THE INFLUENCE OF EXPERIENCES WITH SERIOUS MEDICAL CONDITIONS ON SELF-REPORTED HEALTH BEHAVIORS IN OLDER ADOLESCENT UNIVERSITY STUDENTS

A Dissertation

by

DANIELLE LOUISE COOPER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2006

Major Subject: Psychology

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Approved by:

Co-Chairs of Advisory Committee:	Robert Heffer
	Douglas Snyder
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	William Rae
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ABSTRACT

The Influence of Experiences with Serious Medical Conditions on Self-Reported Health Behaviors in Older Adolescent University Students. (May 2006)

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Dr. Douglas Snyder

The purpose of this study was to examine the influence of experiences with cancer, diabetes, and cardiovascular disease on self-reported health behaviors in older adolescents/young adults, conceptualized as 17 to 24 years of age. This study utilized a developmental perspective to review models of health motivation and prevention. Pertinent models are discussed, such as the Theory of Planned Behavior, models utilizing the concept of locus of control, the Biopsychosocial model, the Contextual/Social-Ecological model, as well as an Integrated Developmental model. The present study sampled university students to examine the impact on health behaviors of knowledge or experience with serious medical conditions. The overall hypothesis, based on the Integrated Developmental model (Cooper & Heffer, in preparation), was that illness experiences or knowledge influences self-report of health behaviors and health locus of control. Participants (n=459) were administered a demographic questionnaire, the Illness Experiences Questionnaire, the 2003 Youth Risk Behavior Survey, and the Multidimensional Health Locus of Control Scales. Factor analysis was conducted on the YRBS, yielding three factors: Alcohol Use, Smoking Behaviors, and Sexual Activity. The MHLC is also comprised of three subscores: Internality, Powerful Others, and Chance. The research question examined differences on YRBS factors and MHLC scales by several independent variables. MANOVAs were conducted on the three YRBS factors and on the three MHLC scales by several independent variables. Results did not support the hypothesis that experiences with or knowledge of these illnesses are associated with differences in ratings of health behaviors and reported health locus of control.

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INTRODUCTION

The purpose of this study was to examine the influence of experiences with cancer, diabetes, and cardiovascular disease on health-related beliefs and behaviors in older adolescents or young adults. The period of older adolescence has been conceptualized as 17 to 24 years of age (Stevens & Dunsmore, 1996). Due to the dearth of suitable literature focusing explicitly of this developmental period, this review will include important adolescent and, to a more limited degree, adult literature.

Because cancer, diabetes, and cardiovascular disease are the leading causes of death for adults in the United States, the current study focused primarily on experiences with these three diseases. Although medical advancements have reduced the probability of death by acute disease, more individuals are living with chronic diseases. This, in turn, means that more in our society are learning vicariously about disease from watching ill family members, friends, or peers cope in their daily lives with compromised health. For example, the Centers for Disease Control (CDC; 1997, 2000) reported cancer as the second leading cause of death in the year 2000, reported that among adults, chronic diseases are the nation's leading killers, and stated that 6% of individuals aged 18 and older had some form of cancer.

Out of necessity, primary and secondary prevention has become increasingly important as these health threats have become more prevalent. Throughout the past few decades, research has indicated the leading causes of mortality in the United States are due to modifiable lifestyle factors (CDC, 1980; Stroebe & Stroebe, 1995). Interest and attention has become focused on why individuals do or do not participate in appropriate preventative and curative behaviors, such as making dietary changes or participating in screening programs (Leventhal, Safer, & Panagis, 1983). For example, Kaplan (1984) contended that the practice of health promotion is rooted in at least four assumptions, (a) behaviors may increase the risk of certain chronic diseases, (b) changes in behaviors may reduce the chance of being diagnosed with certain diseases, (c) behavior is changeable, and (d) behavioral intentions are cost-

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This dissertation follows the style of *Journal of Clinical Child and Adolescent Psychology*.

effective. Kaplan (2000) also noted that disease prevention may be accomplished in part by being proactive, such as promoting healthy lifestyles and intervening before a diagnosis occurs. The Centers for Disease Control (2000) stated that practicing healthy behaviors could prevent many premature deaths, and contended that healthy behaviors need to be established in childhood before less healthy behaviors become normal practice. To facilitate and organize thinking and research in this area, several models have been developed in recent decades to better explain, conceptualize, and understand differences in health-related motivation.

This study utilized a developmental perspective to review models of health motivation and prevention relevant to older adolescents or young adults. For example, cognitive models such as the Theory of Planned Behavior and models utilizing the concept of locus of control are discussed. Other models pertinent to chronic illness and health also are reviewed, such as the Biopsychosocial model and the Contextual/Social-Ecological model. Significant developmental changes are discussed, such as the increased influence of peers and the influence of the inherently chaotic and unstable time period of older adolescence on health attitudes and behaviors. Further, selected relevant research involving health-related motivation models in the adult literature are described it pertains to older adolescents. An integrative model is described that was created to guide future theory and research in conceptualizing health related beliefs and behaviors of older adolescents or young adults regarding chronic illness. Hypotheses and a methodology for addressing aspects of this model and the subsequent results and discussion will be presented.

Models of Health Related Motivation

Cognitive models. A group of well-known cognitive models include the general Subjective Expected Utility (SEU) models. Models developed within this grouping attempt to tap individuals' thoughts and attitudes concerning the consequences of engaging in certain behaviors, the perceived probabilities that those consequences will actually occur, and the beliefs about others' reactions to those behaviors (Chassin, Presson, Sherman, & McConnell, 1995). One example of these SEU models is the Theory of Reasoned Action, which later spawned the Theory of Planned Behavior (Ajzen, 1985; Ajzen &

Fishbein, 1980). The main difference between these two models is that the Theory of Planned Behavior includes the perception of how much control people have over their behavior, with the hypothesis that the greater resources that individuals have, the greater their perception of control (Ajzen, 1985; Brannon & Feist, 2000). Both models assume that people use relevant information when making decisions about how to behave, and that behavior is typically goal-oriented (Ajzen, 1985).

These models are useful to better understand thoughts and attitudes individuals' hold regarding consequences of actions and a belief that consequences will occur. These models typically make predictions regarding the connections that exist among health beliefs, as well as the connections between beliefs and behaviors. "The Theory of Planned Behavior assumes that perceived control can affect behavior indirectly through intentions" (Stroebe & Stroebe, 1995, p. 33). Perceived control can be construed as either internal or external to the individual (Ajzen, 1988). In conclusion, Brannon and Feist (2000) contend that the Theory of Planned Behavior makes "predictions of behavior can be made from knowledge of (a) people's attitudes toward the behavior, (b) their subjective norm, and (c) their perceived behavioral control. All three components interact to shape people's intentions to behave. In addition, perceived behavioral control may have a direct influence on people's behavior (Ajzen, 1991)." (p. 51)

Health locus of control. Another belief construct found to be predictive of health behavior is Health Locus of Control developed from Rotter's internal-external locus of control, a key concept in his social learning theory (Lau, 1982; Lau & Ware, 1981; Wallston, Wallston, & Devillis, 1978). Health Locus of Control beliefs are relatively static individual difference measures developed early in life, which determine perceptions about the causality of health (Gottlieb & Baker, 1986).

Chassin et al. (1995) noted that although these models have demonstrated some success in predicting health-related behaviors, a need persists to utilize these models within a developmental framework. Health-related cognitions and attitudes about future implications of health-related behavior may vary drastically throughout the lifespan. For example, children think very differently than adolescents or adults about the consequences of their behaviors (Berk, 1994). Furthermore, a concept or understanding about what "health" and "illness" mean also evolve over the lifespan and be shaped by life experiences (Susman, Dorn, Feagans, & Ray, 1992).

Health Belief Model

The Health Belief Model, based on theories of learning, attitude, and motivation, was originally developed to explain preventative health behaviors by examining perceptions of health and illness (Becker & Maiman, 1975; King, 1983; Rosenstock, 1966). While the Health Belief Model shares some features with that of Protection Motivation Theory (Rogers, 1975) as well as the Theory of Planned Behavior (Ajzen & Madden, 1986), it is distinctly different from these other models.

Specifically, the Health Belief Model theorizes that one's beliefs affect behavior in a direct manner rather than by exerting influence on behavioral intentions (Abraham, Sheeran, Spears, & Abrams, 1992). Thus, conceptualizing the use of preventative health behaviors may be hypothesized more directly. The Health Belief Model also fits nicely with the Subjective Expected Utility Theories, in that once relevant beliefs have been identified "specific predictions about the relations among beliefs and the relations between beliefs and behaviors" may be identified (Ronis, 1992, p. 127). Since its' origination, the Health Belief Model has been used to help explain preventative health-related behaviors such as compliance with medical recommendations and attendance at screenings for illness (Becker & Maiman, 1975; Rosenstock, 1966).

Description of the Health Belief Model. The original Health Belief Model contained four health belief measures – perceived susceptibility to the health problem, perceived severity of the health problem, perceived efficacy of practicing preventive behaviors, and perceived barriers to practicing preventative behaviors (Bond, Aiken, & Somerville, 1992; Janz & Becker, 1984). This model predicts that health-protective behaviors are more likely to occur when perceived susceptibility, perceived severity, and perceived benefits are high and perceived barriers are low (Steers, Elliott, Nemiro, Ditman, & Oskamp, 1996). Gottlieb and Baker (1986) further described the Health Belief Model:

> The Health Belief Model postulates that individual decision-making regarding compliance behavior or seeking preventative care is contingent upon readiness as determined by the individual's perceptions or personal susceptibility to disease, severity of consequences, benefits of prevention, barriers to action and cues to action. Personal

> susceptibility refers to the individual's view of him or herself as potentially vulnerable to a particular condition. (p. 918)

Later versions of the Health Belief Model have expanded to contain various additional health belief measures, such as self-efficacy, social support, perceived access to health care and advice, and knowledge about various diseases such as HIV (Hayes, 1991; Sheeran & Abraham, 1996; Steers et al., 1996; Wilson, Lavelle, Greenspan, & Wilson, 1991). This expansion of the model has allowed greater flexibility and usefulness. The Health Belief Model has been used in research examining issues such as participation in screening and immunization programs, preventative dental check-ups, and treatment adherence associated with a variety of acute and chronic diseases (Dielman et al., 1980; Jette, Cummings, Brock, Phelps, & Naessens, 1981).

Previous research has indicated that attitudes about health do not necessarily translate directly into engaging in healthy behaviors. For example, it would make intuitive sense to assume that individuals' with a positive attitude about health would have healthy lifestyles, but this has not been found to be the case (Eagly & Chaiken, 1993; Stroebe & Stroebe, 1995). For example, it could be hypothesized that individual who exercise would also engage in other healthy behaviors such as abstaining from smoking; however, this hypothesis has not been generally supported (Mechanic, 1979).

Other Models Pertinent to Chronic Illness and Health in Adolescence

Models more specific to adolescents coping with chronic illness have been proposed to explain adaptation to illness and health-related behavior. For example, several models have been developed to understand the role of families in pediatric illness, since family factors are considered important outcome predictors when the "patient" is an adolescent (Kazak, Segal-Andrews, & Johnson, 1995).

Disability-Stress-Coping model. One such model is the Disability-Stress-Coping model, which aims to better understand adjustment in both children, adolescents, and adults and strives to incorporate theories of disease processes with ideas about coping strategies and the differing stressors with which the "patient" and each member of the involved family might be faced (Moos & Schaefer, 1984; Rutter, 1990; Wallander & Thompson, 1995; Wallander & Varni, 1992). The Disability-Stress-Coping model includes variables hypothesized to be important to adjustment and organizes them as either risk or resiliency factors

(Wallander & Thompson, 1995). In this model, stress is believed to be an important risk factor for development of psychosocial problems, such as daily hassles and major life events (Wallander & Thompson, 1995). Interpersonal factors, social-ecological factors, and stress processing strategies are conceived as resiliency factors that influence coping and adjustment (Wallander & Varni, 1992).

Biopsychosocial model. The Biopsychosocial model speaks to the relationships that exist between psychological, biological, family, individual, and community subsystems. In this particular model, illness symptoms are viewed as associated with emotional and social functioning (Engel, 1977; Kazak, Segal-Andrews, & Johnson, 1995). Environmental variables are viewed as important in influencing health-related symptoms. The name "Biopsychosocial model" has sometimes been used as a descriptor of a conclusive model that sees all person and environmental variables as interrelated. This model attempts to provide a "framework for integrating biological, psychological, and social approaches to health and illness (Schwartz, 1982, p. 1040)." Certainly, the integration of this information may be helpful when addressing questions regarding prevention, diagnosis, and treatment, especially since the attitude that health related problems are often multidimensional has become more established in recent decades (Schwartz, 1982).

Contextual/Social-Ecological model. The Contextual/Social-Ecological model explores the associations between the developing individual and the environment or context, providing a way to organize variables such as the ill individual, the family, the larger environmental context, and the subsuming social environment. This particular model represents several spheres of influence, with the ill child or adolescent in the center. Like the circles that emerge after dropping a pebble in a clear pond, the resulting spheres develop outward from the center point. These spheres of influence include the microsystem, thought of as the nuclear and extended family and the disease itself, and the mesosystem, described as including individuals such as peers, friends, school, doctors, and the hospital. The next sphere is the exosystem, which includes social networks, and the final sphere is the macrosystem, which includes social class, values, subcultures, the legal system, and technology.

Integrated Developmental Model. The Integrated Developmental Model (Cooper & Heffer, in preparation) integrates existing models of health and illness to better guide thinking regarding how adolescents make decisions and form attitudes and health beliefs regarding serious medical conditions.

This model (see Figure 1) attempts to include the most pertinent aspects from the strongest models just discussed in a manner that facilitates understanding health beliefs within a developmental framework.

The Integrated Developmental Model suggests that when discussing health beliefs in adolescents, the developmental status of the individual and how this impacts individual factors must be examined, as developmental status will also influence all other components of the model. Individual factors such as gender, ethnicity, age at time of illness experience, and perceived closeness to an individual with compromised health are related to environmental factors such as potential environmental stressors and how the individual learned about health related information. These individual and environmental factors work together to influence health beliefs and attitudes regarding causality and vulnerability of health, as well as perceived efficacy and barriers of preventative behaviors. All of these factors work to influence an individual in practicing either preventative or risky health-related behaviors such as safe sex, eating a healthy diet, and utilizing appropriate medical care. Finally, the Integrated Developmental Model proposes that all of these factors influence an individual's coping and adjustment as it relates to health. For example, having the ability and motivation to seek out relevant health-related information and apply that information to actual healthful behaviors. Adoption of this model implies that research and practice involving this age group must focus on these multiple variables and how they work to affect health-related beliefs and behavior.

Relevant Adolescent Literature

The importance of a developmental perspective. When contemplating health beliefs, an important question is, "how do individuals develop beliefs regarding health, and how do these thoughts then affect health-related behavioral intentions?" King (1983) proposed that beliefs in the Health Belief Model may be preceded by other cognitive processes that operate directly on health beliefs and thus indirectly on health behaviors. In addition, such cognitive processes yield causal explanations of illness (King, 1983; Stoeckle & Barsky, 1980). From a developmental perspective, either personal or vicarious experiences (e.g., if a friend or family member is ill) might impact the use of preventative health strategies and expectations of illness and causality across the life span.

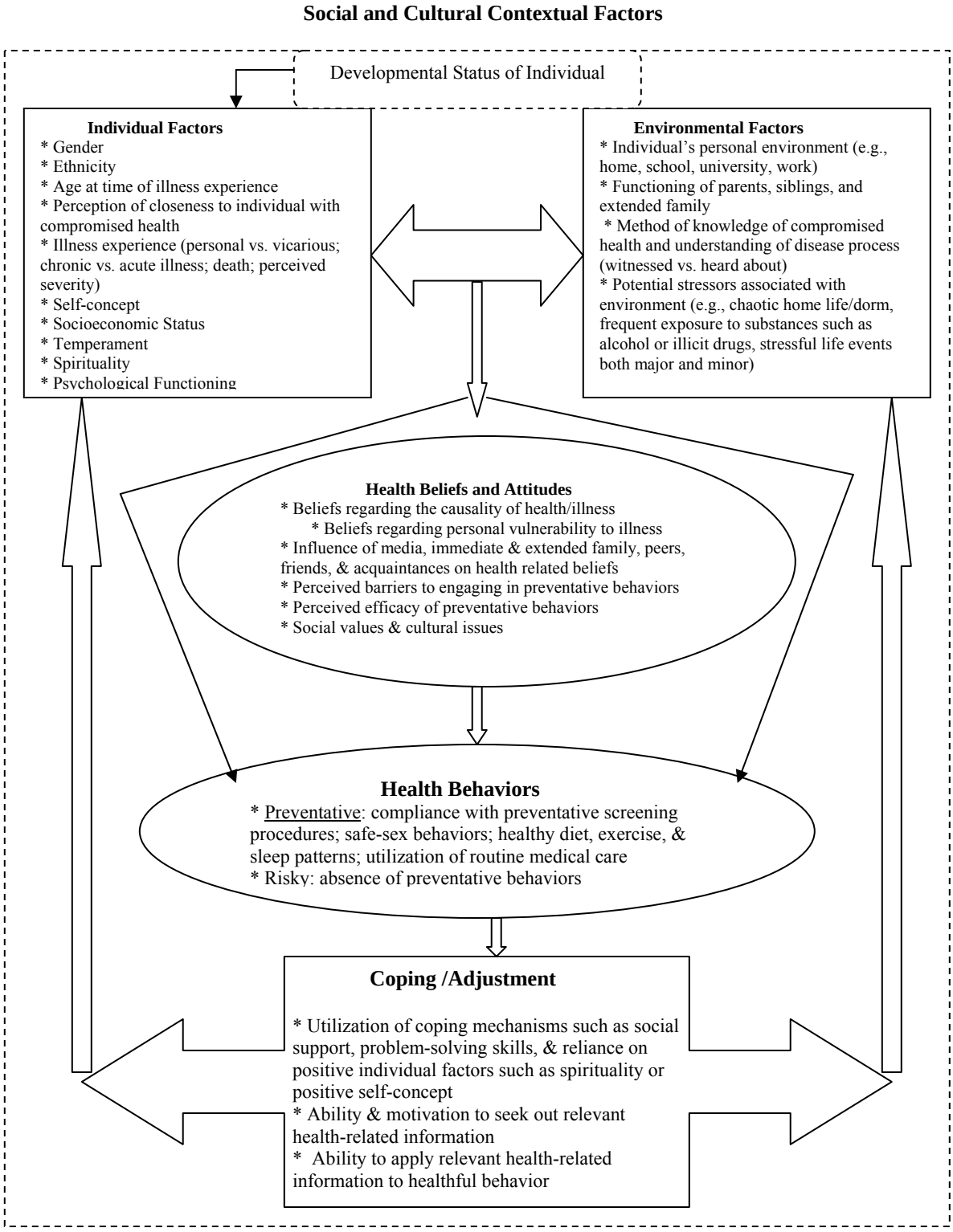

Figure 1. Integrated Developmental Model. (Cooper & Heffer, in preparation).

To better understand how decisions are made regarding health and illness, I first consider the information available regarding health-related beliefs of older adolescents. Previous research has suggested that influential relationships throughout adolescence typically include the nuclear and extended family, teachers, peers, and social groups (Shulman, 1993). Like beliefs and attitudes individuals hold about various topics, adult and adolescent health beliefs and attitudes may be impacted by childhood experiences with peers, families, and exposure to illness (Lewis & Lewis, 1982).

Seiffge-Krenke (1998) contended that individuals' conception of health and illness are clarified through out childhood and adolescence, as individuals draw from their own experiences with medical conditions, either personal or vicarious. These reported changes in knowledge of illness and health-related behaviors may be associated with developmental changes in other areas such as compliance with medical regimens. Developmental psychology research has examined the importance of considering the timing of developmental events, suggesting time-related differences in attitude development. Research investigating developmental psychopathology has given the field concepts, such as risk factors, protective factors, vulnerability, and resiliency (Cicchetti & Rogosch, 2002; Graber & Brooks-Gunn, 1996). However, little research has explored associations among developmental change and health behaviors, and some have suggested that research has been slow to incorporate developmental principles into their work (Drotar, 1997; Holmbeck, 2002; Wallander & Varni, 1992).

Health behaviors in adolescence. Adolescence has been described as a transitional developmental period between childhood and adulthood typically characterized by biological, psychological, and social role changes (Feldman & Elliott, 1990). Holmbeck (2002) contended that adolescence is an important stage of development regarding establishing health-related behaviors, and this period may significantly impact adolescents' developmental and health trajectories for the remainder of their lifetime. Viewing health beliefs from a developmental vantage point is further endorsed, because as children become adolescents, they are better able to understand how their health-related behaviors impact their personal health; adolescents and their health-related behaviors are also more impacted by their peer groups (Brooks-Gunn, 1993; Holmbeck, 2002).

Evolving from the Biopsychosocial model described previously, Holmbeck (2002) described a model for organizing adolescent adaptation and adjustment to represent biological, psychological, and social changes that typically occur simultaneously during the adolescent developmental period. Thus, impacting development in any of these areas could potentially have implications for the others. Three important aspects of adolescent development in relation to health-related behaviors are cognitive processes, social influences, and biological factors (Chassin, Presson, Sherman, & McConnell, 1995). Chassin et al. (1995) described cognitive processes as including models of decision-making, while social influences encompass peer and parental influences, along with the development of autonomy and self-concept. Biological factors are described as including developmental issues such as pubertal development and increased risky behaviors (Chassin et al., 1995). As Holmbeck (2002) suggested, all three of these factors may be developing simultaneously at disparate rates, impacting the overall trajectory of an adolescent's development.

Just as the period of adolescence is unique from childhood, so is it different from adulthood. These differences have important implications for understanding behaviors, cognitions, and attitudes. For example, different decision-making steps have been cited as resulting in differences in adult versus adolescent behavior. These steps include identifying outcomes of behavioral choices, determining the likelihood that the predicted outcome will occur, thinking about the impact of the outcome, and using this information when making decisions (Chassin et al., 1995; Furby & Beyth-Marom, 1992). Risky adolescent health behaviors have been described as a serious problem in health care (DiClemente, Hansen, & Ponton, 1996). Arnett (1992) suggested that adolescents tend to engage in more risky health behaviors in part because they underestimate the probability that a negative outcome will happen to them, perhaps demonstrating cognitive differences between adolescents and adults.

Some have suggested that neither adolescent's cognitive conceptions regarding health or the connection adolescents make from cognition to health behaviors are well understood (Bond, Aiken, & Somerville, 1992; Chassin, Presson, & Sherman, 1987). Perhaps how adolescents make health-related decisions is poorly understood as opposed to the view that thought processes differ between adolescents and adults. Sloane and Zimmer (1993) suggested a skill deficit, such that "underdeveloped problem-

solving and communication skills of young adults are often more significant barriers to understanding and coping with health issues than is ignorance." (p. 243) Utilizing the health locus of control model, Booth-Butterfield, Anderson, and Booth-Butterfield (2000) found that adolescents who reported feeling less control over their lives also reported using more tobacco products and believing that chance played a greater role in their health compared to adolescents who did not use tobacco products.

Experience with or knowledge of a friend or family member with a serious medical condition may profoundly impact attention paid to health-related issues, as personal experiences may promote more realistic thinking. Abraham, Sheeran, Spears, and Abrams (1992) utilized a large sample of adolescents to examine health beliefs and the promotion of HIV-preventative behaviors. They concluded that greater maturity may result in "enhanced rational decision-making as proposed by the Health Belief Model." (p. 369) Although representations that individuals have regarding illness vary over time, these representations reflect our psychosocial histories or illness memories from personal experiences, friends, the media, and family. These representations impact coping with illness and treatment, as well as how illness is understood (Leventhal & Crouch, 1997). Therefore, when individuals witness significant others' struggles with illness, it seems logical that these vicarious experiences shape attitudes and beliefs.

Increased influence of peers during adolescence. During adolescence and into the transition to college life, the parent-child relationship changes, with greater influence and investment of time given to the peer group (Collins, 1990; Seiffge-Krenke, 1990; Wright, 1984; Youniss, 1980). An adolescent's peer group is an important component of socialization as peer acceptance becomes more important (Anderson & Coyne, 1993; Hartup, 1983). Adolescents commonly spend a majority of their time with peers either at school or in extracurricular activities (La Greca & Prinstein, 1999). Again, this increased peer influence may have important implications on health-related cognitions and attitudes, particularly when a member of the peer group is ill. For example, the peer group may have a significant impact on both positive and negative health-related behaviors such as preventative behaviors and treatment adherence (Brooks-Gunn, 1993; Holmbeck, 2002).

While much of the current research examines the relationship between friendships and health-related behaviors regarding risky behaviors such as smoking, drug use, and other unsafe behaviors, it is

also important to explore possible positive influences that peers may have on adaptive health behaviors and disease management (Burroughs et al., 1997; Kazak, Segal-Andrews, & Johnson, 1995; La Greca, Prinstein, & Fetter, 2001; Prinstein, Boegers, & Spirito, 2001; Urberg, 1992). More completely understanding peer influence is important, because adolescents typically desire increased control and privacy, and begin to individuate from parents, taking on increased responsibility for managing their own health behaviors (Anderson & Coyne, 1993).

Role of similarity in effective communication. Given the increased cache of the peer group during adolescence, one tactic of relaying information often used successfully is peer education. Peer education gained popularity in the 1970's and has continued to be an effective way to transmit information (Sloane & Zimmer, 1993). As children mature and the bond between peers strengthens, peer education often occurs naturally. For example, young individuals often turn to friends for advice that may affect their health behaviors, regardless of the accuracy of the peer-provided information. Sloane and Zimmer (1993) contend that especially for youth, who often do not identify or communicate effectively with adults, a greater likelihood exists that information will be heard and impact attitudes and behaviors if the individual believes the deliverer of the information is similar to them. This logically places friends in the position of influencing adolescent attitudes and beliefs about health.

Gottlieb and Baker (1986) examined the influence of health beliefs, parental and peer behaviors, and exercise program participation on adolescent smoking, alcohol use and physical activity. Their results indicated that drinking and smoking by peers was directly associated with these behaviors in both male and female participants, with same-sex associations being the strongest (Gottlieb & Baker, 1986). They also found that for alcohol use, belief in the efficacy of behavioral change was inversely related to consumption for both males and females, and efficacy belief was also related to smoking behaviors for females. Gottlieb and Baker (1986) suggested the need for prevention programs to maximize peer support for healthy behavior and to increase beliefs in the efficacy of behavioral changes to reduce health risks. Peer influence or support to think about the consequences of engaging in unhealthy behaviors may have more of an impact on actual behaviors than other methods (Grodner, 1991).

Other correlates of health behaviors. Another potential influence on health-related cognitions and behaviors may be related to ethnicity and gender. For example, Price, Desmond, Wallace, Smith, and Stewart (1988) found significant differences between African American and Caucasian adolescents' knowledge of cancer such as warning signs, prevention techniques, and etiology. Furthermore, Sydney et al. (2000) examined differences in ethnicity and gender for risk perceptions of major diseases and motor vehicle accidents in adolescents and found that females risk perceptions were similar to males although national statistics indicated that adolescent males are at a greater risk than females.

Yep (1993) used the Health Belief Model to explore HIV prevention among Asian-American college students. After finding no support for the theory that perceived susceptibility would be positively associated with HIV-preventative behaviors, Yep (1993) suggested that perhaps students in the sample failed to personalize the threat of HIV or held an "optimistic bias", which describes a propensity to underestimate one's personal risk as compared to the risk others face (Weinstein, 1989). Optimistic bias is essentially Elkind and Bowen's (1979) cognitive distortion known as "personal fable", in which adolescents express an inflated opinion of their own importance. This feeling of personal importance or uniqueness can result in risky health behaviors, as the individual believes that they are different and invulnerable (Berk, 1994). Yep (1993) stated that because many Asians saw HIV and AIDS as a non-Asian epidemic, the participants in this study reported feeling a low personal vulnerability to the disease.

Backman, Haddad, Lee, Johnstone, and Hodgkin (2002) utilized the Theory of Planned Behavior to investigate predictors of healthful dietary behaviors in adolescents. Backman et al. (2002) found that intention to eat a healthy diet was a predictor of healthful dietary choices. Intention was found to be most influenced by attitude, perceived behavioral control, and subjective norm (Backman et al., 2002). Subjective norm is defined as the perceived social pressure to engage or not engage in a behavior and the felt motivation to comply (Ajzen & Fishbein, 1980). For example, if an adolescent feels that his friends are encouraging him to drink, and he wants these friends to like him, the motivation to comply is great and it is more likely that this behavior will occur. Jessor, Turbin, and Costa (1998) examined the role of both health-related and conventionality-related protective factors as related to healthful behaviors. Healthful behaviors examined were healthy diet, regular exercise, adequate sleep, good dental hygiene, and seatbelt

use. Health-related protective factors included value of health, perceived effects of health-compromising behaviors, and parents who modeled health behaviors (Jessor et al., 1998). Conventionality-related protective factors were positive attitude regarding school, involvement in prosocial activities, church attendance, and friends who demonstrated these behaviors (Jessor et al., 1998). Jessor et al. (1998) found that both health-related and conventionality-related protective factors had significant positive relations with healthful behavior.

Perceived vulnerability. Other research has examined the relationship between personal experience and perceived vulnerability, yielding expected findings of greater perceived vulnerability when a family member has been diagnosed with a particular disease. For example, when adolescents' had a father with diabetes, they tended to report a greater perceived vulnerability to diabetes (Sydney et al., 2000). Similarly, Miller et al. (2001) found that first-degree relatives of prostate cancer patients reported greater perceived vulnerability for prostate cancer, agreed more strongly that prostate cancer is inherited, and felt that less can be done to prevent the disease.

Health Behaviors in Older Adolescence

Although sometimes termed late or older adolescence and sometimes termed young adulthood, the period of late adolescence has been conceptualized as ranging from 17 to 24 years of age and is often characterized by the formation of careers, separation from family, and increased financial independence (Stevens & Dunsmore, 1996). In the United States, this is typically the time when individuals enter higher education such as college, begin working full time, or begin a family.

College students. Because health and illness in adolescents occur within a developmental context, researchers who examine individuals 20 through 30 years old should continue to be influenced by a developmental perspective, since late adolescence is typically thought of in the United States as ending around age 24 (Holmbeck, 2002; Holmbeck et al., 2000; Seiffge-Krenke, 1998; Stevens & Dunsmore, 1996; Wallander & Siegel, 1995). A typical setting in which to gain access to individuals of this age is in colleges and universities. Much of what is known about health-related thinking and behaviors has been gleaned from research conducted with university students.

Some have contended that college student behavior is oriented to short-term pleasure-seeking and pain avoidance (Lester & Leach, 1983; Lester & Perez, 1977). For example, in a study of perceived susceptibility to disease, Weinstein (1984) found that college students had an optimistic bias toward behavioral risk, but not toward environmental or hereditary risk. Weinstein (1984) hypothesized that this weak association between behavior and susceptibility may lessen the motivation to cease unhealthful behavior and adopt healthful ones for individuals of this age. Further, the "egocentric undergraduate is oriented to the here and now. Thus, although college students have the cognitive ability to imagine the future, it often seems irrelevant" (Manning, Barenberg, Gallese, & Rice, 1989, p. 258). Although this idea may be generalized to other individuals in this age and developmental category, one must take caution when making this generalization. For example, individuals in this period of late adolescence/young adulthood may behave and think differently if in a college setting or in a workplace setting. However, it is logical to assume that regardless of the environmental context, individuals of this age are typically experiencing similar developmental transitions (Erickson, 1968).

Examining the knowledge and health beliefs of college student concerning AIDS, Manning, Barenberg, Gallese, and Rice (1989, p. 257) concurred that, "many undergraduates still are completing the adolescent stage of development and are subject to powerful forces inhospitable to safe sexual behaviors." They outlined several issues adolescents, including college students, struggle with that might influence their health behaviors. These issues include identity versus role confusion, defining sex roles, sexual experimentation, cognitive development, risk taking, and egocentrism (Manning, Barenberg, Gallese, & Rice, 1989). Speaking to the issue of cognitive development, adolescence is the period in which individuals attain Piaget's stage of formal operations, in which they are able to master facts, think abstractly, think scientifically, and have a greater understanding of health and illness (Inhelder & Piaget, 1958; Weinman & Petrie, 1997).

One study utilizing college students in the United States examined health beliefs as predictors of HIV-preventive behavior and the role of ethnic differences in prediction since demographic, sociocultural, and personal factors may modify attitudes (Gottlieb & Baker, 1986; Steers et al., 1996). Steers et al. (1996) indicated that constructs such as perceived susceptibility, self-efficacy, and social support did

predict many safer-sex behaviors. Specifically, the Health Beliefs Model predicted more safer-sex behaviors for the Euro-American students compared to Hispanic American, African American, and Asian American students. However, their data did not indicate large differences in safer-sex behavior among these students. Also examining safer-sex behaviors, Bennett and Bozionelos (2000) reviewed 20 studies that focused on the utility of the Theory of Planned Behavior in predicting condom use. Bennett and Bozionelos (2000) concluded that the Theory of Planned Behavior has been useful in predicting both intentions to use condoms and condom use. They contended that attitudes are more powerful predictors than social norms, and that judgments of efficacy look to be more influential than other perceived control factors.

More broadly, Hodgson (2001) examined three different dimensions of the health locus of control (i.e., locus of control, perception of risk, and risk-taking behavior) in a sample of 18- to 21-year-olds. This study utilized Form A of the Multidimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978), the Perception of Risk Subscale of Busen's (1991) Adolescent Risk-Taking Instrument, and a revised version of the Youth Risk Behavior Survey (Centers for Disease Control and Prevention, 1997). Hodgson's (2001) results did not yield significant correlations between internal health locus of control and perception of risk and between powerful others health locus of control and perception of risk. However, results did yield significant correlations between chance health locus of control and perception of risk and between perception of risk and risk-taking behavior.

Meschke (1998) investigated changes in risk-taking behavior between adolescence and young adulthood, examining four risk-taking behaviors, marijuana use, alcohol use, thrill seeking behaviors, and antisocial behaviors. Acquiring adult roles such as college, career, or romantic relationship involvement were isolated as potential predictors of change for these four risk-taking behaviors. Meschke (1998) reported that greater satisfaction with adult roles predicted less of an increase in marijuana and alcohol use, thrill-seeking behaviors, and antisocial behaviors. Conversely, Brener and Collins (1998) utilized the Youth Risk Behavior Survey to examine health-risk behaviors in young and older adolescents, finding an increase in health-risk behaviors as adolescents get older.

Steptoe and Wardle (2001) also examined the locus of control as it relates to health behaviors in young adults ages 18 to 30. They examined the relationships between internal powerful others, chance health locus of control, health values, as well as investigating 10 health-related behaviors: physical exercise, smoking, alcohol consumption, breakfast, tooth-brushing, seat belt use, and consumption of fruit, fat, fiber, and salt. Steptoe and Wardle (2001) found that individuals in the highest quartile of internal locus of control were 40% more likely to engage in healthy behaviors than individuals in the lowest quartile of internal locus of control after adjustment for sex, age, health value and other locus of control scales. Furthermore, high chance locus scores were associated with more than 20% reductions in the likelihood of healthy options for many behaviors (Steptoe & Wardle, 2001).

Armitage, Norman, and Conner (2002) investigated the ability of the Theory of Planned Behavior to mediate the effects of age, gender, and multidimensional health locus of control on behavioral intentions and behavior. They examined three self-reported health-related behaviors: safe sex, binge drinking, and drinking and driving, with results indicating that the Theory of Planned Behavior was a better predictor of health-related behavioral intentions that both demographic variables and multidimensional health locus of control. Armitage et al. (2002) also examined attendance at health screenings and results indicated that the Theory of Planned Behavior variables were useful predictors of actual behavior. In conclusion, Armitage et al. (2002) stated that although the Theory of Planned Behavior accounted for significant proportions of the variance in health-related behavioral intentions and behavior, it failed to completely mediate the effects of demographic variables such as gender.

Relevant adult literature. Due to the dearth of literature available regarding health beliefs in older adolescents, a brief discussion of selected relevant adult-based literature will be included here. These studies include variables germane to issues discussed in this paper, and are not meant to constitute an exhaustive review. For example, Jones (1982) contended that disease information only becomes salient when reality reinforces the information. For example, perceptions of vulnerability to cancer may develop after encountering information describing causes of cancer, or information that others similar to the individual have developed cancer (Cameron, 1997). This perception of having greater vulnerability when someone that is perceived as being similar to the individual is ill was also noted in research conducted

with children. Perhaps as individuals, we typically feel more vulnerable if someone we consider to be similar to ourselves is diagnosed with an illness, regardless of where our path along a developmental trajectory.

Finney and Iannotti (2001) explored the impact of having a family history of breast cancer on the health beliefs of women. They included women with both negative (no cancer known) and positive family histories (cancer diagnosed in a relative). They found that for their sample, both women with positive and negative family histories of breast cancer had similar perceived benefits and barriers in regard to care utilization and cancer screening behaviors (Finney & Iannotti, 2001). However, it was noted that other issues were found to have increased relevance for women with positive histories of breast cancer, such as susceptibility, salience of family history, cues to action, and issue involvement (Finney & Iannotti, 2001). So when women in this study had a positive family history for cancer, they tended to be more aware of this history, tended to feel more vulnerable to the disease, and tended to become more involved in preventative actions. Another example is that described by Lerman et al. (1993), in which they found that approximately 50% of their sample of women with a family history of breast cancer reported that they experienced intrusive thoughts regarding their cancer risk.

Other studies have yielded various findings. For example, some have found a positive relationship between screening compliance and a positive family history of breast cancer (Lippert, Eaker, Vierkant, & Remington, 1999), while others have either found no connection between screening compliance and family history (Drossaert, Boer, & Seydel, 1996) or a negative relationship between screening compliance and a positive family history of breast cancer (Hyman, Baker, Ephraim, Moadel, & Philip, 1994). Finney and Iannotti (2001) contend that much of the previous research in this area did not explore other health beliefs separate of risk perceptions and mammography screening that may be of importance. It could be argued either that if one has a positive family history of cancer, they may be more inclined to take actions such as participating in screening procedures, or they may be fearful and exhibit avoidance behaviors by not engaging in proactive screenings.

Individuals may also hold misconceptions regarding their vulnerability to various illnesses. For example, women may believe that breast cancer typically occurs at an earlier age than it really does,

because they remember hearing about younger women diagnosed, and these memories impact their beliefs about who is vulnerable (Leventhal & Crouch, 1997). Family history of breast cancer has been significantly correlated with perceptions of vulnerability (Cameron, 1997, p. 304). "Family history of cancer may foster vulnerability beliefs by providing conceptual information that the individual may be genetically predisposed to cancer, as well as concrete experiences of family members struggling with the disease" (Cameron, 1997, p. 315).

Another reason why individuals might not engage in preventative health behaviors is that being at risk for a medical condition that is perceived as multi-causal may decrease an individuals' perception of the benefits of any single preventative measure (Lindsay-Reid & Osborn, 1980). This type of thinking may result when an individual feels overwhelmed and hopeless, and thus feels that no action will be helpful.

Povey Conner, Sparks, James, and Shepard (2000) examined the extent to which the Theory of Planned Behavior is able to predict intentions to eat a healthy diet as well as predict actual eating behavior in an adult sample. The Theory of Planned Behavior variables of attitude, subjective norm, and perceived behavioral control were all found to be significant predictors. Attitudes were found to be the strongest, such that stronger intentions were related to more positive attitudes about eating a healthy diet (Povey et al., 2000). Finally, Povey et al. (2000) concluded that intentions and perceived behavior control predicted healthy eating behavior.

Armitage and Conner (2001) reviewed 185 independent studies and found that the Theory of Planned Behavior accounted for 27% of the variance in behaviors, and 39% of the variance in intention. When behavior measures were self-reports, the Theory of Planned Behavior accounted for 11% more of the variance in behavior than when behavior measures were objective or observed.

Critique. Although this section reviewed health beliefs and the health belief model in relation to older adolescents and young adults, some work utilizing adult subjects was included due to the scarcity of appropriate literature for this age range. This may be in part a result of the lack of clarity in the literature regarding this particular age grouping, as there tends to be inconsistent labeling from study to study as to what ages constitute adolescence, adulthood, and the period in between, older adolescence/young adulthood.

Other areas that researchers have investigated, but need further exploration, include the possibility of differences in health beliefs and behavior due to ethnicity and gender. Furthermore, some have discussed the importance of continuing to use a developmental framework for work with individuals of this age. Ideas regarding health vulnerability must also continue to be addressed with individuals at this point of development, as the literature has begun to examine the potential role that feelings of vulnerability might have on health behaviors. Finally, future research must continue to examine the role of family history of illness and the role it might play in impacting health beliefs and behaviors. Some work has attempted to do this using adult samples, but it is important that this is continued with those classified as "older adolescents."

Integration and Summary

The developmental period termed as young adulthood is often unclear and may also be conceptualized in the United States as older adolescence. This period of development, encompassing the ages of 17 through 24 years, is a time when individuals are often fine-tuning their sense of self, experimenting with different aspects of their life, experiencing true independence for perhaps the first time, and often transitioning through college life. These developmental tasks are consistent with Erikson's fifth and sixth developmental stages: (a) identity versus identity confusion, in which individuals attempt to discern who they are and where they are going in life, and (b) intimacy versus isolation, in which young adults form intimate relationships with others (Erikson, 1968). Given the built-in instability or inconsistency of self and potentially both the physical and social environment as well, this may be considered a time in which vicariously experiencing the illness of another carries a significant impact.

As many in our society are faced with serious medical conditions such as cardiovascular disease, cancer, and diabetes, older adolescents and young adults are likely to vicariously experience the effects of compromised health in those that they know and care about. Figure 1 (Cooper & Heffer, in preparation), the Integrated Developmental model, attempts to organize what we understand thus far about health related beliefs and behaviors in older adolescents and young adults. This model combines variables included in other previously reviewed models in a manner that is helpful in conceptualizing health related beliefs and behaviors older adolescents have about serious medical conditions. It is important that a

conceptualization of health and illness behavior and cognitions evolve within a developmental perspective, acknowledging that changes throughout the lifespan may be particularly accelerated or heightened during this time of older adolescence when autonomy and independence is so vital (Erikson, 1968).

Hypotheses

Based on the reviewed literature, I sampled older adolescents or young adults to examine the influence of experience or knowledge of cancer, diabetes, or cardiovascular disease on self-reported health behaviors. An important question was whether or not having an experience with or detailed knowledge of serious medical conditions influences self-report of health-related behaviors. It has been hypothesized that two steps exist in health behavior modification: intention to change and acting on and maintaining these behavioral intentions (Stroebe & Stroebe, 1995). Although limits of this study do not allow for the measurement of actual behaviors by more sophisticated means (e.g. observational data, self-monitoring, physiological measures over time), it will rely on participants self-report of their health-related behaviors.

The hypothesis involves the existence of experiences with a serious medical condition, which may have been either personal, may have been experienced through a friend, an acquaintance, peer, or family member, or through the media. I hypothesized that statistically significant differences would be found in responses on the YRBS for individuals who reported experience or knowledge of cancer, diabetes, or cardiovascular disease compared to those who did not report experience or knowledge. Individuals with no experience or knowledge of any of these diseases were predicted to endorse riskier health behaviors as measured by responses on the YRBS. Furthermore, I predicted that experiences with or knowledge of any of these three diseases would be associated with differences in reported health locus of control.

METHOD

Participants

Students enrolled in undergraduate psychology courses at Texas A&M University were recruited to participate. Only data from participants ages 17 to 24 were included in this study, as this is the age range classified as being older adolescents or young adults. Participants earned partial course credit in compensation for their participation.

Measures

Demographic measure. This measure was created specifically for use in the present study. Participants provided various demographic information such as gender, ethnicity, and highest completed education levels of mother and father.

Illness Experience Questionnaire. The Illness Experience Questionnaire (IEQ) was created for use in the present study. Participants reported any experiences they or others they know have had with cancer, diabetes, or cardiovascular disease. Participants were also prompted to report any health-related knowledge that they have encountered through the media, such as books, web sites, or television programs. If an experience was reported, the participant was then prompted to report how old they were at the time of the experience.

Youth Risk Behavior Survey. (YRBS; Centers for Disease Control and Prevention, 2003). The YRBS was developed by the Centers for Disease Control to assess health-risk behaviors in adolescents. Behaviors such as alcohol and other drug use, tobacco use, sexual behaviors that have the potential of resulting in HIV infection or unintended pregnancy, physical inactivation, and unhealthy dietary behaviors are measured across 87 items. The present study used 65 of these 87 items. Items 1 through 7 were not included in this study as they were not pertinent (such as participants' height and weight). A few other items were not included due the sensitive nature of the item content (violence related). Informants rate items using a variety of formats; some items request a yes/no response, while other items request the frequency of a behavior in a given time frame. Behaviors included on the YRBS may result in either intentional or unintentional injuries and tap behaviors directly or indirectly associated with morbidity and

mortality (Melnick, Miller, Sabo, Farrell, & Barnes, 2001). The YRBS has been used since 1990 to assess health risk behaviors in students nationwide (Brener, Collins, Kann, Warren, & Williams, 1995). Kappa coefficients have been found to range from 23.6% to 90.5%, with a mean of 60.7%; 47.2% of items were found to have at least "substantial" reliability ($K \geq 61\%$), while 93.1% had at least "moderate" reliability ($K \geq 41\%$) (Brener, Kann, McManus, Kinchen, Sundberg, & Ross, 2002). Brener et al. (1995) reported that the YRBS is more appropriate for use with students in grade eight and above.

Multidimensional Health Locus of Control Scales (MHLC; Wallston, Wallston, & DeVellis, 1978). The MHLC assesses individuals' beliefs of their control as it relates to health. The MHLC has two equivalent forms (A and B), and both consist of three subscales: Internal Health Locus of Control (IHLC), Chance Health Locus of Control (CHLC), and Powerful Others Externality (PHLC). Each of the three scales is comprised of six-items and are presented in Likert format, ranging from strongly disagree (1) to strongly agree (6). The MHLC has been utilized with various samples, including samples that have and have not had personal health problems, such as samples of college students and samples of chronic illness patients. Each of the subscales has been found to have both good internal consistency, with Cronbach α values ranging between .61 through .80 for the IHLC scale, .55 through.83 for the CHLC scale, and .56 through .75 for the PHLC scale. Test-retest reliability (4-6 month) has been reported to be .66 for the IHLC scale, .73 for the CHLC scale, and .71 for the PHLC scale. Form A was used in this study.

Procedure

Data was collected in group format. Participants were given a packet consisting of all the materials. The order of the materials was counterbalanced to guard against order effects. Standard procedures for the Department of Psychology subject pool were followed, with participants earning partial course credit for Introductory Psychology courses. Participants were given instructions both orally and in writing. Packets of measures were stapled together with a participant number already marked. To ensure anonymity, participants completed a consent form with the participant number also marked on it, which was turned in and stored separately from the measures packet.

RESULTS

Participants (*n*=459) were administered the demographic questionnaire, IEQ, YRBS, and MHLC. Two-hundred and twenty-eight participants (49.6%) were female and 232 (50.4%) male. The average age was 19.34 (SD=2.17) years. Table 1 presents the frequency and percent of participants' ethnicity, where most were Caucasian. Table 1 also presents the frequency and percent of participants' mother's and father's education, participants' age, and participants' year in school. A majority of participants were between the ages of 18- and 20-years of age and were typically either in their first or second year of college. A majority of participants' parents completed high school or college.

Information summarizing the Fall 2004 undergraduate student population at Texas A&M University (TAMU) indicated that 35,732 students were registered, per the Office of Institutional Studies and Planning at Texas A&M University, (http://www.tamu.edu/oisp/reports/ep/epfa2004_certified.pdf). When examining the undergraduate student population, nearly half was female (49.2%) and 50.8% was male. In addition, TAMU undergraduate population was comprised of primarily Caucasian students (81.7%). Other ethnicities represented include African American (2.3%), Hispanic (10.1%), Asian American (3.3%), American Indian (0.5%), International students (1.5%), and Unknown/Other ethnicities (0.6%). The age distribution of TAMU undergraduate student population was broken down into six categories, including those under 18 (0.2%), 18 – 21 years (71.2%), 22 – 25 years (26.1%), 26 – 30 years (1.6%), 31 – 39 years (0.6%), and those over 40 years of age (0.3%).

Table 1

Sample Frequencies and Percentages

	Frequency	Percent
Ethnicity		
African American	11	2.2
Hispanic	45	9.2
Asian American	17	3.5
Caucasian	377	76.8
Native American	1	.2
Other	10	2.0
Unknown	30	6.1
Father's Education		
Less than 12th	14	2.9
High School	99	20.2
2 yr college	46	9.4
4 yr college	180	36.7
Grad school	120	24.4
Missing	32	6.5
Mother's Education		
Less than 12th	10	2.0
High School	126	25.7
2 yr college	73	14.9
4 yr college	187	38.1
Grad school	65	13.2
Missing	30	6.1
Age		
17	2	0.4
18	100	20.4
19	203	41.3
20	93	18.9
21	36	7.3
22	14	2.9
23	2	0.4
25	2	0.4
26	2	0.4
33	1	0.2
36	1	0.2
40	1	0.2
Missing	34	6.9
Year		
Freshman	296	60.3
Sophomore	100	20.4
Junior	46	9.4
Senior	16	3.3
5th year	3	.6
Missing	30	6.1

Three chi-squares were conducted to assess whether the population demographics (Texas A&M University students) significantly differed from the sample study demographics. The first chi square revealed that there was a significant difference on age, χ^2 (1) = 124.30, p = .001, by TAMU students versus the study participants. Study participants tended to be younger, more representative of the 18-21 year old age group, than the TAMU population. The second chi square revealed that there was a significant difference on ethnicity, χ^2 (1) = 7.81, p = .005, by TAMU students versus the study participants. The study had a greater representation of minority students than the general TAMU population. The third chi square revealed that there was no significant difference on gender, χ^2 (1) = .024, p = .876, by TAMU students versus the study participants.

Psychometric Properties of Measures

YRBS. Items 1 through 7 and a few additional items were not used in this study due to irrelevant item content. YRBS scores used were continuous. Factor analysis was conducted on the YRBS. A three factor solution was retained for several reasons, the primary one being the theoretical utility of the item content (retaining one or two additional factors would not have added information relevant to this particular study, such as physical exercise or dietary choices). In order to capture other relevant items such as those pertaining to diet or exercise, an excessive number of factors would have had to be retained. Secondly, a scree test was used, where Stevens (1996, p.366) suggests retaining as many factors in the sharp decent before the first one where the line starts to level off (Figure 2). This suggestion also supported a three factor solution (Table 2).

Given the various responses possible on the survey, all the scores were standardized. No previous factor analyses on the YRBS were identified. Therefore, to decide which questions (i.e., loading) should be retained (in addition to theoretical item utility), Stevens (1996, p.371) suggests doubling the critical value for a correlation coefficient at probability $\alpha = .01$ level appropriate for the sample size. Loadings that were retained were .244. The questions that loaded on a factor were then averaged, where high numbers indicated more risk and low number indicated less risk. The items loading on Factor 1 (Alcohol Use) regarded alcohol use, such as drinking and riding or driving in a car or how many alcoholic drinks consumed in a row. Items 10, 11, 39, 41, 42, and 43 loaded on this factor, which accounted for 8.56% of the variance. The Cronbach α reliability value for the Alcohol Use factor was .84. Items on Factor 2 (Smoking Behavior) measured smoking behaviors (both cigarettes and cigars) and was comprised of items 28, 29, 30, 31, 33, 34, 35, and 38. This factor accounted for 6.72% of the variance. Factor 3 (Sexual Activity) examined sexual activity, such as number of sexual partners. The Sexual Activity factor was comprised of items 58, 59, 60, and 61 and accounted for 5.46% of the variance. Cronbach α reliability values for the Smoking Behavior and Sexual Activity factors were .80 and .68, respectively. These three factors accounted for 20.74% of the cumulative variance.

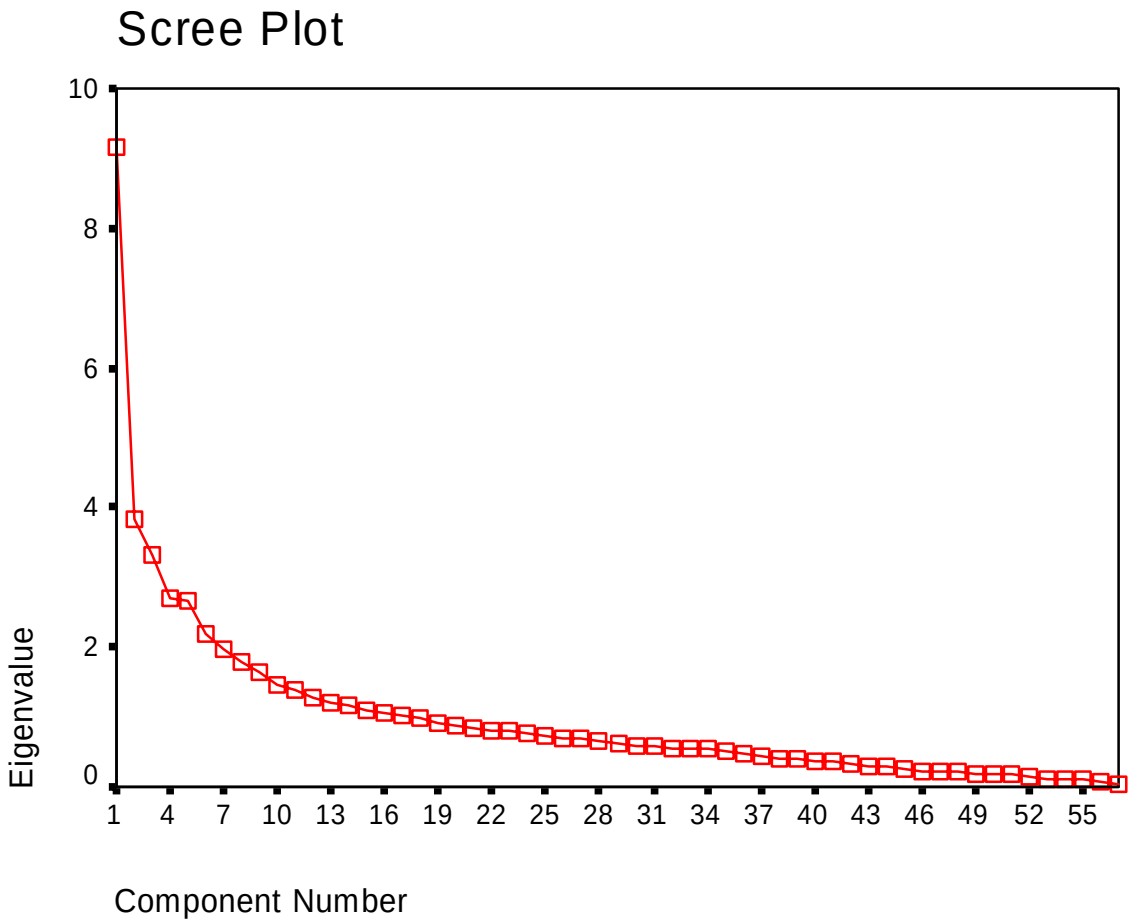

Figure 2. Scree Plot of Youth Risk Behavior Survey.

Table 2

Three Factor Solution on 2003 Youth Risk Behavior Survey

Item	Alcohol Use	Smoking Behaviors	Sexual Activity
8 (wear helmet when bike riding)	.033	.083	-.021
9 (wear seat belt in car)	-.119	-.151	-.123
10 (driven by intoxicated person)	.755	.141	.144
11 (drive while intoxicated)	.747	.114	.163
28 (smoke cigarettes)	-.563	-.241	-.133
29 (age when 1st smoked cigarettes)	-.414	-.315	-.110
30 (# of days smoked this month)	.229	.888	.100
31 (# cigarettes smoked per day)	.270	.840	.083
33 (smoke cigarettes at school)	.088	.823	.031
34 (smoked daily for a month)	-.130	-.689	-.058
35 (try to quit (cigarettes) in past year)	.289	.530	.064
36 (days used dip in past month)	.183	.084	.053
37 (# days dip at school in past month)	.105	.092	.048
38 (# days smoked cigars in past month)	.155	.385	-.036
39 (# days drank alcohol)	.779	.102	.272
41 (# days in past month drank alcohol)	.856	.162	.201
42 (5+ drinks at one time in past month)	.836	.156	.169
43 (drink at school in past month)	.258	.085	-.033
44 (# times used marijuana)	.487	.347	.152
46 (# times used marijuana past month)	.283	.290	.090
47 (# times used marijuana at school)	.047	.151	.018
48 (# times used cocaine)	.133	.125	.080
49 (# times used cocaine in past month)	.050	.003	.068
50 (# times sniffed glue/paint)	.075	.116	.003
51 (# times sniffed glue/paint in month)	-.026	.047	.053
52 (# times used heroine)	-.029	.036	.043
53 (# times used methamphetamines)	.058	.065	.032
54 (# times used ecstasy)	.158	.204	.111
55 (# times used steroids)	.018	.053	.051
56 (# times injected illegal drug)	.047	-.019	.039
57 (been offered drug at school)	.077	.056	.072
58 (ever had sex)	-.252	-.045	-.851
59 (age when 1st had sex)	.271	.058	.881
60 (# of sexual partners)	.333	.087	.718
61 (# sexual partners in 3 months)	.258	.112	.798
65 (# of pregnancies)	-.079	-.054	.235
66 (how you describe your weight)	-.025	-.071	.018
68 (exercise in past month)	-.027	-.066	.015
69 (eat less this month to lose weight)	-.041	-.044	.019
70 (fast this month to lose weight)	-.071	-.142	.018
71 (use diet pills this month)	-.086	-.011	-.079
72 (vomit/use laxatives this month)	-.073	-.098	-.047
73 (# times drank juice this week)	-.060	.167	.037
74 (# times ate fruit this week)	-.026	-.043	-.015

Table 2 Continued

Item	Alcohol Use	Smoking Behaviors	Sexual Activity
75 (# times ate salad this week)	.093	.000	-.004
76 (# times ate potatoes this week)	-.060	.029	.186
77 (# times ate carrots this week)	.029	.020	-.097
78 (# times ate other vegetables)	.007	-.033	-.031
79 (# times drank milk this week)	-.032	-.099	.005
80 (# times sweat at least 20 min)	.053	-.036	-.023
81 (# times do activity at least 30 min)	.017	-.057	.018
82 (# times tome muscles this week)	-.003	-.018	.040
83 (hrs TV watched per day)	.180	-.093	.005
84 (# days week do exercise at school)	-.051	-.019	.055
86 (# sports teams part of in past year)	.238	-.054	-.060
87 (learned about HIV/AIDS at school)	-.018	-.097	.003
Percent Variance	8.56%	6.72%	5.46%
Cronbach Alpha	.84	.80	.68
Eigenvalue	4.879	3.831	3.113
Cumulative Variance 20.74%			

*Multidimensional Health Locus of Control Scale*s. The MHLC is comprised of three subscores: Internality, Powerful Others, and Chance. In accordance with the MHCL instructions, IHCL score was calculated by adding items 1, 6, 8, 12, 13, and 17; PHCL score was calculated by adding items 3, 5, 7, 10, 14, and 18; and CHCL score was calculated by adding items 2, 4, 9, 11, 15, and 16. As the previous three factor structure of the MHLC was found to be reliable and valid, it was retained for this study.

Hypothesis

The main research question hypothesized differences on the three YRBS factors and MHLC scales by several independent variables.

Multivariate Assumptions

Prior to analysis, the three YRBS factors and MHLC scores were examined through various SPSS analyses for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis. To improve univariate normality and reduce extreme skewness, YRBS Factor 2 (Smoking Behaviors) and YRBS Factor 3 (Sexual Activity) were corrected by using

square root transformations. Two cases on YRBS Factor 1 (Alcohol Use), one case on MHLC Internality and one case on MHLC Powerful Others were found to be univariate outliers; all four outliers were deleted. After the above changes, univariate assumptions for normality and homogeneity of variance were met. By using Mahalanobis distance with $p < .001$, no cases were identified as multivariate outliers. No cases produced significant Box's M or Levene's test scores at the $p < .001$. Equal variances were assumed, and multivariate assumptions met.

Analyses

The independent variables from the IEQ were cancer, diabetes, and cardiovascular disease for parents, siblings, extended family, friend, acquaintance, classmates, self, and media. To simplify the data and make results easier to generalize, the independent variables from the IEQ were combined into four categories (self, parent-sibling, all others, and media). MANOVAs and follow-up ANOVAs were conducted on the three YRBS factors (Alcohol Use, Smoking Behavior, and Sexual Activity) and on the three MHLC scales (Internality, Powerful Others, and Chance) by the 4 independent variables (self, parent-sibling, all others, and media).

Three separate MANOVA's for Self-cancer, diabetes, and cardiovascular disease could not be assessed due to fewer than two nonsingular cell covariance matrices. A composite score was calculated by collapsing the three individual diagnoses (cancer, diabetes, and cardiovascular disease). A single MANOVA was conducted on all three of the YRBS factors by the composite Self score. The MANOVA was not statistically significant on the YRBS scale by Self, F (3,448) = 1.12, *ns* (η^2=.001, power = .302). Similarly, a MANOVA conducted on the 3 MHLC scores by Self (aggregate cancer, diabetes, and cardiovascular) was not statistically significant, F (3, 448) = .396, *ns* (η^2=.003, power = .128). Table 3 shows the means and standard deviations on the three scores by Self.

Table 3

Means and Standard Deviations on YRBS and MHLC Scores by Self

	Self	n	M	SD
YRBS				
Alcohol Use	No	442	-0.01	1.00
	Yes	10	0.38	1.01
	Total	452	0.00	1.00
Smoking Behavior	No	442	0.01	1.01
	Yes	10	-0.31	0.61
	Total	452	0.00	1.01
Sexual Activity	No	442	0.00	1.00
	Yes	10	0.15	1.18
	Total	452	0.01	1.00
MHLC				
Internal	No	442	26.38	4.07
	Yes	10	27.00	6.29
	Total	452	26.40	4.12
Powerful	No	442	17.30	4.94
	Yes	10	17.50	6.80
	Total	452	17.31	4.98
Chance	No	442	17.12	4.72
	Yes	10	18.50	4.40
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by Parent-Sibling-Cancer was not statistically significant, F (3, 448) = 0.60, *ns* (η^2=.004, power = .174). A MANOVA conducted on MHLC score by Parent-Sibling—Cancer was also not statistically significant, F (3, 448) = .67, *ns* (η^2=.004, power = .191). Table 4 shows the means and standard deviations on the three scores by Parent-Sibling—Cancer.

Table 4

Means and Standard Deviations on YRBS and MHLC Scores by Parent-Sibling-Cancer

	Parent-Sib	n	M	SD
YRBS				
Alcohol Use	No	402	0.01	1.00
	Yes	50	-0.09	1.00
	Total	452	0.00	1.00
Smoking Behavior	No	402	0.00	1.00
	Yes	50	0.01	1.02
	Total	452	0.00	1.01
Sexual Activity	No	402	0.00	1.01
	Yes	50	0.08	0.97
	Total	452	0.01	1.00
MHLC				
Internal	No	402	26.39	4.09
	Yes	50	26.50	4.40
	Total	452	26.40	4.12
Powerful	No	402	17.33	4.93
	Yes	50	17.10	5.40
	Total	452	17.31	4.98
Chance	No	402	17.05	4.68
	Yes	50	17.90	4.96
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by Parent-Sibling-Diabetes was not statistically significant, F (3, 448) = 0.40, *ns* (η^2=.003, power = .130). A MANOVA conducted on MHLC score by Parent-Sibling—Diabetes was also not statistically significant, F (3, 448) = .404, *ns* (η^2=.003, power = .130). Table 5 shows the means and standard deviations on the three scores by Parent-Sibling—Diabetes.

Table 5

Means and Standard Deviations on YRBS and MHLC Scores by Parent-Sibling-Diabetes

	Parent-Sib	n	M	SD
YRBS				
Alcohol Use	No	412	-0.01	1.01
	Yes	40	0.09	0.97
	Total	452	0.00	1.00
Smoking Behavior	No	412	0.01	1.02
	Yes	40	-0.05	0.80
	Total	452	0.00	1.01
Sexual Activity	No	412	0.01	1.00
	Yes	40	-0.05	0.99
	Total	452	0.01	1.00
MHLC				
Internal	No	408	26.42	4.03
	Yes	44	26.18	4.95
	Total	452	26.40	4.12
Powerful	No	408	17.25	4.99
	Yes	44	17.86	4.92
	Total	452	17.31	4.98
Chance	No	408	17.18	4.78
	Yes	44	16.87	4.12
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by Parent-Sibling-Cardiovascular Disease was also not statistically significant, F (3, 448) = 0.83, *ns* (η^2=.001, power = .231). A MANOVA conducted on MHLC score by Parent-Sibling—Cardiovascular Disease was not statistically significant, F (3, 448) = .404, *ns* (η^2=.003, power = .130). Table 6 shows the means and standard deviations on the three scores by Parent-Sibling—Cardiovascular Disease.

Table 6

Means and Standard Deviations on YRBS and MHLC Scores by Parent-Sibling-Cardiovascular Disease

	Parent-Sib	n	M	SD
YRBS				
Alcohol Use	No	424	0.02	1.00
	Yes	28	-0.28	0.99
	Total	452	0.00	1.00
Smoking Behavior	No	424	0.00	0.99
	Yes	28	-0.03	1.25
	Total	452	0.00	1.01
Sexual Activity	No	424	0.01	1.00
	Yes	28	-0.08	0.97
	Total	452	0.01	1.00
MHLC				
Internal	No	423	26.42	4.07
	Yes	29	26.04	4.85
	Total	452	26.40	4.12
Powerful	No	423	17.28	4.96
	Yes	29	17.66	5.28
	Total	452	17.31	4.98
Chance	No	423	17.19	4.74
	Yes	29	16.52	4.39
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by All Others-Cancer was not statistically significant, F (3, 448) = 1.24, *ns* (η^2=.008, power = .333); the MANOVA conducted on MHLC score by All Others-Cancer was also not statistically significant, F (3, 448) = .562, *ns* (η^2=.004, power = .166). Table 7 shows the means and standard deviations on the scores by All Others-Cancer.

Table 7

Means and Standard Deviations on YRBS and MHLC Scores by All Others-Cancer

	All Others	n	M	SD
YRBS				
Alcohol Use	No	197	-0.01	1.04
	Yes	255	0.01	0.97
	Total	452	0.00	1.00
Smoking Behavior	No	197	-0.08	0.86
	Yes	255	0.06	1.10
	Total	452	0.00	1.01
Sexual Activity	No	197	-0.05	1.02
	Yes	255	0.05	0.99
	Total	452	0.01	1.00
MHLC				
Internal	No	112	26.51	4.27
	Yes	340	26.36	4.07
	Total	452	26.40	4.12
Powerful	No	112	16.79	5.32
	Yes	340	17.48	4.86
	Total	452	17.31	4.98
Chance	No	112	17.08	5.12
	Yes	340	17.17	4.58
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by All Others-Diabetes was not statistically significant, F (3, 448) = 1.29, *ns* (η^2=.009, power = .345); the MANOVA conducted on MHLC score by All Others-Diabetes was also not statistically significant, F (3, 448) = .395, *ns* (η^2=.003, power = .128). Table 8 shows the means and standard deviations on the scores by All Others-Diabetes.

Table 8

Means and Standard Deviations on YRBS and MHLC Scores by All Others-Diabetes

	All Others	n	M	SD
YRBS				
Alcohol Use	No	303	-0.02	1.01
	Yes	149	0.05	0.99
	Total	452	0.00	1.00
Smoking Behavior	No	303	-0.06	0.92
	Yes	149	0.12	1.15
	Total	452	0.00	1.01
Sexual Activity	No	303	-0.02	1.01
	Yes	149	0.07	0.99
	Total	452	0.01	1.00
MHLC				
Internal	No	194	26.37	4.38
	Yes	258	26.41	3.92
	Total	452	26.40	4.12
Powerful	No	194	17.13	5.01
	Yes	258	17.44	4.96
	Total	452	17.31	4.98
Chance	No	194	16.89	4.91
	Yes	258	17.34	4.56
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by All Others-Cardiovascular Disease was not statistically significant, F (3, 448) = 1.00, *ns* (η^2=.007, power = .272); the MANOVA conducted on MHLC score by All Others-Cardiovascular Disease was also not statistically significant, F (3, 448) = .422, *ns* (η^2=.003, power = .134). Table 9 shows the means and standard deviations on the scores by All Others-Cardiovascular Disease.

Table 9

Means and Standard Deviations on YRBS and MHLC Scores by All Others-Cardiovascular Disease

	All Others	n	M	SD
YRBS				
Alcohol Use	No	333	-0.02	1.02
	Yes	119	0.04	0.96
	Total	452	0.00	1.00
Smoking Behavior	No	333	-0.06	0.93
	Yes	119	0.11	1.11
	Total	452	0.00	1.01
Sexual Activity	No	333	0.00	1.01
	Yes	119	0.01	0.98
	Total	452	0.00	1.00
MHLC				
Internal	No	194	26.39	4.38
	Yes	258	26.41	3.92
	Total	452	26.40	4.12
Powerful	No	194	17.13	5.01
	Yes	258	17.44	4.96
	Total	452	17.31	4.98
Chance	No	194	16.89	4.91
	Yes	258	17.34	4.56
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by Media-Cancer was not statistically significant, F (3, 448) = 1.71, *ns* (η^2=.011, power = .449). The MANOVA conducted on MHLC score by Media-Cancer was also not statistically significant, F (3, 448) = .073, *ns* (η^2=.001, power = .063). Table 10 shows the means and standard deviations on the scores by Media-Cancer.

Table 10

Means and Standard Deviations on YRBS and MHLC Scores by Media-Cancer

	Media	n	M	SD
YRBS				
Alcohol Use	No	295	-0.05	1.03
	Yes	157	0.09	0.94
	Total	452	0.00	1.00
Smoking Behavior	No	295	-0.07	0.92
	Yes	157	0.13	1.14
	Total	452	0.00	1.01
Sexual Activity	No	295	-0.03	1.01
	Yes	157	0.07	0.99
	Total	452	0.01	1.00
MHLC				
Internal	No	184	26.32	4.29
	Yes	268	26.46	4.00
	Total	452	26.40	4.12
Powerful	No	184	17.23	5.12
	Yes	268	17.36	4.90
	Total	452	17.31	4.98
Chance	No	184	17.10	4.86
	Yes	268	17.18	4.62
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by Media-Diabetes was not statistically significant, F (3, 448) = 0.33, *ns* (η^2=.002, power = .114). The MANOVA conducted on MHLC score by Media-Diabetes was also not statistically significant, F (3, 448) = .158, *ns* (η^2=.001, power = .079). Table 11 shows the means and standard deviations on the scores by Media-Diabetes.

Table 11

Means and Standard Deviations on YRBS and MHLC Scores by Media-Diabetes

	Media	n	M	SD
YRBS				
Alcohol Use	No	426	0.01	1.00
	Yes	26	-0.18	1.03
	Total	452	0.00	1.00
Smoking Behavior	No	426	0.00	1.02
	Yes	26	-0.08	0.74
	Total	452	0.00	1.01
Sexual Activity	No	426	0.01	1.00
	Yes	26	-0.04	1.02
	Total	452	0.01	1.00
MHLC				
Internal	No	295	26.42	4.05
	Yes	157	26.35	4.27
	Total	452	26.40	4.12
Powerful	No	295	17.36	5.02
	Yes	157	17.21	4.92
	Total	452	17.31	4.98
Chance	No	295	17.25	4.84
	Yes	157	16.96	4.47
	Total	452	17.15	4.71

A MANOVA conducted on the three YRBS factors by Media-Cardiovascular Disease was not statistically significant, F (3, 448) = 0.26, *ns* (η^2=.002, power = .099). The MANOVA conducted on MHLC score by Media-Cardiovascular Disease was also not statistically significant, F (3, 448) = .200, *ns* (η^2=.001, power = .087). Table 12 shows the means and standard deviations on the scores by Media-Cardiovascular Disease.

Table 12

Means and Standard Deviations on YRBS and MHLC Scores by Media-Cardiovascular Disease

	Media	M	SD	n
YRBS				
Alcohol Use	No	0.01	1.00	413
	Yes	-0.07	1.01	39
	Total	0.00	1.00	452
Smoking Behavior	No	0.01	1.01	413
	Yes	-0.10	0.94	39
	Total	0.00	1.01	452
Sexual Activity	No	0.02	1.00	413
	Yes	-0.10	0.99	39
	Total	0.01	1.00	452
MHLC				
Internal	No	26.36	4.12	278
	Yes	26.47	4.13	174
	Total	26.40	4.12	452
Powerful	No	17.19	5.09	278
	Yes	17.50	4.82	174
	Total	17.31	4.98	452
Chance	No	17.17	4.77	278
	Yes	17.11	4.64	174
	Total	17.15	4.71	452

SUMMARY AND DISCUSSION

The present study was generally unable to provide support for the hypothesis that predicted that individuals who experienced one of the three health conditions (i.e., cancer, cardiovascular disease, or diabetes) would report significantly fewer "risky" health behaviors associated with smoking, alcohol use, and sexual activity. Personal experiences and knowledge of these three health conditions from a parent, sibling, others in their life, or through the media were all examined and were also found to have no significant impact on reported health behaviors.

These results support previous findings that college students tend to be oriented to the present and do not acknowledge a clear association between their behaviors and their current of future health (Lester & Leach, 1983; Weinstein, 1984). Perhaps participants viewed cardiovascular disease, cancer, and diabetes as diseases that occur much later in life and are not directly impacted by health-related behaviors occurring in the present. Although the Alcohol Use and Smoking Behavior factors of the YRBS were associated with the three disease categories, the failure to support the hypotheses may also be related to the lack of a clear association between Sexual Behaviors and cancer, diabetes, or cardiovascular disease. Although the YRBS did include some other items with relevant content (e.g. sexual behaviors, diet and exercise) the data analyses used (factor analyses) did not lend itself to appropriately utilizing these additional items.

Examining the influence of experience or knowledge with these three illnesses on ratings of health locus of control, the current study did not find statistically significant differences in ratings on the three MHLC scores (Chance, Powerful Others, or Internal) for participants with or without these experiences or knowledge. One possible explanation is that this sample did not typically perceive "powerful others" such as physicians to be in control of their health or "cause" good or bad health. Similarly, Hodgson (2001) found no significant correlation between the Powerful Others health locus of control and perception of risk in a sample of individuals ages 18 to 21.

Strengths and Implications for Future Research

It has been suggested that risky adolescent health behaviors are a serious problem in health care (DiClemente, Hansen, & Ponton, 1996). Due to the dearth of previous research examining health-related beliefs within the developmental period of older adolescence/young adulthood, a strength of this study is

the attempt to examine the influence of experiences with cancer, diabetes, and cardiovascular disease on these behaviors.

The Integrated Developmental Model examines the relationship among various individual and environmental factors, coping strategies, and health-related beliefs, attitudes, and behaviors within a developmental framework. This model strives to organize the numerous influences on health behaviors during the period of young adulthood. It incorporates constructs previously supported in the adult literature and integrates them within a developmental context. Future research in this area should consider using this model as a guide to select which constructs to examine as well as how each of these constructs may be interrelated.

The current study examined the influence of experience or knowledge with these three medical conditions on ratings of health locus of control. As statistically significant differences in ratings on the three MHLC scores (Chance, Powerful Others, or Internal) were not found, it will be important for future research to further examine the concept of the health locus of control as it relates to this developmental period (Chassin et al., 1995).

Although the current findings did not provide support for the prediction that experiences with cancer, cardiovascular disease, or diabetes would significantly influence participants' ratings of health behaviors regarding alcohol use, smoking behaviors, and sexual activity, it was important for this study to examine these three behaviors. As leading causes of mortality in this country are due to modifiable lifestyle factors such as drinking, smoking, and unsafe sexual practices, it was important to examine how experiences with these three medical conditions may impact these three easily modifiable behaviors (CDC, 1980). Furthermore, older adolescents are known to engage in these "risky" behaviors that can have a lasting impact on health. Future research should continue to work toward a better understanding of why experiences with medical conditions may not have an effect on health behaviors. Could it be that the power of the "optimistic bias" or the tendency to underestimate personal risk allows individuals to discount the importance of behavior (Weinstein, 1989)?

Limitations and Implications for Future Research

Several limitations exist with the present study. First, it utilized a sample of convenience, which was comprised of university students, somewhat limiting the ability to generalize findings. Future studies should include older adolescents not enrolled in a college or university to explore other possible trends. In addition, future samples should be more ethnically diverse than this sample, which was approximately 77% Caucasian. This further limits ability to generalize to the larger population. As differences by gender were not examined, future research should explore potential gender differences in ratings of health behaviors and health locus of control. For example, Sydney et al. (2000) found that males and females did not differ in their perceptions of risk as related to major disease, even though gender differences do exist in national statistics.

The present study did not control for the potential impact of social desirability in participants responses. It is difficult to determine why individuals report that they would or would not engage in particular behaviors, thus leaving the current results vulnerable to the impact of responding in a socially desirable manner. Although participants in the present study were ensured confidentiality, participants may have still responded in what they perceived to be a desirable way. Future studies should continue to control for the issue of social desirability influencing responses.

The present study examined only self-reported health behaviors. Limitations of both time and money prohibited more sophisticated measures of actual behavior such as diet and exercise diaries or breath analyzers to measure smoking behavior. In the present study, the YRBS was used to obtain participants report of health behaviors; however, no additional data were used in the current study to verify these reports of actual behavior are valid. Future studies should utilize more sophisticated measures of behavior in addition to the YRBS to examine actual behaviors.

Finally, although the YRBS contains items asking about a variety of health-related behaviors, the three factors created (Alcohol Use, Smoking Behavior, and Sexual Activity) were only marginally relevant to the three illnesses examined (cancer, diabetes, and cardiovascular disease). Additional research utilizing a greater range of health-related behaviors such as dietary choices and physical exercise is warranted. As

previously stated, the data analyses used (factor analyses) did not lend itself to appropriately utilizing these additional items.

Conclusions

The present study is an initial step toward understanding how experiences with serious medical conditions influence health behaviors in older adolescent university students. Finally, the health locus of control is a belief construct that attempts to explain perceptions regarding the causality of health. Results of this study question the utility of this construct when exploring health behaviors in older adolescence.

The selection of the constructs examined in this study was guided by the Integrated Developmental model. This model conceptualizes relevant constructs from other supported models in the literature as they relate to the developmental period of older adolescence. However, other models pertinent to this developmental period have examined health behaviors as they relate to an adolescent with compromised health. The Integrated Developmental model may be applied by future researchers and practitioners who wish to better understand how experiences with others with compromised health influence healthy young adults as they form attitudes about health and make decisions about health behaviors.

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