents aged 12-18 in rural Florida and used a multi-step method. Each teen completed a Health Profile, had height, weight, blood pressure and serum cholesterol measured, received a computer analysis of the Health Profile, established a personal health contract, received one to one or group counseling, participated in periodic educational sessions, and then repeated the process one year later. Though long term results have not been reported, data on the initial health risk scores are relevant to the current study. The scores ranged from 39 - 100 with the mean at 87.7. The general topics accounting for the most lost points were: failure to practice safety habits; alcohol and drug usage; inadequate exercise; obesity; and, abnormal cholesterol levels. Two of these subjects, alcohol and drug usage and exercise, were explored as components of adolescent health behavior as measured by the Student Lifestyle Survey. Moody and Rienzo also stated that 169 of the 307 subjects returned mailed evaluations of the program after completion. Overall perceptions were favorable with 56% reporting they learned "much" (not defined) about how to improve health habits and 55% reported feeling "very" (not defined) motivated to make positive lifestyle changes.

It is difficult to interpret the implications of these two studies as the results are seemingly quite different. It is possible that more favorable results reported by Moody and Rienzo relate to the younger age of the sample - perhaps younger adolescents are more amenable to change in health behavior than are older, almost adult subjects. In addition, Moody and Rienzo utilized a greater number of

strategies to motivate behavior change than did Wilson et al., supporting the need for multifaceted approaches when seeking to promote change in health behavior. Finally, the sample in the study of Wilson, Wingender, Redican and Hettler was small, with 29 of 89 subjects completing health hazard appraisals and attending the information session. It may be that lack of change in health related behavior resulted from methodologic problems in the study's design.

Summary

Though adolescent health behavior is discussed in theory, there is virtually no research to date which has examined it as a multidimensional phenomenon. An epidemiologic data base exists which documents single indices of health behavior in adolescents and much of the research available has undertaken to accumulate statistical data of a descriptive nature.

From the studies cited in this section of the review of the literature, it has been shown that adolescent health behavior is, in fact, multidimensional. Moreover, the utility of self reported behavior has been demonstrated empirically. To the knowledge of this writer, no studies exist which examine not only adolescent health behavior but also the potential relationship to health locus of control and value of health as variables which influence such behavior. For this reason, the writer undertook such an investigation.

Health Locus of Control

Introduction

The health locus of control construct was proposed by Wallston, Wallston, Kaplan and Maides (1976) in an effort to develop a more specific expectancy measure for predicting behavior in a delimited area such as health than was currently available.

Previously, a generalized expectancy measure such as Rotter's (1966) Internal-External Locus of Control (I-E) Scale was used. A brief review of the internal-external locus of control concept is presented first to clarify the foundation upon which the health locus of control variable is predicated.

Internal-External Locus of Control

Locus of control is the central concept of Social Learning Theory which predicts how individuals make choices from the range of behaviors potentially available to them. According to this theory, the behavior chosen is related to three factors: 1) how the individual perceives the situation; 2) the individual's locus of control, i.e., expectancy that a given outcome will occur as a result of specific behavior; and 3) the degree to which the individual values that outcome (reinforcement value) (Rotter, 1954).

It is believed that the outcome (reinforcement) acts to strengthen an expectancy that a particular behavior will be followed by the outcome in the future. Through the course of development, the individual has experiences and begins to differentiate events which are causally related to preceding events and those which are not (Rotter,

1966). The individual develops generalized expectancies from a specific situation to a series of situations perceived as related or similar (Rotter, 1954). Therefore, in any specific event, an individual judges the chances for success by assessing the immediate situation (situational expectancy) and also draws upon previous learning from past experiences that seem similar to the present situation (generalized expectancy).

Within Social Learning Theory, the generalized expectancy locus of control is a relatively stable personality characteristic developed over time as a result of numerous social learning experiences. Rotter (1966, p. 1) defines locus of control as:

The degree to which the individual perceives that the reward follows from, or is contingent upon, his own behavior or attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own action...

An individual who perceives the events of life as being contingent upon one's behavior or attributes and usually believes that what happens to oneself is a result of one's own abilities, efforts and skills is termed 'internal.' An individual who perceives the events of life as unrelated to one's own behavior or attributes and usually believes that what happens to oneself is due to chance, fate or the influence of powerful others is termed 'external.'

Numerous studies have investigated the relationship of locus of control and health behavior. Early studies supported relationships

between internal locus of control and knowledge of disease (Lowery, 1974; Seaman & Evans, 1962)). However, later investigations of locus of control and various health behaviors such as smoking, use of birth control, and weight loss have had inconsistent findings (Balch & Ross, 1975; Best & Steffy, 1971; Coan, 1973; Danaher, 1977; Harvey, 1976; Lumley, 1972; Mlott & Mlott, 1975).

Findings from studies which have failed to support a relationship between locus of control and health behavior might be attributed to the use of Rotter's (1966) Internal-External Locus of Control (I-E) Scale which measures generalized expectancy rather than a more specific expectancy related to health. This possibility is supported by Rotter (1975) who states that generalized expectancy beliefs have their limitations as they represent only one of the variables that enter into the prediction of behavior and he recommends the use of a more specific expectancy measure, "...if one's interest is in a limited area and particularly if one is seeking some practical application where every increment in prediction is important" (p. 59).

Health Locus of Control

Because of the difficulty in predicting behavior in a specific area such as health when using a generalized expectancy measure such as Rotter's (1966) Internal-External Locus of Control (I-E) Scale, Wallston, Wallston, Kaplan and Maides (1976) undertook the development of a more sensitive measurement to predict the relationship between internality and health behavior.

To develop this new health locus of control scale, a 34 item pool written as face valid measures (by Wallston et al.) of generalized expectancies regarding locus of control related to health was administered to 98 undergraduate students. In addition, the subjects completed Rotter's (1966) Internal-External Locus of Control (I-E) Scale and the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964). Based on item analysis, an eleven item scale was selected with five items internally worded and six items externally worded. Alpha reliability of the eleven item HLC Scale is .72 and the scale does not reflect a social desirability bias as evidenced by a -.01 correlation with the Marlowe-Crowne Social Desirability Scale. The concurrent validity of the HLC Scale is shown by a .33 correlation ($p < .01$) with Rotter's (1966) Internal-External Locus of Control (I-E) Scale. This represents 10% common variance with Rotter's scale which the researchers state was intentionally kept low to meet the requirement that a new test not correlate too highly with measures from which it was supposed to differ. The HLC Scale has a six point, Likert type format and has a potential score range of 11 to 66. Individuals with low scores on this scale are termed 'health internals.' The scale is a measure of an individual's belief that health is or is not determined by one's own behavior.

Wallston, Wallston, Kaplan and Maides then conducted two validation studies to test the discriminant validity of the HLC Scale and its ability to predict health behavior. In the first study, 88 volunteer college students (44 male, 44 female) completed the HLC

Scale and Rotter's (1966) Internal-External Locus of Control (I-E) Scale. The subjects then read a mildly threatening message about hypertension and took a knowledge test designed to reinforce their feelings that they were uninformed about high blood pressure. Following this, subjects could choose as many pamphlets about hypertension as they desired from a list of 16 pamphlets available. The investigators had predicted that subjects with internal health locus of control would choose to expose themselves to more information and would therefore choose more pamphlets. Wallston et al. supported their hypothesis using the HLC Scale but were unable to do so when data were analyzed using Rotter's (1966) Internal-External Locus of Control (I-E) Scale. They concluded that the data demonstrated that the I-E and HLC Scales were not measuring the same construct and that the HLC Scale was the more sensitive predictor of health behavior.

In a second study that same year (1976), the same investigators tested the hypothesis that subjects in a weight reduction program designed with an orientation congruent to the subjects' general expectancies would be more satisfied and successful than subjects in a program inconsistent with their locus of control beliefs. Thirty-four overweight women (mean age 21, average 32.4 pounds overweight) completed a pre-experimental test battery which included the HLC and I-E Scales and subjects matched on HLC scores were randomly assigned to one of two weight reduction treatments - an internally oriented self directed program or an externally oriented group program. While details of the program are not described by the authors, they do state that the

essential differences in the programs related to the method of disseminating information about weight control strategies and the amount of contact between subject and experimenter. Data analysis measuring program satisfaction demonstrated a significant interaction between subjects' HLC classification and type of program ($F(1,14) = 5.50, p = .03$) but failed to demonstrate a significant interaction between the internal-external generalized expectancies classification developed by Rotter and the type of program assigned. The investigators concluded that by using the more specific health expectancies measure (HLC Scale), those programs consistent with subjects' expectancies were evaluated more positively than were inconsistent programs. However, the data for weight loss in which analysis of variance was tested failed to yield any significant main effects or interactions. Nevertheless, when using the HLC Scale, the results were in the expected direction, and when using the I-E Scale, weight loss results were in the direction opposite to that hypothesized. Wallston et al. again concluded that the data demonstrate that the two scales are not measuring the same construct.

Wallston, Wallston, Kaplan and Maide's (1976) study regarding health locus of control and information seeking was replicated later that year by Wallston, Maides and Wallston. Undergraduate students participated (52 male, 45 female) and both procedure and findings were comparable to the first study. Comparisons of means indicated that subjects with internal health locus of control chose a significantly larger number of pamphlets than subjects in other groups

($p < .05$). This study supports the utility of the Health Locus of Control Scale as a more sensitive predictor of health behavior than previously available using Rotter's (1966) Internal-External Locus of Control (I-E) Scale.

Other researchers have continued to investigate the relationship between health locus of control and health behavior in different adult populations. Lewis, Morisky and Flynn (1978) studied the relationship of health locus of control orientation, perceived home assistance, and self reported compliance behavior. Three hundred and eighteen stabilized hypertensive patients participated. Of the sample, 91% were black, 70% were female, and almost 60% had less than nine years of formal education. The HLC Scale was administered during an interview as was an investigator designed instrument to measure home assistance (operationalized as the number of times a family member reminded the subject to take medication, keep an appointment with the doctor, or follow the diet) and compliance behavior (operationalized as medication taking). The two way interaction between health locus of control classification and perceived home assistance was significant ($F_{1, 277} = 6.014$; $p = .02$). On the basis of social learning theory and as hypothesized by the researchers, the greater the subjects' internal orientation (expectancy that outcome results from one's behavior) and the greater the level of perceived home assistance (perception of the situation), the greater the subjects' compliance (health behavior).

Further support of the relationship of internal health locus

of control and health behavior was reported in a study by Kaplan and Cowles (1978). The subjects were 13 males and 22 females who volunteered to participate in a smoking reduction program. The HLC Scale was administered prior to initiation of a three phase treatment program. Findings were that subjects with internal health locus of control tended to have greater success in smoking reduction during all treatment phases than did subjects with external health locus of control ($p = .14$). Moreover, at the end of the first seven week phase, when the differences in smoking rates were greatest, subjects with internal health locus of control were smoking a mean of 4.9 cigarettes/day versus a mean of 10.9 cigarettes/day for subjects with external health locus of control.

Similar findings were reported by Wildman, Rosenbaum, Framer, Keane and Johnson (1979) in a seven week smoking reduction program stressing exercise and self control procedures. Although their sample was small ($N = 16$), subjects with internal health locus of control were not only smoking significantly fewer cigarettes than subjects with external health locus of control but also maintained a lower smoking rate throughout the 21 month follow up period.

These studies support the HLC Scale developed by Wallston, Wallston, Kaplan and Maides (1976) as a more sensitive measure of health expectancies and better predictor of health behavior than the non specific generalized expectancies measure developed by Rotter (1966). However, further theoretical consideration and research of the construct led to a more refined conceptualization of health locus

of control.

Multidimensional Health Locus of Control

Based on continued exploration of the health locus of control construct and its measurement (HLC Scale, Wallston et al., 1976), subsequent factor analysis of the HLC Scale by Wallston, Wallston and DeVellis (1978) revealed that it was possible that in fact the scale represented a multidimensional rather than unidimensional measure as originally conceived. A multidimensional conceptualization of locus of control had been previously proposed by Levenson (1973, 1974, 1975) who theorized that understanding and prediction would be enhanced by studying fate and chance expectations separately from external control by powerful others. Levenson developed three, eight item Likert type scales to measure three distinct expectancies for control: internal locus of control; powerful others locus of control; and, chance locus of control. It is of interest that Levenson's scales were similar to Rotter's I-E Scale as they were both measures of generalized expectancies and did not include any items specific to health.

Wallston, Wallston and DeVellis (1978) utilized this multidimensional concept of locus of control and applied it to development of the more specific health expectancies measurement, health locus of control. To develop the Multidimensional Health Locus of Control Scales, the 11 items of the original HLC Scale were retained and additional items were added. These were items which on an a priori basis reflected three dimensions of health locus of control (internal health locus of control - IHLC, powerful others' health

locus of control - PHLC, and chance health locus of control - CHLC). The total of 81 health locus of control items were then mixed with Levenson's I, P and C Scale items, a shortened version of the Marlowe-Crowne Social Desirability Scale, and two items questioning health status into one instrument utilizing a six point Likert type format. The instrument was administered to a convenience sample (N = 282) and 115 completed instruments were utilized for final scale development. Extensive data analysis included multiple item analyses, measurement of means, standard deviations and alpha reliabilities. The new Multidimensional Health Locus of Control Scales have two alternate forms (A and B) for use in designs which require repeated measurements. Descriptive data on the scales is offered by the authors (p. 165) and is illustrated in Table 1. The scales are intended for use with any persons having an eighth grade reading level and no functional impairments. The Multidimensional Health Locus of Control Scales now offer three separate theoretically and empirically differentiated dimensions for measurement of the expectancy health locus of control and are expected to have greater potential usefulness than the original HLC Scale.

At this time, several researchers have utilized the Multidimensional Health Locus of Control Scales in efforts to better understand and predict health behavior though results have been inconsistent.

Rosenblum (1979) assessed the relationship between multidimensional health locus of control, perceived vulnerability and health behavior

Table 1

Multidimensional Health Locus of Control Means and SD's

Scale ^a	Mean	SD	Alpha
IHLC			
Form A	25.104	4.891	.767
Form B	25.304	4.646	.710
PHLC			
Form A	19.991	5.221	.673
Form B	20.974	5.487	.715
CHLC			
Form A	15.575	5.751	.753
Form B	15.461	5.204	.691

^aNumber of items in form of scale is 6

(operationalized as maternal compliance in having children immunized). In a descriptive correlational study of 95 mothers of pre-school children, data analysis demonstrated no statistical differences between compliant and non compliant mothers on the basis of the predictor variables.

In a 1980 study, Anderson investigated the relationship between multidimensional health locus of control, health behavior and health status (the latter two measured by an investigator designed instrument). In a sample of 80 volunteer, elderly, white, widowed ambulatory women,

positive correlations were found between internal health locus of control and health status and between internal health locus of control and health behavior. Criteria used to determine health status are not reported by Anderson nor are criteria used to measure health behavior.

Two studies analyzed the relationship of multidimensional health locus of control and the practice of breast self examination in women. Hallal (1980) predicted that MHLC scores of adult women who practice breast self examination would reflect more internality than MHLC scores of women who do not practice breast self examination. In a purposive sample of 204 subjects, using four self administered questionnaires to collect data (including the Multidimensional Health Locus of Control Scales developed by Wallston et al., 1978), practitioners of breast self examination demonstrated 'slightly higher' mean scores on the internal subscale of the MHLC Scales than did non practitioners. However, results do not appear to have reached statistical significance. Gramse (1981) undertook a similar study of 212 women aged 25 to 54 years and found that though women who held external health expectancies tend not to practice breast self examination, there were no statistically significant findings.

In a 1981 study by Pill and Stott which investigated the relationship between multidimensional health locus of control and beliefs about health behavior, no relationship was found between a measure of 'salience of lifestyle,' i.e., awareness that day to day behavior influences health status and the internal or chance multidimensional locus of control scales. However, those in a sample of 41 who measured high on the salience of lifestyle construct were

significantly less likely to believe that powerful others controlled their health.

Wallston and Wallston (1979) replicated their earlier study on seeking information about hypertension and used both the HLC and MHLC Scales. In a sample of 240 undergraduate students, students with internal health locus of control (as measured by the HLC Scale) chose significantly more hypertension information pamphlets and asked more relevant questions than did students with external health locus of control. When the data was analyzed for the Multidimensional Health Locus of Control Scales, on the basis of IHLC score, expected differences in pamphlet selection were not evident. Lack of support for the discriminating ability of the MHLC Scales is disappointing and indicates that additional research with the instrument is needed.

Summary

Based on the large number of studies on Rotter's work, one can conclude that health locus of control is a theoretically sound and empirically tested approach that may enhance understanding of health behavior. With the development of the Multidimensional Health Locus of Control Scales (Wallston, Wallston & DeVellis, 1978) a more sensitive measure of health locus of control is available. Though Wallston et al. report that the scale may appropriately be used in any population with an eighth grade reading level, no studies have been found in which it has been studied in relation to adolescent health behavior.

Findings of studies which have investigated health locus of control as well as multidimensional health locus of control in adult populations have been inconsistent. This may well be related to the fact that as health behavior is a complex phenomenon, a number of complex factors may converge as determinants of such behavior. This argument is supported by Wallston et al. (1978) who state (p. 168):

There is no reason to expect that MHL scores alone should explain much of the obtained variance in health behaviors. Only in interaction with one, or preferably more, of a multitude of contributing factors will beliefs in the locus of control play a significant role in the explanation of health behaviors. Examples of other contributing factors are perceived severity and susceptibility; health motivation; social supports; previous behavior; attitudes towards health professionals; perceived costs and benefits of specific action; demographic factors such as race and social class; and, most importantly, the value of health as reinforcement.

Therefore, the present study investigated multidimensional health locus of control in combination with the value of health as a reinforcement to better understand adolescent health behavior.

Value of Health

Introduction

Health behavior is a complex phenomenon and it is therefore logical to expect that multiple factors may converge to predict such behavior. Many studies which have investigated health behavior have focused on locus of control as a sole predictor and although findings

have generally been in the direction predicted, they have not been statistically significant. This outcome is understandable in light of Social Learning Theory which proposes that the behavior an individual chooses is related to three factors: 1) perception of the situation; 2) locus of control (expectancy that a given outcome will occur as a result of a specific behavior; and, 3) the degree to which the individual values that outcome (reinforcement value) (Rotter, 1954). Prediction of health behavior should be strengthened by considering how the individual values health (the reinforcement value) in conjunction with health locus of control beliefs.

Value Theory

The value of health construct is derived from Rokeach's (1973) theory on human values and in recent years has received attention by researchers interested in correlates of health behavior (Kaplan & Cowles, 1978; Saltzer, 1978, 1981; Wallston et al., 1976; Ware & Young, 1976).

A brief discussion of Rokeach's theory is necessary to enhance understanding of studies which have explored the value of health construct. Rokeach (1968, p. 14) defines values as:

... abstract ideals, positive or negative, not tied to any specific object or situation, representing a person's beliefs about modes of conduct and ideal terminal modes.

Values, which are learned, become integrated into an organized system

where each value is ordered in priority with respect to other values. All values have cognitive, affective and behavioral components in that the individual has knowledge of what is considered desirable behavior by the reference group, the individual feels emotional charge about values and the individual's actions, i.e., behavior are evoked by activation of a value. Values are dynamic in that they may change depending on the extent to which the value contradicts the person's self-conceptions.

While all values are beliefs regarding what is personally or socially preferable, some values relate to the individual's mode of conduct (instrumental values) while other values relate to desirable end states of existence (terminal values). In other words, instrumental and terminal values,

... represent two separate yet functionally interconnected systems, wherein the values concerning modes of behavior are instrumental to the attainment of all values concerning end states (Rokeach, 1973; p. 12).

Though one might estimate that the number of values human beings possess is rather large, this in fact is not the case. As explained by Kluckhohn and Strodtbeck (1961, p. 10),

... there is a limited number of common human problems for which all peoples at all times must find some solution.... while there is variability in solutions of all the problems, it is neither limitless or random but is definitely variable within a range of possible solutions.... all alternatives of all solutions are present in all societies at all times but are differentially preferred.

Values, limited in number, are conceptualized as intervening

variables and are presumed to be a significant factor underlying or determining social behavior.

Measurement of Terminal Values

Rokeach developed instruments for the measurement of both instrumental and terminal values and conducted numerous studies using these instruments. For the purpose of the present study, measurement of the terminal value construct, i.e., desirable end state of existence will be focused on as value of health is conceptualized as a terminal value.

The Terminal Value Survey (Rokeach, 1973) lists 18 alphabetically arranged terminal values with brief definitions and instructions to the respondent to, "arrange them in order of importance to YOU, as guiding principles in YOUR life" (p. 27). There are five alternate forms of the survey available with reliabilities ranging from .62 - .87 (p. 32). Rokeach reports that the Terminal Value Survey's instructions are easily grasped by people aged 11 to 90 providing they are literate. The test is viewed as being projective in nature as it elicits responses, i.e., rankings that come from internal demands rather than as the result of some external stimulus.

It is of interest to note that health as a value is not included as one of the 18 terminal values being measured. Rokeach asserts that health as a value is too important to measure. Other theorists disagree and argue that though health as related to other values might be attributed by most people to have the greatest importance, it should nevertheless be included in any analysis of value systems

(Becker, Haefner, Kasl, Kirscht, Maiman & Rosenstock, 1977; Freeman, Levine & Reeder, 1972; Rosser, 1971).

Analysis of the degree to which individuals value health as well as whether health as a value demonstrates enough variability to warrant inclusion in value surveys was undertaken by Ware and Young (1979). Data were gathered from a sample of over 2000 persons aged 16 - 92. The survey instruments included an 18 item value ranking battery based on Rokeach's (1973) Terminal Value Survey with health (physical and mental well-being) added. In the five field tests conducted, health proved to be the most highly valued construct as evidenced by a composite rank order of one in all field tests with median ranks for health ranging from 2.3 to 4.7. In the aggregate, health was clearly valued most. Moreover, there was marked variability in the rank order assigned to health both within and between field tests. Across field tests, as many as 40% and as few as 20% of subjects did not include health in the first five ranks. The authors assert that such evidence supports the variability of the construct and appropriateness of including health as a value in value surveys.

Studies on Value of Health

Despite the theoretical proposition that how an individual values health is a major influence in health and illness behavior (Becker et al., 1977; Freeman et al., 1972; Mechanic, 1968; Rosser, 1971) the approach in researching the value of health construct has been to analyze value of health in combination with another variable,

most commonly, health locus of control. Though this approach does not yield extensive information regarding the value of health construct, it is theoretically sound in light of the framework of Social Learning Theory which proposes that behavior is a joint function of locus of control expectancy and reinforcement value. The outcome is additional empirical evidence that enhances understanding of health behavior.

Initial investigation of value of health and health locus of control as predictors of health behavior was undertaken by Wallston, Wallston, Kaplan and Maides (1976) in a study on health information seeking behavior. The authors tested the proposition that individuals with internal health locus of control beliefs who also valued health highly would choose to expose themselves to more information about hypertension than individuals with internal health locus of control who valued health less. Volunteer college students (N = 88) completed a test battery which included the Value of Health Scale (modeled after Rokeach's (1973) Terminal Value Survey) in which subjects rank ordered ten terminal values including health and the Health Locus of Control Scale. High health value was assigned to subjects who ranked health in one of the four top positions and all others were classified as low health value. Data analysis did support the research proposition previously stated with the high value of health 'internals' choosing more pamphlets (the measure of information seeking) (M = 10.95) than all other types of subjects (high value of health 'externals' ((M = 9.00)), low value of health 'internals' ((M = 9.05)), low value of health 'externals' ((M = 9.86))). A planned post-test comparison of the one mean versus the other three was significant

($t(80) = 1.84$, $p < .04$, one tailed). There was also a marginally significant interaction between value of health and health locus of control classification ($F(1, 80) = 3.02$, $p = .08$). It appears to be the joint action of health locus of control and value of health which influenced information seeking. Though the study supported the theoretically predicted relationship, the question of how value of health relates to health locus of control and the joint influence on health behavior is not altogether settled.

Additional support for the utility of considering both value of health and health locus of control to explain health related behavior was reported by Wallston, Maides and Wallston that same year. The researchers undertook two studies with college students ($N = 88$ and $N = 97$) and obtained support for the hypothesis that health related information seeking behavior is a joint function of internal health locus of control (measured by the HLC Scale) and high value of health (measured by a modified version of Rokeach's (1973) Terminal Value Survey). In the first study, a test of the interaction between internal health locus of control and high value of health resulted in an F value of 3.93 ($df = 1, 80$) which was significant at $p < .05$. In the second study, a comparable interaction was found ($F = 4.55$ (($df = 1, 89$)) $p < .04$).

DeVito, Bogdanowicz and Reznikoff (1982) attempted to replicate and extend the 1976 study of Wallston, Maides and Wallston. In a sample of 37 male and 53 female undergraduate students, a test battery was administered and included the Health Locus of Control Scale (Wallston et al., 1976) and a modified Terminal Value Survey (based on

Rokeach's (1973) Terminal Value Survey using nine original values and adding health as a value) as well as an investigator designed instrument to measure knowledge of hypertension. These researchers not only studied the subjects' stated interest in obtaining more information about hypertension (replication of Wallston et al. 1976 study) but also the actual behavior of seeking more information (by providing a mail in form to actually obtain pamphlets). The number of pamphlets requested was analyzed by a $2 \times 2 \times 2$ analysis of variance in which health locus of control classification, value of health classification and sex were the independent variables. Though no significant main effect was found for value of health, there was a significant interaction between value of health and health locus of control ($p < .05$) on pamphlet selection. High value of health 'internals' chose more pamphlets than all other subjects.

Kaplan and Cowles (1978) found that in a sample of 35 subjects who volunteered to participate in a university based smoking reduction program, subjects who valued health highly (measured by a modified version of Rokeach's (1973) Terminal Value Survey with Health: Physical and Mental Wellbeing added) smoked a mean of 16.9 cigarettes/day versus a mean of 28.9 cigarettes/day for subjects who valued health little - this was a significant difference ($F((1, 29)) = 10.27, p = .004$). Moreover, following smoke reduction treatment, subjects who valued health highly and had internal health locus of control smoked significantly fewer cigarettes at the two follow up periods than the other three groups combined ($p < .05$).

Saltzer has reported two studies (1978, 1981) which have

investigated the relationship of value of health, weight locus of control and intention to lose weight. In the first study, 55 male and 61 female undergraduate students (median age 19.1) completed an investigator designed weight locus of control scale, a fixed alternative measure of intention to lose weight with 24 items, and an 11 item value survey (nine terminal values from Rokeach's (1973) Terminal Value Survey plus two items relevant to weight control - value of health and value of physical appearance). The study was designed to investigate the relative importance of personal attitudes versus social pressure for weight loss in locus of control internals and externals who valued health and/or physical appearance highly. The predicted pattern for behavioral intention did not occur when subjects were differentiated by weight locus of control score. However, when subjects who valued health and/or physical appearance highly were differentiated by the specific weight locus of control scale, there was support for the hypothesized relationship.

In the later study, Saltzer investigated prior behavioral intent with subsequent actual behavior. Seventy-nine women who completed a medical weight reduction program participated (mean age = 35.1) and completed the same instruments as used in the first study. Saltzer reports that subjects with internal weight locus of control and high value of health and/or physical appearance had significantly higher correlations between intention to lose weight and actual behavior than subjects with external weight locus of control and high value of health and/or physical appearance. For subjects who placed a low value on health and/or physical appearance, regardless of whether the

subjects were of internal weight locus of control expectancy or external weight locus of control expectancy, there was no significant correlation between intention to lose weight and actual behavior. These findings support Rotter's statement that predictions about locus of control expectancies having an influence on behavior must incorporate the value of the outcome of the behavior.

Though research investigating both health locus of control in combination with value of health seems promising in enhancing understanding of health behavior, not all studies have been able to demonstrate the expected relationship. Lewis, Morisky and Flynn (1978) predicted that self reported compliance behavior would be related to health locus of control, value of health and the level of perceived home assistance. In a sample of 318 stabilized, black hypertensive patients, the researchers found no significant interaction between the degree to which the subject values health and the other two predictors of compliance. However, value of health was measured by an investigator designed three item ranking task and lack of significant findings might be related to weakness in measurement of the value of health construct.

Rosenblum (1979) assessed the health behavior of mothers as related to providing immunizations for their preschool children in relation to their health locus of control and value of health (measured by the Health Value Survey, Wallston et al., 1976). Rosenblum found no difference between compliant and non compliant mothers based on the predictor variables.

Similarly, Anderson (1979) investigated the relationship

between value of health, health locus of control, health behavior and health status in 80 volunteer subjects aged 65 - 74. Subjects completed the Health Locus of Control Scale (Wallston et al., 1976), the Health Value Survey (Wallston et al., 1976) and investigator designed instruments to measure health behavior and health status. Though health was valued 'highly' by 54 of the 80 subjects, there was no correlation between value of health and health behavior.

Conclusion

Research which seeks to explore health behavior from the perspective of Social Learning Theory by utilizing the health locus of control construct would do well to treat value of health as a separate variable. Though empirical evidence of the role value of health plays in health behavior is limited, it is a promising concept worthy of further investigation.

At this time, the writer has been unable to find any research which has specifically investigated health behavior in adolescents as such behavior relates to health locus of control and value of health. There appears to be a need for additional research on the value of health, especially in light of Rosser's (1971, p. 386) proposition that,

The greatest potential for the improvement of health within human groups is to be found in what people do and don't do for themselves. If one accepts the premise that behavior is determined, rather subjectively, by an individual's own values, then such intervening variables exert tremendous influence on decision making or choice of action.

Therefore, this study was designed to investigate value of health in conjunction with health locus of control to better understand and predict health behavior in adolescents.

CHAPTER III

METHOD

Introduction

This investigation was designed to study the relationship among health locus of control, value of health and health behavior in adolescents.

Health locus of control was measured by the Multidimensional Health Locus of Control Scales (Wallston, Wallston & DeVellis, 1978) (see Appendix A); value of health by the Value Survey (Wallston, Maides & Wallston, 1976) (see Appendix B); and adolescent health behavior by the Student Lifestyle Survey (McKillip & Taylor, 1979) (see Appendix C). In addition, demographic data describing the sample was collected using a Personal Information Sheet (see Appendix D).

Sample

A sample of adolescents in grades ten through twelve was selected through school systems in the New York Metropolitan area. School systems were chosen as the setting for data collection where a sample of healthy adolescent subjects, free of any major diagnosed chronic disease, homogeneous in age and heterogeneous in respect to race and religion could be expected.

It was recognized that this approach would limit the generalizability of the findings. However, this approach would reveal

whether or not the relationship could be demonstrated in one sample of adolescents. Replication would be required to establish generalizability. A sample larger than 30 subjects per variable as recommended by Kerlinger (1973) was obtained. Furthermore, to insure a power of .80 to detect a population correlation of $r = .20$, for an alpha of .05, the sample had to include at least 193 subjects (Cohen, 1977; p. 103).

Each subject and respective school remained anonymous. Code numbers were assigned for the purpose of data retrieval and analysis.

Permission of each subject and parent or guardian was obtained prior to data collection (see Appendix E - Subject Consent Letter and Parent/Guardian Consent Letter).

Data Collection

Subjects completed the questionnaires during a designated period while at school. The investigator and/or classroom teacher were available to answer any questions of subjects. All questionnaires were collected by the investigator following completion.

Questionnaires were self administered and each subject responded to the items in writing. Completion of all four instruments required less than 30 minutes. Each packet of instruments contained, in the order listed, the: Value Survey; Health Locus of Control Scales; Student Lifestyle Survey; and Personal Information Sheet. The Personal Information Sheet which taps subjects that might be sensitive to an adolescent appeared as the last in the series as recommended by Kerlinger (1973, p. 486).

Subjects were given a verbal explanation of the purpose of the research study as part of the investigator's dissertation requirements (see Appendix F). They were assured that data are confidential and would be treated as group data to insure anonymity.

Description of the Instruments

Personal Information Sheet

The Personal Information Sheet was designed by the investigator for the purpose of gathering demographic data and assessing that each subject meets the delimitations of the study.

Items #1, 2, 3, and 6 assess sex, ethnicity, religion and age and provide data for supplementary analysis as to whether such demographic characteristics function as intervening variables. In addition, such data would be of assistance in any future replications or extensions of this study.

Items #4, and 10 identify whether subjects meet the stated delimitations.

Items #8 and 9 assess height and weight to provide data to determine percent overweight, one of the eleven components of health behavior being investigated. To determine whether a subject is within normal weight for height, sex and age, the data entered in items #8 and 9 was compared to standardized growth charts appearing in Nelson's Textbook of Pediatrics (Nelson, 1979; pp. 34 - 35).

Multidimensional Health Locus of Control Scales

The measurement of an individual's belief that one's health is or is not determined by one's behavior was obtained using the

Multidimensional Health Locus of Control Scales developed by Wallston, Wallston, and DeVellis (1978). Three distinct dimensions of health expectancy beliefs are measured by three separate scales: the Internal Health Locus of Control (IHLC) Scale; the Chance Health Locus of Control (CHLC) Scale; and, the Powerful Others' Health Locus of Control (PHLC) Scale.

Validity

The development of the MHLCS was predicated on Levenson's work with the generalized locus of control construct (1973, 1974, 1975) in which it was posited that not only are beliefs of internal locus of control orthogonal to beliefs of external locus of control, but also that chance locus of control expectation is a separate dimension of externality than is the belief in control by powerful others.

Based on this model, Wallston, Wallston and DeVellis (1978) reanalyzed the original HLC Scale (which measured two dimensions - internal and external health locus of control) and their factor analysis demonstrated that in fact, three dimensions of control were present. However, the 11 items composing the scale were not evenly distributed among the three dimensions and so new items were developed to expand and refine the instrument. The outcome was an item pool of 81 belief statements relevant to the three dimensions of health locus of control beliefs, 25 IHLC items, 30 PHLC items and 26 CHLC items. This instrument was administered to a convenience sample of 282 and 115 completed instruments were used for final scale development.

Separate item analyses were run on the pools of IHLC, PHLC and CHLC items to select the items which would constitute the new

scales. Criteria for selecting an item included: a) item mean close to the midpoint of 3.5; b) significant item to scale (minus the item) correlation; and, c) low correlation with the measure of social desirability. Six pairs of items were selected for each of the three new scales to provide equivalent forms in which total scores per form were as identical as possible.

Concurrent and discriminant validity of the MHLC Scales was established by correlation with the scale's theoretical counterpart among Levenson's dimensions. Two of the scales correlate highly - the IHLC correlates significantly with Levenson's Internal Scale ($r = .567$) and the CHLC correlates significantly with Levenson's Chance Scale ($r = .799$). The PHLC Scale correlates with Levenson's Powerful Others' Scale ($r = .275$) although the cause of this lower correlation is not yet clear. Additional evidence of validity is provided by subsequent factor analysis of the MHLC Scales which reproduced the three dimensions of IHLC, CHLC and PHLC without error (Wallston and Wallston, 1981).

Reliability

Wallston and Wallston (1981) report that in four recent studies alpha reliabilities of the MHLC Scales (Form A) range from 0.56 to 0.80. When the equivalent forms of the scales are combined, i.e., Form A & Form B there is an increase in reliability to a range of 0.77 to 0.86.

Nagelberg (1979) reports test-retest correlations on MHLC - Form A (over a period of four to six months) of: $r_{IHLC} = .66$;

$r_{CHLC} = .73$; and $r_{PHLC} = .71$.

Though by combining the equivalent forms of the MHLC Scales (Form A & B), the reliability of the instrument is increased, the response time is likewise increased. Because the MHLC is one of four instruments used in the current study and demonstrates adequate reliability in the uncombined form, the investigator used MHLC Form A for the purpose of measuring health locus of control.

Scoring

Each Multidimensional Health Locus of Control Scale consists of six items worded to reflect beliefs about 'self.' The respondent reads each item and indicates the degree of relative agreement or disagreement with the statement according to a six point Likert type format with a range from one (strongly disagree) to six (strongly agree). For each scale, a single score is obtained by adding the response selected/item. The IHLC score is the sum of items #1, 6, 8, 12, 13, & 17. The CHLC score is the sum of items #2, 4, 9, 11, 15, & 16. The PHLC score is the sum of items #3, 5, 7, 10, 14, & 18.

Wallston and Wallston (1981) report norms for the MHLC Scales derived from 26 studies. These norms are illustrated in Table 2.

Value Survey

The measurement of the value of health to an individual was obtained by the Value Survey developed by Wallston, Wallston, Kaplan and Maides (1976). This instrument is modeled after the Terminal Value Survey developed by Rokeach (1973).

Table 2

Mean Scores for MHLC Scales Across Types of Subjects

Sample	N	Mean Scores		
		IHLC	CHLC	PHLC
Chronic patients	609	25.78	17.64	22.54
College students	749	26.68	16.72	17.87
Healthy adults	1287	25.55	16.21	19.16
Persons with preventive health behavior	720	27.38	15.52	18.44

Validity and Reliability

Wallston (1980) reports that face validity for the Value Survey was established by submitting the instrument to a panel of psychologists who were asked to evaluate whether the ten items reflected items of worth to an individual. Their agreement established the face validity of the instrument.

Additional support is derived from studies in which it was found that individuals who value health highly demonstrate more positive health behaviors regardless of their health expectancies classification (DeVito, Reznikoff & Bogdanowicz, 1979; Wallston, Kaplan & Maides, 1976; Wallston, Maides & Wallston, 1976; Wallston & Wallston, 1981; Wallston, Wallston & DeVellis, 1978). It was

found that the interaction of value of health and health locus of control was significant in explaining the variance in health behavior (Wallston, Maides & Wallston, 1976: $F((1, 80)) = 3.93, p < .04$; Wallston, Wallston, Kaplan & Maides, 1976; $F((1, 14)) = 5.50, p < .03$).

Ware and Young (1979) comment on the reliability of one form of the Value Survey. They utilized Rokeach's (1973) Terminal Value Survey with 'health' as one of the 18 values to be rank ordered and gathered data from a sample of over 2000. These authors report 'moderate' to 'high' range test-retest reliability coefficients (specific values not reported) for university students. However, these coefficients were lower in general populations with less than high school education. Ware and Young recommend that research investigating health value constructs ask respondents to rank a smaller number of items to provide a less complicated ranking task and improve reliability scores. As the present study investigated value of health in adolescents who have not yet completed high school, a modified version of Rokeach's (1973) Terminal Value Survey designed by Wallston, Wallston, Kaplan and Maides (1976) and containing ten items was used.

Description and Scoring

The Value Survey lists ten values including health in alphabetical order with instructions that the respondent 'arrange them in order of importance to YOU, as guiding principles in YOUR life.' Thus, the most important value is assigned a rank order of one and the least important value is assigned a rank order of ten.

Subjects are categorized as either 'high health value' or 'low health value' based upon the rank assigned to health. If health is

ranked in the first four positions, the individual is considered as 'high health value.' If health is ranked in positions five through ten, the individual is considered as 'low health value.'

Student Lifestyle Survey

The dependent variable in this study, adolescent health behavior, was measured by the Student Lifestyle Survey (SLS). The SLS was designed by McKillip and Taylor (1979) to measure health behavior of college students. Their survey study focused on the relationship of health behavior, as one of several independent variables related to the use of an on campus ambulatory clinic for reason of illness or injury. The study had a sample of 400 students at a midwestern university. As the SLS had been used in only one study to date (J. McKillip, personal communication, January 1985) and involved a college age rather than high school population, the investigator conducted a pilot study to evaluate the utility of the instrument for the present study. The instrument as developed and reported by McKillip and Taylor is presented, followed by a description of the pilot of the instrument for the purposes of the present study.

Description

The SLS is a 32 item questionnaire which measures ten components of health behavior. The components are: 1) alcohol use, consumption measured by a six item quantity-frequency index; 2) smoking, average daily cigarette consumption; 3) caffeine use, average daily consumption of caffeinated coffee, tea or cola; 4) sexual activity, a dichotomous item indicating sexual activity in the past six months; 5) sleep,

frequency of getting enough sleep; 6) hours worked, weekly average hours at a job other than studying; 7) exercise, frequency of engaging in any of eight strenuous activities for twenty minutes or more at least every other day; 8) amount studied, weekly average hours studied; 9) percent overweight, percentage deviation of weight from ideal weight for sex and height taken from Metropolitan Life Insurance ideal weight tables; and 10) stress, frequency of engaging in any of twelve stress related behaviors as described by McCamy and Presley (1975) (McKillip and Taylor, pp. 5-6).

The items are weighted on a one to five scale with the exception of items #8, 10 and 12 which are weighted on a one to six scale. For items #14 through 21, a response of one or two is counted as '0' and a response of three to five is counted as '1.' The scoring is reversed on items #2, 3, 5, 6, 23, 25, 26, 29, 30, 32 and 33 to maintain consistency.

Reliability and Validity

McKillip and Taylor (1979) submitted responses to the ten components of health behavior to a principle components factor analysis with varimax rotation. This factor analysis yielded three factors composed of nine of the ten health behaviors and is illustrated in Table 3. The authors report that percent overweight did not load on any of these factors and was therefore not included in any further data analysis. Reliability of the stress scale was reported as adequate (coefficient alpha .79).

Table 3

Factor Analysis of SLS by McKillip and Taylor

Factor	Label	Health Behavior Loadings
1	Stressful Lifestyle	sleep (-.64) stress (.62) hours worked (.61) exercise (-.40)
2	Hedonic Lifestyle	smoking (.72) alcohol use (.60) caffeine use (.55) sexual activity (.46)
3	Studious Lifestyle	hours studied (.82)

Pilot StudySample

The investigator contacted several high schools in the New York Metropolitan area requesting permission to collect data. Assurance was given that each subject who participated as well as the school would remain anonymous and that all information would be confidential. Two schools granted permission, one in New York City and the other in suburban New Jersey. Appropriate consent from student and parent or guardian was obtained by the schools. Subjects and respective schools were identified by code numbers for the purpose of data retrieval.

In consideration of the possible influences of demographic variables on adolescent health behavior, the investigator took the following steps: 1) attempted to gain participation of subjects from schools where a degree of diversity could be anticipated in terms of ethnicity, religion and social class; 2) gathered data on the Personal Information Sheet relevant to such demographic variables to evaluate the heterogeneity of the sample as well as meeting stated delimitations; and 3) obtained a sample of sufficient size to avoid capitalizing on chance for the purpose of factor analysis. A sample of 330 would fulfill the recommended ten subjects per item (Nunnally, 1976).

Three hundred and forty-seven students from two high schools, one in New York City and the other in suburban New Jersey participated in the pilot study. Of these, twelve students did not complete the instruments and eight students indicated being under medical treatment for chronic illness and were dropped from the sample. The remaining 327 subjects composed the sample used for data analysis. Table 4 summarizes the demographic characteristics of the sample.

Procedure

All data were collected during a one week period in February 1985 during the students' regular health or physical education classes. Questionnaires were distributed by the regularly assigned classroom teacher along with the student consent letter. Appropriate parental/guardian consent was obtained by the schools.

Each student completed the SLS and Personal Information Sheet

Table 4

Demographic Characteristics of Pilot Study Sample (N = 327)

Characteristic	n	%
Sex:		
female	176	53.8
male	151	46.2
Ethnicity:		
black	50	15.3
hispanic	24	7.3
white	215	65.7
other	38	11.6
Religion:		
catholic	159	48.6
jewish	28	8.6
protestant	73	22.3
other	67	20.5
Current Grade:		
tenth	103	31.5
eleventh	91	27.8
twelfth	133	40.7
Age:		
15 years	72	22.0
16 years	95	29.1
17 years	126	38.5
18 years	34	10.4

in writing by selecting the response that is appropriate. In addition, 50 of the 347 subjects received a booklet containing not only the SLS and Personal Information Sheet but also the Value Survey and Multidimensional Health Locus of Control Scales. This was done to evaluate clarity of directions and items, ability to actually rank order ten values, and determine approximate time required to complete all four instruments.

It was found that no students had any questions regarding the directions or items, all successfully rank ordered the items of the Value Survey, and all students completed the instruments in less than 30 minutes.

Instrument

For the pilot of the Student Lifestyle Survey (SLS), the original 32 items measuring ten components of health behavior as described by McKillip and Taylor (1979) were retained. However, based upon recommendation by McKillip (personal communication, January 1985), the item assessing sexual activity as a dichotomous variable was modified and expanded. The word 'activity' was changed to 'intercourse' to clarify the behavior in question, and the dichotomous 'yes/no' response option was expanded to a five point scale and refocused to incorporate birth control. For the purpose of factor analysis, the response was scored as a dichotomous variable to retain similarity of structure to the original instrument. Additional information relevant to the use of birth control is therefore available for secondary analysis.

An eleventh component of health behavior related to the use of illicit drugs was added to the original instrument (item #13). There is evidence that this behavior is of major concern in considering the health behavior of adolescents and that its omission would be a serious loss of information (Jessor, 1978; Jessor, Chase and Donovan, 1980).

Scoring of the modified 33 item SLS is identical to scoring of the original instrument and is already described.

The data were prepared for computer analysis using the Statistical Package for the Social Sciences, SPSS (Nie, 1983).

Results

A principle components varimax rotation factor analysis was undertaken to determine which items load on which factors. In this manner, the investigator would describe factors in terms of the items which have the highest loadings on the factors. A minimum factor loading of 0.30 was accepted as adequate for interpretation (Tabachnick, 1983, p. 411). In addition, the investigator used the coefficient alpha, a measure of internal consistency, to estimate the reliability of the instrument. Table 5 illustrates the factors.

Coefficient alpha was obtained for the alcohol scale (0.87), the exercise scale (0.64) and the stress scale (0.44). This can be compared to the data reported by McKillip and Taylor (1979) in which the only coefficient alpha reported is for the stress scale (0.79). The lower coefficient alpha obtained for the stress scale in the pilot study might be related to developmental differences in samples

Table 5

SLS Factor Analysis - Pilot Study (N = 327)

Factor	Label	Health Behavior Loadings
1	Stressful Lifestyle	sleep (.471) stress (.319)
2	Hedonic Lifestyle	drug use (.582) intercourse (.534) alcohol use (.519) smoking (.469)
3	Studious Lifestyle	hours studied (.614)
4	Active Lifestyle	exercise (.654)

(adolescents in the pilot study versus young adults in the McKillip and Taylor study).

Discussion

Though not identical, the factor analysis of the SLS from the pilot study data demonstrates strong comparability to the factor analysis reported by McKillip and Taylor. This comparison is illustrated in Table 6. As previously found by McKillip and Taylor, percent overweight did not load on any factors. Therefore, following the pilot study, it was deleted from consideration. The relative stability of the Student Lifestyle Survey over time (1979 to 1985) and applied to different populations supports the utility

Table 6

SLS Factor Analysis - Comparison of Two Studies

Factor	Label	Health Behavior	Health Behavior
		Loadings (M&T)	Loadings (Pilot)
1	Stressful	sleep (-.64)	sleep (.471)
	Lifestyle	stress (.62)	stress (.319)
2	Hedonic	smoking (.72)	smoking (.469)
	Lifestyle	alcohol (.60) caffeine (.55) sex (.46)	alcohol (.519) drugs (.582) sex (.534)
3	Studious	study (.82)	study (.614)
	Lifestyle		
4	Active	--	exercise (.654)

of the instrument as an adequate measure of health behavior.

CHAPTER IV

ANALYSIS OF THE FINDINGS

Description of the Sample

Four hundred forty-four volunteer high school students who lived in the New York Metropolitan area participated in this study. Each subject completed the Multidimensional Health Locus of Control Scales, Value Survey, Student Lifestyle Survey and Personal Information Sheet. Of these, seven students did not complete the instruments and 15 students indicated being under treatment for chronic illness and were dropped from the sample. The remaining 422 subjects composed the sample used for data analysis.

The sample ranged in age from 14-18 years with a mean age of 16.3 years. Females predominated (55.5%) as did caucasians (61.6%) and catholics (45.3%). Fifty-three percent of the sample reported their grade point average to be in the B range. Students in the tenth, eleventh and twelfth grades had approximately equivalent distribution (29.6%, 33.9% and 36.5% respectively). Table 7 summarizes the demographic characteristics of the sample.

Treatment of Data

For each subject, questionnaire responses generated the following data: a) demographic information, b) internal health

Table 7

Demographic Characteristics of Sample (N = 422)

Characteristic	<u>n</u>	%	cum. %
Sex:			
female	234	55.5	55.5
male	188	44.5	100.0
Ethnicity:			
black	74	17.5	17.5
hispanic	39	9.2	26.8
white	260	61.6	88.4
other	49	11.6	100.0
Religion:			
catholic	191	45.3	45.3
jewish	49	11.6	56.9
protestant	93	22.0	78.9
other	89	21.1	100.0
Current Grade:			
tenth	125	29.6	29.6
eleventh	143	33.9	63.5
twelfth	154	36.5	100.0
Age:			
14 years	2	0.5	0.5
15 years	89	21.1	21.6
16 years	139	32.9	54.5
17 years	155	36.7	91.2
18 years	37	8.8	100.0

locus of control score, c) chance health locus of control score, d) powerful others' health locus of control score, e) value of health score, and f) four health behavior scores for health behavior factors one through four. Instrument reliability was assessed for the Multidimensional Health Locus of Control Scales and the Student Lifestyle Survey.

Data were prepared for computer analysis using the Statistical Package for the Social Sciences, SPSS (Nie, 1983) and the BMDP Statistical Software Package (Dixon, 1983).

Instrument Reliability

The measurement of an individual's belief that one's health is or is not determined by one's behavior was obtained using the Multidimensional Health Locus of Control Scales (Wallston, Wallston & DeVellis, 1978). Three distinct dimensions of health expectancy beliefs were measured by three separate scales: the Internal Health Locus of Control (IHLC) Scale; the Chance Health Locus of Control (CHLC) Scale; and, the Powerful Others' Health Locus of Control (PHLC) Scale.

The coefficient alpha, a measure of internal consistency, was used to estimate the reliability of the Multidimensional Health Locus of Control Scales. Coefficient alpha for each scale was: Internal Health Locus of Control Scale (0.63); Chance Health Locus of Control Scale (0.41); and Powerful Others' Health Locus of Control Scale (0.64).

Adolescent Health Behavior was measured by the Student Lifestyle Survey. This 33 item questionnaire measured ten components of health

behavior.

The coefficient alpha for the Student Lifestyle Survey Scales were: alcohol (0.88), exercise (0.64), and, stress (0.42).

Description of the Data

Means and standard deviations were calculated for all variables. The three health locus of control measures compared with norms for college students reported by Wallston and Wallston (1981) are illustrated in Table 8.

Table 8

Comparison of Multidimensional Health Locus of Control Means and SD's

Multidimensional HLC Scale	Wallson and Wallston (1981) Mean	SD	More (1985) Mean	SD
IHLC	26.68	--	26.09	4.86
CHLC	16.72	--	17.25	4.78
PHLC	17.87	--	18.18	5.69
--not reported				

The value of health measure was scored as a dichotomous variable with high value, i.e., ranking health as one of the four most important values scored as 0, and low value, i.e., ranking health as the fifth through tenth value scored as 1. The mean for value of health was 0.30 and the standard deviation was 0.46.

Adolescent health behavior was measured by the Student Lifestyle

Survey. This 33 item questionnaire measured ten components of health behavior as follows: 1) sleep, frequency of getting enough sleep; 2) smoking, average daily cigarette consumption; 3) caffeine use, average daily consumption of caffeinated coffee, tea or cola; 4) amount studied, weekly average hours studied; 5) work, number of hours at a paid job each week; 6) sexual activity, an item indicating use of birth control when engaged in intercourse, scored as a dichotomous variable in the primary analysis and measuring engages in intercourse versus abstinence; 7) drug use, frequency of using illicit drugs, 8) alcohol use, consumption measured by a six item quantity-frequency index; 9) exercise, frequency of engaging in any of eight strenuous activities for 20 minutes or more at least every other day; and 10) stress, frequency of engaging in any of 12 stress related behaviors. All behaviors, with the exception of sexual activity, were treated as continuous variables.

In this questionnaire, the higher the score on any item, the more favorable the behavior. However, to reduce response bias, several items were worded in the opposite direction. In treatment of the data, computer entries were made to compensate for item reversals and to retain theoretical consistency. Therefore, in interpreting means, the higher the mean for the item, the more health promoting the behavior.

The means and standard deviations of the ten components of health behavior were determined and are reported in Table 9.

Analysis of the Data

The correlations among the ten health behaviors measured by the

Student Lifestyle Survey were determined. This is reported in Table 10.

Table 9

Means and Standard Deviations of Health Behaviors (N = 422)

Health behavior	Mean	SD	Range
sleep	3.11	1.04	1 - 5
smoking	4.71	0.77	1 - 5
caffeine use	3.68	0.95	1 - 5
study	2.50	1.41	1 - 5
work	3.74	1.51	1 - 5
sexual activity	0.57	0.50	0 - 1
drug use	4.50	1.04	1 - 5
alcohol	24.80	6.04	6 - 33
exercise	2.10	1.72	0 - 8
stress	38.29	5.58	12 - 60

Despite the fact that many of the correlations were statistically significant, the significance appears to be an artifact created by the large sample size (Kerlinger, 1973; pp. 200 - 201). Moreover, as stated by Hays, "It is entirely possible for a highly significant result to contribute nothing to our ability to predict behavior...." (1973; p. 385).

It was noted that there was a dearth of meaningful relationships among the ten health behaviors as indicated by relatively low correlations. Van Dalen's criteria (1979, p. 324) were used for the

Table 10

Correlations Among Ten Health Behaviors Measured by the SLS (N = 422)

	sleep	smoking	caffeine	study	work	sex ⁺	drugs	alcohol	exercise	stress
sleep	1.00									
smoking	0.22***	1.00								
caffeine	0.07	0.18***	1.00							
study	0.09*	0.06	-0.08	1.00						
work	0.10*	0.06	0.03	0.04	1.00					
sex ⁺	0.08	0.26***	0.01	0.12**	0.07	1.00				
drugs	0.19***	0.40***	0.05	0.16***	0.08*	0.29***	1.00			
alcohol	0.28***	0.34***	0.19***	0.16***	0.11*	0.31***	0.49***	1.00		
exercise	-0.04	0.05	0.05	0.14**	0.01	-0.02	0.11**	-0.02	1.00	
stress	0.19***	0.10*	0.10*	-0.03	0.05	0.03	0.17***	0.17***	0.03	1.00

⁺ sex scored as dichotomous variable; *p < .05, **p < .01, ***p < .001

interpretation of the correlation coefficients and the criteria are as follows (1979, p. 324):

r = ± .00 to ± .20, negligible relationship

r = ± .20 to ± .40, low relationship

r = ± .40 to ± .70, marked relationship

r = ± .70 to ± 1.00, high to very high relationship

The investigator found eight non-negligible relationships as illustrated in Table 11.

Table 11

Non-negligible Correlation Coefficients Among Health Behaviors (N = 422)

Van Dalen's criteria	Variables	<u>r</u>	<u>r</u> ²
Low relationship	sleep & smoking	0.22	0.05
	alcohol & sleep	0.28	0.08
	alcohol & sex	0.31	0.10
	alcohol & smoking	0.34	0.12
	sex & smoking	0.26	0.07
	drugs & sex	0.29	0.08
Marked relationship	drugs & smoking	0.40	0.16
	alcohol & drugs	0.49	0.24

There were no high, definitive relationships found among the correlations for the ten health behavior measures.

The data from the Student Lifestyle Survey were then subjected to a principal factors factor analysis using varimax rotation. This is

illustrated in Table 12.

Table 12

SLS Factor Analysis - Varimax Rotation (N = 422)

Factor	Label	Health Behavior	Loadings
1	Hedonic Lifestyle	alcohol use	(.629)
		drug use	(.643)
		sexual activity	(.482)
		smoking	(.483)
2	Stressful Lifestyle	sleep	(.629)
		alcohol use	(.330)
3	Active Lifestyle	exercise	(.626)
4	Studious Lifestyle	caffeine use	(.396)
		hours studied	(-.363)

Factor names assigned in the pilot study were retained in the current investigation for the purpose of hypothesis testing. However, factor two, originally consisting of sleep and stress now consists of sleep and alcohol and the name assigned the factor might be misleading. To determine the number of factors to be extracted from the analysis, the Kaiser Criterion, "the procedure of determining the number of initial factors to be extracted... (eigenvalue greater than or equal to 1)," (Kim and Mueller, 1978, p. 49) was applied to the unrotated matrix and four factors were extracted. However, the eigenvalues after rotation were found to be lower than the original

eigenvalues. The factor extraction is reported in Table 13.

Table 13

Factors Extracted From SLS Data With Initial Eigenvalues Greater Than One (N = 422)

Factor	Eigenvalue prior to rotation	% of variance	Cumulative %	Eigenvalue after rotation
1	2.373	23.7	23.7	1.76
2	1.207	12.1	35.8	0.50
3	1.066	10.7	46.5	0.36
4	1.014	10.1	56.6	0.29

Hypothesis Testing

In order to test the first four hypotheses, the correlations between the four lifestyle factors with the three health locus of control measures and value of health measure were determined. These are reported in Table 14.

Hypothesis one stated that there would be a significant correlation between internal health locus of control and studious lifestyle. The results of the analysis indicated that there was a negligible, non significant relationship between internal health locus of control and studious lifestyle ($r = .02$, ns); therefore, hypothesis one was not supported.

Table 14

Matrix of Correlations Between Four Lifestyle Factors With Four Personality Measures (N = 422)

Personality Measure	Factor 1	Factor 2	Factor 3	Factor 4
	(Hedonic)	(Stressful)	(Active)	(Studious)
IHLC	.06	.08*	.07	.02
CHLC	-.03	-.09*	-.04	-.13**
PHLC	.20**	.16***	.05	-.02
VOH	-.13	-.14**	.03	.03

* p < .05, **p < .01, ***p < .001

Hypothesis two stated that there would be a significant correlation between internal health locus of control and active lifestyle. The results of the analysis indicated that there was a negligible, non significant relationship between internal health locus of control and active lifestyle ($r = .07, \text{ns}$); therefore, hypothesis two was not supported.

Hypothesis three stated that there would be a significant correlation between high value of health and studious lifestyle. The results of the analysis indicated that there was a negligible, non significant relationship between high value of health and studious lifestyle ($r = .03, \text{ns}$); therefore, hypothesis three was not supported.

Hypothesis four stated that there would be a significant correlation between high value of health and active lifestyle. The results of the analysis indicated that there was a negligible, non significant relationship between high value of health and active lifestyle ($r = .03$, ns); therefore, hypothesis four was not supported.

Hypothesis five stated that the R^2 change would be significantly greater when studious lifestyle was regressed on both internal health locus of control and value of health than when studious lifestyle was regressed on either internal health locus of control or value of health alone. A forward multiple regression analysis was undertaken to test this hypothesis. The results are reported in Table 15.

Table 15

Forward Multiple Regression Analysis of IHLC and VOH on Studious Lifestyle (N = 422)

Step	Variable	Beta	<u>R</u>	<u>R</u> ²	ΔR^2	<u>F</u>
1	VOH	0.03415	.03	.001	.001	0.423
2	IHLC	0.02554	.04	.002	.001	0.271

Analysis of the forward multiple regression undertaken indicated that value of health and internal health locus of control accounted for negligible proportions of the variance attributed to the studious lifestyle factor (less than 1%). Therefore, hypothesis five was not supported.

Hypothesis six stated that the \underline{R}^2 change would be significantly greater when active lifestyle was regressed on both internal health locus of control and value of health than when active lifestyle was regressed on either internal health locus of control or value of health alone. A forward multiple regression analysis was conducted to test this hypothesis. The results are reported in Table 16.

Table 16

Forward Multiple Regression Analysis of IHLC and VOH on Active Lifestyle (N = 422)

Step	Variable	Beta	\underline{R}	\underline{R}^2	$\Delta \underline{R}^2$	F
1	IHLC	0.0723	.07	.005	.005	2.00
2	VOH	0.03621	.08	.006	.001	0.54

Analysis of the forward multiple regression undertaken indicated that internal health locus of control and value of health accounted for negligible proportions of the variance attributed to the active lifestyle factor (less than 1%). Therefore, hypothesis six was not supported.

Hypothesis seven stated that there would be at least one significant relationship between personality measures of internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health and measures of adolescent health behavior (stressful lifestyle, studious lifestyle,

hedonic lifestyle and active lifestyle). The results of the canonical correlation analysis indicated that there was only one significant canonical correlation among the four linear composites using the Bartlett's Test in the EMDP program. Therefore, only the first canonical correlation resulted in a significant relationship beyond the .05 level of significance (Chi Square ((16)) = 49.36, $p < .001$). Bartlett's Test is reported in Table 17.

Table 17

Bartlett's Test for Determining the Number of Canonical Variates
(N = 422)

Eigenvalue	Canonical Correlation	# of Eigenvalues	Bartlett's Test for Remaining Eigenvalues		
			Chi Square	D.F.	Probability
			49.36	16	0.00*
0.085	0.292	1	12.18	9	0.20
0.023	0.151	2	2.64	4	0.62
0.005	0.070	3	0.58	1	0.45
0.001	0.373				

* $p < .001$

On the basis of the aforementioned, the last three canonical variates were not interpreted because they were not meaningful.

Although there was one significant canonical correlation for

for the first set of composites, even this relationship was not deemed meaningful. The canonical correlation between the two linear composites of the first set of canonical variates accounted for only 8.5% of the variance and was therefore not considered meaningful based on Pedhazur's recommendation (1982, p. 727) that a canonical correlation of less than 10% of shared variance between two sets of variables not be treated as meaningful. Therefore, hypothesis seven was not supported.

Factor 1 (hedonic lifestyle) and factor 2 (stressful lifestyle) had the highest loadings on the first canonical variate composed of the four lifestyle factors. Powerful others' health locus of control and value of health had the highest loadings on the first canonical variate composed of the four personality measures. This is illustrated in Table 18.

The redundancy coefficients, "how much of the variance of a set as contained in the variate can be accounted for by the variate in the other set" (Levine, 1977, p. 24) are reported in Table 19. The redundancy coefficients for the first canonical variate for the independent variables (personality factors) and the first canonical variate for the dependent variables (health behavior factors) were found to be .023 and .028 respectively. These were both very weak coefficients even though a significant relationship between the first set of canonical variates had been found. The remaining redundancy coefficients were not interpreted as the sets of canonical variates were not found to be significantly related.

Table 18

Structure Coefficients of Canonical Variates with Original
Variables (N = 422)

Original variable	<u>First set of canonical variates</u>			
	Variate 1	Variate 2	Variate 3	Variate 4
Hedonic lifestyle	.82	-.19	.08	-.53
Stressful lifestyle	.78	.12	-.30	.53
Active lifestyle	.19	.37	.90	.11
Studious lifestyle	.10	.85	-.39	-.33
% of trace	.334	.229	.245	.172

	<u>Second set of canonical variates</u>			
	Variate 1	Variate 2	Variate 3	Variate 4
IHLC	.33	.28	.50	.75
CHLC	-.26	-.87	.41	-.10
PHLC	.78	-.24	.38	-.44
VQH	-.54	.44	.57	-.44
% of trace	.266	.273	.221	.240

Table 19

Redundancy Coefficients Associated With Canonical Correlations

Canonical variate set	<u>Redundancy coefficients</u>			
	r_c	r_c^2	Independent set	Dependent set
1	.292	.085	.023	.028
2	.151	.023	.006	.005
3	.070	.005	.001	.001
4	.037	.001	.000	.000

In addition, the structure coefficients which are the correlations between each variable and its associated canonical variate score were determined. This is reported in Table 20.

Research Questions

Four research questions were posed as there was insufficient reason to predict the direction of the relationships. These questions are as follows:

1. What is the relation among four personality measures (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and stressful lifestyle?
2. What is the relation among four personality measures (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and hedonic

Table 20

Structure Coefficients and Percent of Trace (N = 422)

<u>Structure coefficient matrixes</u>				
	Dependent canonical	Dependent canonical	Dependent canonical	Dependent canonical
Variable	variate 1	variate 2	variate 3	variate 4
Factor 1	.822	-.186	.076	-.533
Factor 2	.784	.121	-.300	.530
Factor 3	.188	.373	.901	.114
Factor 4	.096	.854	-.392	-.329
% of factor trace	.334	.229	.245	.172
 <u> </u>				
	Independent canonical	Independent canonical	Independent canonical	Independent canonical
	variate 1	variate 2	variate 3	variate 4
IHLC	.328	.281	.503	.748
CHLC	-.256	-.871	.408	-.096
PHLC	.775	-.243	.380	-.444
VOH	-.537	.443	.567	-.440
% of variable trace	.266	.273	.221	.240

lifestyle?

3. What is the relation among four personality measures (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and studious lifestyle?
4. What is the relation among four personality measures (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and active lifestyle?

Forward multiple regression analyses were used to measure the relative importance of each of the four personality variables on each lifestyle factor. This was accomplished by determining the amount of variance of the given lifestyle factor which could be attributed to each of the four personality variables. This was found by reporting the multiple R and R² change attributed to each of the four personality measures as they entered the regression equation. The results of the regression analyses are reported in Tables 21 - 24.

For research question one, the analysis demonstrated that the powerful others' health locus of control variable accounted for approximately 2.4% of the variance of the stressful lifestyle factor ($F ((1, 420)) = 10.5, p < .001$). Chance health locus of control accounted for an additional 1.5% of the variance associated with the stressful lifestyle factor ($F ((1, 419)) = 6.35, p < .05$). The value of health and internal health locus of control personality factors did not significantly add to the proportion of lifestyle variance accounted

for in the regression analysis (see Table 21). Even though there was a significant relationship due to the large sample size, the overall relationship among the four personality measures and the stressful lifestyle factor was negligible; therefore, there was no definitive relationship. Thus, for research question one, no meaningful relationship was found among four personality measures (IHLC, CHLC, PHLC, VOH) and stressful lifestyle.

Table 21

Forward Multiple Regression of Personality Measures on Stressful Lifestyle (N = 422)

Variable	Beta	R	R ²	ΔR ²	F
PHLC	.16458	.1562	.0244	.0244	10.507**
CHLC	-.10808	.1974	.0390	.0146	6.349*
VOH	-.10989	.2273	.0517	.0127	5.599
IHLC	.04562	.2316	.0536	.0020	0.869

*p < .05, **p < .001

For research question two, the analysis demonstrated that the powerful others' health locus of control variable accounted for approximately 4.15% of the variance of the hedonic lifestyle factor ($F(1, 420) = 18.18, p < .001$). Value of health accounted for an additional 1.2% of the variance associated with the hedonic lifestyle factor ($F(1, 419) = 5.09, p < .05$). The chance health locus of

control and internal health locus of control personality factors did not significantly add to the proportion of lifestyle variance accounted for in the regression analysis (see Table 22). Even though there was a significant relationship due to a large sample size, the overall relationship among the four personality measures and the hedonic lifestyle factor was barely above the relationship of .20. Thus, for research question two, a low but weak relationship was found among four personality measures (IHLC, CHLC, PHLC, VOH) and hedonic lifestyle.

Table 22

Forward Multiple Regression of Personality Measures on Hedonic Lifestyle (N = 422)

Variable	Beta	R	R ²	Δ R ²	F
PHLC	.20544	.2037	.0415	.0415	18.176**
VOH	-.10211	.2302	.0530	.0115	5.086*
CHLC	-.06869	.2413	.0582	.0053	2.331
IHLC	.02643	.2427	.0589	.0007	0.293

*p < .05, **p < .001

For research question three, the analysis demonstrated that the chance health locus of control variable accounted for approximately 1.7% of the variance of the studious lifestyle factor ($F((1, 420)) = 7.13, p < .01$). Value of health, powerful others' health locus of control and internal health locus of control each

accounted for less than 1% of the variance associated with the studious lifestyle factor (see Table 23). The one significant relationship was attributed to large sample size. As the overall relationship among the four personality measures and the studious lifestyle factor is negligible and no definitive relations were found, it was concluded that for research question three, no meaningful relationship was found among four personality measures (IHLC, CHLC, PHLC, VOH) and studious lifestyle.

Table 23

Forward Multiple Regression of Personality Measures on Studious Lifestyle (N = 422)

Variable	Beta	R	R ²	Δ R ²	F
CHLC	.13412	.1292	.0167	.0167	7.126**
V OH	.03699	.1338	.0179	.0012	0.521
PHLC	.01805	.1349	.0192	.0003	0.129
IHLC	-.00115	.1349	.0182	.0000	0.001

** p < .01

For research question four, the analysis demonstrated that each personality variable, IHLC, PHLC, CHLC and V OH accounted for less than 1 % of the variance associated with the active lifestyle factor (see Table 24). No significant relationships were found. Therefore, it was concluded that there was no meaningful relationship among four

personality measures (IHLC, CHLC, PHLC, VOH) and active lifestyle.

Table 24

Forward Multiple Regression of Personality Measures on Active Lifestyle (N = 422)

Variable	Beta	<u>R</u>	<u>R</u> ²	ΔR^2	<u>F</u>
IHLC	.06252	.0689	.0047	.0047	2.001
PHLC	.06150	.0840	.0070	.0023	0.974
VOH	.04323	.0937	.0088	.0017	0.728
CHLC	-.03945	.1010	.0102	.0014	0.598

In summary, seven hypotheses were tested to assess selected relationships among multidimensional health locus of control, value of health and adolescent health behavior. None of the seven hypotheses was supported. In addition, four research questions explored the overall relationship among multidimensional health locus of control, value of health and each of the four lifestyle factor components of adolescent health behavior. The few statistically significant relationships found were attributed to the large sample size and no conceptually meaningful relationships were found. Therefore, it was concluded that no support was found for a relationship among multidimensional health locus of control, value of health, and adolescent health behavior measured by the factors.

Additional Analysis

Due to the low correlations among the ten health behavior measures, the investigator regressed each of the ten health behaviors on the four personality measures to determine if there were any relationships to be found between each of the ten individual health behaviors and the four personality measures. An examination of the correlation matrix indicated there was just one non-negligible correlation, i.e., between alcohol and powerful others' health locus of control ($r = .29$, $p < .001$). This is reported in Table 25.

Table 25

Correlation Matrix Among Ten Health Behavior Measures and Four Personality Measures (N = 422)

Health behavior	IHLC	CHLC	PHLC	VOL
sleep	.07*	-.05	.08	-.11*
smoking	.07	-.08	.10*	-.10
caffeine use	.01	-.06	.01	.05
study	.03	.07	.13**	-.06
work	-.05	-.04	.10*	.00
sexual activity	.01	.06	.06	-.06
drug use	.11*	-.07	.10	-.11*
alcohol	.03	-.05	.29***	-.12*
exercise	.05	-.04	.05	.04
stress	.08	-.08	.08	-.08

* $p < .05$; ** $p < .01$; *** $p < .001$

Forward multiple regression analyses were run to determine the amount of variance of the ten health behavior measures that were attributable to four personality measures. This is reported in Table 26. The results indicated that only alcohol is a measure that has a low meaningful relationship to the powerful others' health locus of control measure which resulted in the one meaningful multiple R ($R = .32$, $p < .001$).

Table 26

Proportion of Variance for Ten Health Behavior Measures Accounted for by Four Personality Measures (N = 422)

Health behavior	<u>R</u>	<u>R</u> ²	<u>F</u> (4, 417)
sleep	.15	.02	2.47*
smoking	.17	.03	3.12*
caffeine use	.09	.01	0.81
study	.15	.02	2.38
work	.13	.02	1.91
sexual activity	.10	.01	0.95
drug use	.18	.03	14.65**
alcohol	.32	.10	11.75***
exercise	.09	.01	0.91
stress	.16	.03	2.67*

*p < .05; **p < .01; ***p < .001

CHAPTER V

DISCUSSION

Introduction

This study was designed to explore adolescent health behavior and to assess the utility of the personality characteristics health locus of control and value of health in understanding such behavior. A sample of 422 adolescents with a mean age of 16.3 years participated. The sample was representative of the New York Metropolitan area population in terms of sex, ethnicity and religion.

Seven hypotheses were tested and none were supported. In addition, four research questions were posed regarding the relations between the four personality characteristics (internal health locus of control, chance health locus of control, powerful others' health locus of control and value of health) and the four adolescent health behavior factors (hedonic lifestyle, stressful lifestyle, studious lifestyle, and active lifestyle). Though the data can not offer confirmation regarding relationships, they can be interpreted through reconsideration of the method within the context of the theoretical framework of the study.

Three instruments were used to measure the variables in the study: The Multidimensional Health Locus of Control Scales; The Value Survey; and, the Student Lifestyle Survey.

Health Locus of Control

Though the Multidimensional Health Locus of Control Scales have had only limited application to date, the reliability has been demonstrated to be marginally adequate. Wallston and Wallston (1981) reported reliabilities ranging from 0.56 to 0.70, and in this study reliabilities were: $r_{IHLC} = 0.63$; $r_{CHLC} = 0.41$; and, $r_{PHLC} = 0.64$.

Means reported for the Multidimensional Health Locus of Control Scales are similar to the means obtained in the present study. This is illustrated in Table 27.

Table 27

MHLC Scale Means Compared With Normative Data

MHLC Scale	Wallston & Wallston (1981; <u>N</u> = 749)	More (1985) (<u>N</u> = 422)
IHLC	26.26	26.09
CHLC	16.72	17.25
PHLC	17.87	18.18

The Multidimensional Health Locus of Control Scales are judged to offer a marginally stable and reliable measurement of an individual's belief that one's health is or is not determined by one's behavior. The dimensions of Internal Health Locus of Control and Powerful Others' Health Locus of Control were the most stable measures.

Based on the theoretical proposition that adults with internal

health locus of control beliefs would demonstrate health promoting behavior, and in view of the research using the Health Locus of Control Scales which has supported this relationship (Lewis, Morisky & Flynn, 1978; Wallston, Maides & Wallston, 1976; Wallston, Wallston, Kaplan & Maides, 1976), the investigator anticipated that comparable relations would be found in the current study. It was hypothesized that internal health locus of control would be significantly related to studious lifestyle and active lifestyle, the two lifestyle factors viewed as being the most health promoting.

Lack of support for the expected relationship calls for reconsideration of the theory and the method used to test the relationships. The personality variable health locus of control is not well established in the adolescent age group, especially in regard to the chance dimension. The data does support a trend towards increasing internality with age, as illustrated in Table 28.

Table 28

Internal Health Locus of Control Variable by Grade (N = 422)

Grade	<u>n</u>	Mean	<u>SD</u>
10	125	25.17	5.14
11	143	26.00	4.73
12	154	26.93	4.64
total:	422	26.09	4.86

Despite this trend, data provide evidence that powerful others' health locus of control might be the more influential factor in affecting health behavior in adolescents. Among the correlations between the four lifestyle factors and the four personality measures, and applying Van Dalen's (1979) criteria for interpretation of correlation coefficients, the only interpretable correlation found was between powerful others' health locus of control and hedonic lifestyle ($r = .20$, $p < .01$, low relationship).

Moreover, powerful others' health locus of control also appears to vary by ethnicity. In this sample of 422, 38.3% of the subjects were not Caucasian. Differences in means appear striking when examined in relation to ethnicity. This is illustrated in Table 29.

Table 29

Powerful Others' Health Locus of Control by Ethnicity (N = 422)

Ethnicity	<u>n</u>	Mean	<u>SD</u>
Hispanic	39	21.51	6.51
Black	74	21.18	5.56
Other	49	20.80	5.47
White	260	16.33	4.82
total:	422	18.18	5.69

It seems that in this age group, and especially in non Caucasians, the powerful others' health locus of control variable is related to the less health promoting behaviors (hedonic lifestyle

factor composed of alcohol use, drug use, sexual intercourse and smoking). Future research should control for age and ethnicity to further evaluate the interrelationship of these factors with health locus of control. It is possible that the relationship between hedonic lifestyle and powerful others' health locus of control does not hold up among each ethnic group taken separately.

The relationship between powerful others' health locus of control and hedonic lifestyle is understandable in light of adolescent development theory. The hedonic lifestyle factor may be representative of adolescents' "revolt and conformity." Lidz (1968, p. 303) describes this as the process of revolt from parental dictates and conformity to peer group standards, loyalties and ideologies. Moreover, Lidz and Erikson (1963) assert that the adolescent must begin to break the oedipal ties to the family, gain emotional distance from parents and begin to feel capable of directing one's own life. Adolescents tend to experience conflict involving ambivalence between the need to free oneself to establish one's own identity as an integrated and self sufficient person capable of fulfilling an adult role in life and the longing for security and affection of the family. Mid adolescence seems to be the time of greatest ambivalence. It appears that while adolescents are experiencing such intrapsychic turbulence, they tend to believe that the factors which determine health are not moderated by themselves, but rather by powerful others (health professionals and family).

Value of Health

This sample as a whole placed a high value on health

(mean = 0.30; 0 = high value of health, 1 = low value of health).

However, the anticipated effect of the joint action of internal health locus of control, i.e., expectancy and reinforcement value, i.e., value of health posited by Social Learning Theory and supported in other studies (Wallston, Maides & Wallston, 1976; Wallston, Wallston, Kaplan & Maides, 1976) was not obtained in the testing of hypotheses. Failure to support this relationship may be related to the trend towards an external expectancy (powerful others' health locus of control) in this age group as well as to the characteristics of the dependent variable, adolescent health behavior and the question of instrument reliability.

Adolescent Health Behavior

Adolescent health behavior was measured by the Student Lifestyle Survey, a 33 item questionnaire assessing ten components of health behavior. Though the instrument yielded meaningful descriptive data about health behavior in general, it proved weak for the purpose of hypothesis testing. Difficulty arose from the absence of a method to score the broad spectrum of health behaviors as an aggregate.

Therefore, the data obtained by the Student Lifestyle Survey was subjected to factor analysis (see Table 13, p. 80). In the initial analysis, four factors with eigenvalues greater than one were extracted. The procedure for factor analysis as well as the results obtained were comparable to those reported by McKillip and Taylor (1979). However, after rotation, only factor one, Hedonic Lifestyle, retained an eigenvalue greater than one and accounted for 23.7% of

the variance. Hedonic lifestyle had not been viewed by the investigator as representing health promoting behavior and therefore, the hypotheses did not investigate this lifestyle factor in relation to the personality variables.

Social Learning Theory asserts that internal health locus of control in combination with reinforcement value, i.e., value of health should lead to more favorable health behavior. However, in this sample, the measurement of health behavior by the Student Lifestyle Survey yielded only one meaningful factor, Hedonic Lifestyle. Hedonic Lifestyle, composed of four behaviors - alcohol use, drug use, sexual intercourse and smoking - is obviously not health promoting. Thus, for the adolescent age group, hedonic lifestyle is the more dominant theme than the lifestyles composed of health promoting behaviors.

This is curious in light of the descriptive data obtained by the Student Lifestyle Survey. The means for all ten health behavior components with the exception of exercise and study are above the midpoint for the response options thereby indicating more rather than less health promoting behavior per item. However, many of these behaviors were assessed by a single item in this 33 item questionnaire, and the validity of the findings may be questionable. It therefore can not be determined whether the hedonic lifestyle factor is truly the only meaningful factor in this sample or whether the factor analysis did not yield adequate loadings of other health behaviors due to weakness in their measurement. Additional study of adolescent health behavior must be undertaken to clarify this issue.

In assessing the overall relationship among the four personality characteristics (internal health locus of control, chance health locus of control, powerful others' health locus of control, and value of health) and the four lifestyle factors (hedonic lifestyle, stressful lifestyle, studious lifestyle, and active lifestyle), powerful others' health locus of control and value of health had the highest loadings on the first canonical variate of personality characteristics and hedonic and stressful lifestyles had the highest loadings on the first canonical variate of lifestyle factors. However, the canonical correlation accounted for only 8.5% of the variance and therefore was interpreted as not meaningful.

Lack of a meaningful correlation supports the concept that adolescent health behavior is indeed complex and that multiple and as yet undiscovered factors underlie this behavior.

In summary, findings of this study are that adolescents, especially those of ethnic minorities, tend to perceive that powerful others rather than themselves, control their health. This may relate to the developmental stage in which as part of the process of establishing independence from the family, the adolescent 'revolts,' experiences intrapsychic conflict and feelings of ambivalence, and conforms to peer group standards. The hedonic lifestyle factor, composed of alcohol use, drug use, sexual intercourse and smoking, can be understood in light of development also. Engaging in these behaviors may bring relief of anxiety, an outlet for increasing sexual tension, a vehicle for conforming to

peer group mores and at the same time provide for a sense of independence from the family constellation. The absence of any trend towards the health promoting lifestyles is consonant with previous studies. Nader et al. (1982) and Radius et al. (1980) indicated that adolescents are not particularly concerned about current personal health and tend not to acknowledge personal responsibility for their health. Additional study is needed to further evaluate the scope and nature of adolescent health behavior, the perceptions about such behavior by adolescents, and the underlying factors that influence choice of health behavior.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to explore the relationship between multidimensional health locus of control, value of health and health behavior of adolescents. Theoretical and empirical evidence suggested that internal health expectancy and value of health should be related to adolescents' health behavior.

Summary

Respondents for this study were 422 adolescents with a mean age of 16.3 years, who lived in the New York Metropolitan area. These respondents completed a Personal Information Sheet, the Multidimensional Health Locus of Control Scales, the Value Survey and the Student Lifestyle Survey. None of the seven hypotheses examined was supported. All of the variables in this investigation together, contributed significantly to explaining 8.5% of the variance in adolescent health behavior. However, as less than 10% of shared variance existed between the two sets of variables, this relationship was treated as not meaningful.

The major finding was that powerful others' health locus of control was positively and significantly related to the hedonic lifestyle factor ($p < .01$). Additional analysis revealed that powerful others' health locus of control appears to vary by ethnicity

with a trend towards greater belief that health is controlled by such powerful others found in non-caucasian adolescents.

Supplementary analysis of the ten health behavior measures and the four personality measures resulted in a correlation between alcohol and PHLC ($r = .29$, $p < .001$).

In summary, this study contributed to analyzing adolescent health behavior and personality factors underlying such behavior. The findings may be of use to health practitioners designing health education programs for adolescents as well as to health care providers serving an adolescent population.

Conclusions

In this study, health behavior was investigated in adolescents and conclusions drawn can only be made with reference to such behavior in 14-18 year olds.

1. There is no apparent relationship between internal health locus of control and health behaviors (studious lifestyle composed of study and caffeine use and active lifestyle composed of exercise).
2. There is no apparent relationship between high value of health and studious or active lifestyle.
3. There are no meaningful relations among personality measures of Internal Health Locus of Control, Chance Health Locus of Control, Powerful Others' Health Locus of Control, Value of Health and measures of adolescent health behavior (stressful lifestyle, studious lifestyle, hedonic lifestyle, and active lifestyle).
4. Powerful others' health locus of control has a significant

low relationship to the hedonic lifestyle factor.

Recommendations

Based on the findings of this investigation, several implications suggest the following as possibilities for future research:

1. Examination of health locus of control in adolescents in relation to ethnicity.
2. Examination of health locus of control in relation to age.
3. Longitudinal study to investigate the development of health locus of control as a personality trait and in terms of static versus variable characteristics.
4. Further evaluation of the utility of the Student Lifestyle Survey in measuring adolescent health behavior.
5. Further exploration in adolescents of the relationship of health locus of control and value of health to single health behaviors.
6. Further exploration in adolescents of the relationship of health locus of control and value of health to health behavior as an aggregate.
8. Exploration of adolescents' perceptions about their health behavior.

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APPENDIX B

Value Survey

Below you will find a list of ten values listed in alphabetical order. I would like you to arrange them in order of importance to YOU, as guiding principles in YOUR life.

Study the list carefully and pick out the one value which is the most important to you. Write the number "1" in the space to the left of the most important value. Then pick out the value which is the second most important to you. Write the number "2" in the space to the left. Then continue in the same manner for the remaining values until you have included all ranks from 1 to 10. Each value should have a different rank.

I realize that some people find it difficult to distinguish the importance of some of these values. Do the best you can, but please rank all 10 of them. The end result should show how you truly feel.

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

APPENDIX D**Personal Information Sheet**

For the following questions, please write the response that best describes you in the space provided.

1. I am:

- (1) female
- (2) male

1. _____

2. My ethnicity is:

- (1) black
- (2) hispanic
- (3) white
- (4) other (specify here _____)

2. _____

3. My religion is:

- (1) catholic
- (2) jewish
- (3) protestant
- (4) other (specify here _____)

3. _____

4. My current grade is:

- (1) ninth
- (2) tenth
- (3) eleventh
- (4) twelfth

4. _____

5. My cumulative grade point average is
in the:

- (1) A range
- (2) B range
- (3) C range
- (4) D range

5. _____

6. My age is:

- (1) fourteen years
- (2) fifteen years
- (3) sixteen years
- (4) seventeen years
- (5) eighteen years or older

6. _____

7. I began attending this school:
(1) in the ninth grade
(2) in the tenth grade
(3) in the eleventh grade
(4) in the twelfth grade
8. My height is: (enter height in feet
and inches in space #8)
9. My weight is: (enter weight in pounds in
space #9)
10. Are you currently under a doctor's care
for any chronic illness for which you must
do something special because of the
illness? (e.g., take medicine, special
diet, limit activities)
(1) no
(2) yes

7. _____

8. _____ feet
_____ inches

9. _____ pounds

10. _____

If yes, what is the name of this illness
and what do you do for it? (please
specify here) _____

APPENDIX E

Subject Consent Letter

Dear Student:

I am asking for your participation in a study which explores adolescent beliefs and values in relation to health behavior. There has been very little research in this area so your help is important to me.

The booklet you received contains a series of questions regarding what you believe about your health as well as what you actually do and requests some basic information describing you in general terms such as age, grade and ethnicity. All answers will become part of a large group of responses and all information will be analyzed as a group. Therefore, please do not put your name anywhere on the booklet to insure that you will remain anonymous.

I expect that it will take less than 30 minutes to complete the questionnaire. Should you choose not to answer a question you may skip it, and you may stop participation at any point. If you have any questions, feel free to ask.

Please give your consent to be part of this study by signing your name at the bottom and returning this to your classroom teacher. If you would like to receive a copy of the results of the study, please place a check in the space by your signature.

Thank you for your time. Your assistance is very much appreciated.

Sincerely,

Phyllis K. More, R.N., M.A.
Ph.D Candidate
New York University

I agree to participate in this study by answering this questionnaire.

Signature _____

I would like to receive a copy of the results _____

Parent/Guardian Consent Letter

Dear Parent or Guardian:

I am conducting a study which examines the relationship between an adolescent's beliefs and values about health and health behavior. There has been very little research in this area to date.

I am asking your child to participate in the study.

Participation involves answering a questionnaire during the usual health or physical education class. No names will appear anywhere on the questionnaire, thereby assuring anonymity for each student. All data will be analyzed and reported as a group.

The questionnaire will require less than 30 minutes to complete. Your child is free to skip any items, stop participation or withdraw from the study at any time if the child so chooses. There

are no right or wrong answers and I am only interested in how these adolescents as a group see things.

Please give your consent for your child to participate in this study by signing the form at the bottom of the page and having your child return it to the health or physical education teacher. If you would like to receive a copy of the results of the study, please indicate by checking the space by your name.

Thank you for your time and assistance.

Sincerely,

Phyllis K. More, R.N., M.A.
Ph.D Candidate
New York University

I give permission for my child _____
(name)

to participate in this study by answering the questionnaire.

(signature)

I would like to receive a copy of the results of the study.

Yes _____

APPENDIX F

Purpose of Study - Verbal Explanation

You are being asked to participate in a study which explores adolescent beliefs and values in relation to health behavior. The study is being conducted by Mrs. Phyllis More as part of the doctoral dissertation requirement at New York University.

Participation will involve answering a questionnaire during your regular health or physical education class. It should take less than 30 minutes to complete the questionnaire and you may skip an item, stop participation or withdraw from the study at any time if you should so choose.

Your answers are confidential and, as your name will not appear anywhere on the questionnaire, you will remain anonymous.

Thank you for your time and willingness to contribute to better understanding about adolescent health behavior.