2017

Examining Health Behaviors in College Students with and without Chronic Conditions

Duc-Thi J. Barsell
Virginia Commonwealth University

Examining Health Behaviors in College Students with and without Chronic Conditions

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science for Health Psychology at Virginia Commonwealth University

By

D. Jeremy Barsell
B.S., Old Dominion University, May 2015

Advisor: Robin S. Everhart, Ph.D.
Assistant Professor
Department of Psychology

Virginia Commonwealth University
Richmond, Virginia
December 2017

Table of Contents

Abstract…….. iii
Introduction/Background……... 1
Health Behaviors……. 2
Theoretical Background…….. 7
Health Literacy…… 9
Health Locus of Control…….. 11
Health Self-Efficacy…… 15
Health-Related Quality of Life…… 17
Chronic Condition Status as a Moderator……... 20
The Current Study…….. 22
Method……... 26
Participants……. 26
Design and Procedure……. 26
Measures……. 27
Data Analysis Plan……. 37
Results…… 40
Aim 1: Regression Analyses…….. 16
Aim 2: Regression Analyses…….. 56
Aim 3: Moderation Analyses……. 64
Aim 4: Moderation Analyses……. 70
Discussion…….. 74
Health Locus of Control……. 74
Health Literacy……... 77
Health Self-Efficacy……... 79
Health-Related Quality of Life……... 83
Limitations……. 85
Implications and Future Directions…… 86
Conclusion…….. 90
References…….. 92

Abstract

EXAMINING HEALTH BEHAVIORS IN COLLEGE STUDENTS WITH AND WITHOUT CHRONIC CONDITIONS

By D. Jeremy Barsell, B.S.

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science for Health Psychology at Virginia Commonwealth University

Virginia Commonwealth University, 2017

Advisor: Robin S. Everhart, Ph.D.
Assistant Professor
Department of Psychology

Many college students are in a period in which they are transitioning from pediatric to adult health care. This time period can be challenging for all college students, especially those with a chronic condition. The current study investigated the association between various health-related factors (health locus of control [HLOC], health literacy, health self-efficacy, and health-related quality of life [HRQOL]) and health behaviors in college students, as well as the moderating effect of having a chronic condition on those associations. These health behaviors were further operationalized as healthy lifestyle behaviors and risky behaviors. 393 undergraduate students completed electronic questionnaires. Findings suggested HLOC, health literacy, HRQOL were significant predictors of healthy lifestyle and risky behaviors. Chronic condition status moderated associations between HLOC, health literacy, health self-efficacy and both healthy lifestyle behaviors and risky behaviors. Based on these findings, researchers and practitioners should focus on improving and managing these health-related factors.

Examining Health Behaviors in College Students with and without Chronic Conditions

There are approximately 20 million students enrolled in US colleges and universities (US Census Bureau, 2012). Many of these students have some form of chronic condition, which can be defined as a condition lasting 3 months or longer. Each year, 500,000 to 750,000 adolescents with chronic conditions become legal adults (Scal & Ireland, 2005) and as of 2001, at least 15% of college freshmen reported having a chronic condition or disability (Henderson, 2001). The percentage of students with chronic conditions has been increasing in recent years due to higher survival rates for youth with chronic conditions (Lemly et al., 2014). As such, and given the additional challenges of managing a chronic condition in college, it is becoming more important to study the health of college students, especially those who have chronic conditions. To date, however, data on how students adapt to college life in the context of managing their illnesses and their experiences with a chronic condition are limited.

Across the US, many college health services do not require chronic condition information from their students prior to matriculation and many do not have a system in place for identifying incoming students' chronic conditions (Lemly et al., 2014). The majority of colleges do require immunization records, but only about a third of college health services actively identify students with chronic conditions; of those that do, fewer actually reach out to these students (Bravender, 2014). Although some students may not want their chronic condition known, for others, it may be helpful to have resources, such as information about what services are provided, more readily available during this important transition time. For instance, these resources may include information about what services are provided at the college and in the community for specific chronic conditions. College health services not only improve the general health of students, but are in a position to facilitate the transition from pediatric to the adult health care world,

especially for those with chronic conditions (Bravender, 2014). Despite the availability of college health services, students are also less likely to take advantage of such existing services. Reasons for students underutilizing college health services may be due to several factors, such as a gap in knowledge on obtaining services, or dissatisfaction with the services; however, reasons for underutilization are ultimately unknown (Herts, Wallis, & Maslow, 2014). Consequently, further research is needed to better understand how to support students in caring for their health in college.

Moreover, regardless of having a chronic condition or not, college students are at risk for higher rates of risky behaviors (e.g., substance use) during this transitional period. Therefore, the current study focused on better understanding health behaviors among college students, as well as theoretically derived factors that may influence health behaviors in college students. Specifically, this study focused on health literacy, health internal locus of control, health-related quality of life, and health self-efficacy in associations with health behaviors. Health behaviors were categorized into two areas: healthy life style behaviors (e.g., wellness maintenance, physical activity) and risky behaviors (e.g., unsafe sex behaviors, substance use). Additionally, we determined whether these associations differed between students with and without chronic conditions. In the next section, literature on these health-related factors is reviewed.

Health Behaviors

Health behaviors are generally conceptualized as actions that can impact an individual's health and can refer to healthy life style behaviors, such as maintaining diet and exercise, as well as risk-taking behaviors, such as drug and alcohol use. One's health beliefs can dictate health behaviors, which entail preventing and detecting disease (Rosenstock, 1974). Depending on an individual's views on health, they may choose to engage in physical activity, utilize health care

systems through annual visits or preventative screenings, or participate in a number of other health-related behaviors.

To date, few studies have examined health behavior change in college students with a chronic condition. Some studies have investigated short-term and long-term health behavior change (e.g., smoking patterns, alcohol consumption, diet, and physical activity) following the diagnosis of a chronic condition in middle to late adulthood (Newsom et al., 2012; Patterson et al., 2003). In the study conducted by Newsom and colleagues (2012), the researchers found that most individuals did not adopt or maintain healthier behaviors (e.g., smoking cessation, exercising more, and reducing alcohol intake) after being diagnosed with a chronic condition. These chronic conditions included diagnoses of heart disease, diabetes, cancer, stroke, and lung disease. However, the limited group of individuals who did make health behavior changes tended to maintain those behaviors over the long term. The largest observed change was that about 40% of smokers had quit, primarily among those with heart disease, but there were no significant changes in exercise across all chronic conditions. Additionally, the authors found that higher educational attainment was associated with smoking cessation, increased exercise, and decreased alcohol consumption.

On the other hand, many studies that have investigated health behaviors in college students have not considered chronic conditions. In a study conducted by Simons-Morton and colleagues (2016), researchers examined health behavior changes in emerging adults one year after completing high school. The study investigated a wide range of behaviors, which included substance use, driving while intoxicated, risky driving (e.g., speeding, distracted driving), sleep, physical activity, and diet (e.g., soda, fruit, and vegetable consumption). The researchers also examined college status (not attending school, attending technical/community college, or

attending 4-year college), health status (reports of headache, stomachache, backache, and feeling dizzy), family relationships, and depressive symptoms. The results showed that students attending community college or trade school reported more healthy behaviors than those attending 4 year universities and those who did not attend college. Participants in community college and trade schools reported lower rates of binge drinking and marijuana use and higher rates of fruit and vegetable consumption; however, they also reported higher rates of speeding, distracted driving, driving while intoxicated (DWI), and less physical activity. The researchers noted that 4-year college/university students reported more drinking than technical/community college students, but not in comparison to those not attending college, which is contrary to previous literature. Additionally, students attending 4-year colleges/universities did not significantly differ in the other outcomes (health status, family relationships, depressive symptoms) compared to the students attending technical/community college or those who did not attend college (Simons-Morton et al., 2016). In a different study, Heller and Sarmiento (2016) found similar results in inner-city community college students compared to 4-year college students. The researchers found that community college students reported less binge drinking than 4-year college students. The results also showed that healthy eating and physical activity were low across both community college students and 4-year college students. The authors suggested that public health interventions, such as putting fruit in vending machines and offering fruit as a substitute for French fries, should be implemented for both 2-year and 4-year college students.

Other studies with adolescents and college students have mostly shown that these groups are more likely to engage in risky behaviors such as alcohol misuse, illicit drug use, and unsafe sex behaviors than other age groups. Approximately 60% of college students ages 18-22 years

reported that they drank alcohol in the past month, and about 2 out of 3 students reported engaging in binge drinking (National Institute on Alcohol Abuse and Alcoholism, 2015). Another study found that college students who used ecstasy were more likely to use other illicit drugs, engage in binge drinking, and have multiple sexual partners (Strote, Lee, & Wechsler, 2002). Furthermore, more risky sex behaviors were exhibited by college students who engaged in alcohol use and marijuana use (Hittner & Kennington, 2008). In a study conducted by Beckmeyer (2016), non-intercourse and intercourse hookup intentions were examined alongside heavy drinking in college students. Findings suggested that the intention to hookup was positively associated with heavy drinking, but only for non-intercourse hookup and not for intercourse hookups. Previous literature suggests that hookups are impulsive sexual experiences that result from alcohol use (Downing-Matibag & Geisinger, 2009); however, this study suggested that the intent to hookup preceded heavy drinking, at least in this sample of college students (Beckmeyer, 2016). Although the literature frequently examines alcohol consumption and risky sexual behaviors together, the current study examined them as two separate components of risk-taking behaviors.

There is also a growing body of literature that suggests risky behaviors are more frequent in adolescents/young adults with chronic conditions compared to adolescents without chronic conditions. Previously, researchers hypothesized that having a chronic condition was a protective factor against risky behavior, such as having asthma reducing the prevalence of smoking (Brook & Shiloh, 1993). In this instance, however, findings have shown that adolescents with asthma have similar or even higher rates of smoking (Brook & Shiloh, 1993; Tercyak, 2003). In fact, research suggests that adolescents with asthma have an increased risk of nicotine dependence if they smoke, which means these adolescents have a greater number of

unsuccessful smoking cessation attempts (Bitsko, Everhart, & Rubin, 2014). Published reports suggest that individuals with chronic conditions are just as likely or even more likely to engage in these behaviors, including substance use and risky sexual behavior, as compared to their peers without chronic conditions (Valencia & Cromer, 2000). In a study by Suris, Michaud, Akre, and Sawyer (2008), adolescents with a chronic condition were more likely to smoke cigarettes, use cannabis, and to have performed violent or antisocial acts. Another study found that adolescents with chronic conditions were also more likely to engage in sexual intercourse and risky sexual behavior, and that they had higher rates of illicit drug use, especially in females (Suris & Parera, 2005). Additionally, one study found that adolescents with chronic conditions reported fewer protective factors, such as engaging in physical activity more than two times a week and having an optimistic outlook on one's future (Nylander, Seidel, & Tindberg, 2014).

Risky behaviors may co-occur in adolescents with chronic conditions because these adolescents may have a greater need to gain peer acceptance, which would lead to riskier health behaviors. This desire for peer acceptance may be due to feeling different from their peers because of their chronic condition (Valencia & Cromer, 2000). As adolescents transition into young adulthood, normal tasks such as navigating puberty, gaining autonomy, and forming a personal identity can be negatively impaired by any medical setbacks and involuntary dependence due to their chronic condition (Blum et al., 1993). By engaging in risky activities, adolescents may gain more autonomy, feel more mature, and feel more "normal" compared to their peers (Valencia & Cromer, 2000; Nylander, Seidel, & Tindberg, 2014).

Based on the reviewed literature, research on health behaviors in college students is still a growing field. Studies have not specifically examined the effects of having a chronic condition on college students' health behaviors. As such, more research into college students with chronic

conditions and their health behaviors is warranted. This study investigated the healthy lifestyle (e.g., preventative and wellness maintenance behaviors) and risk-taking (e.g., drug use and alcohol consumption, and risky sexual behaviors) behaviors of college students as a whole, which includes students with and without chronic conditions.

Theoretical Background

Given that this study was focused on health behaviors, the Health Belief Model (HBM) as conceptualized by Rosenstock (1974) provided a theoretical framework for understanding health behaviors among college students. According to the HBM, engaging in health-promoting or protecting behaviors is influenced by perceived benefits, perceived barriers, perceived threat, self-efficacy, and cues to action. Additionally, the HBM has been expanded to include self-efficacy and locus of control in recent years in order to increase its predictive ability (Westmaas, Gil-Rivas, & Silver, 2011). Thus, the HBM (See Figure 1) is a theoretical model that has been updated and modified over time as our knowledge and understanding of health-related psychological constructs change.

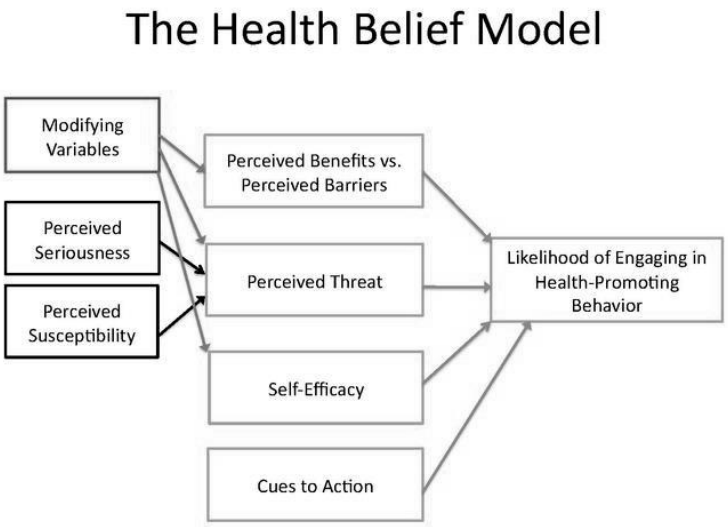

Figure 1. The Health Belief Model

Existing research has used the HBM to predict a variety of health behaviors such as self-examinations for breast cancer (Champion, 1994), safe-sex behaviors (Zimmerman & Olson, 1994), and physical activity (Corwyn & Benda, 1999). Not only have healthy lifestyle behaviors been examined, but risky behaviors have also been examined using the HBM as a framework. A qualitative study conducted by Downing-Matibag and Geisinger (2009) applied the HBM to hooking up and sexual risk taking behaviors in college students. The researchers found that college students' perceived susceptibility was low in terms of contracting a sexually transmitted infection (STI); about 50% of students were concerned about contracting an STI during a hookup. The study also found that alcohol was implicated in about 80% of hookups, which negatively impacted students' safe sex behavior self-efficacy.

The current study also utilized aspects of Social Cognitive Theory (SCT) as conceptualized by Bandura (1989) in its theoretical approach. The SCT states that behavior change happens when individuals observe a model or others performing that behavior and any consequences of that behavior. Additionally, an important component of SCT involves self-efficacy, which was one of the main variables investigated in this study. As such, SCT has been applied to health-related areas, where behavior change can happen frequently. Within the population of college students, many individuals make behavior changes based on their peers. Studies have shown that SCT is implicated in weight gain, physical activity, and sex behaviors in college students (Dennis et al., 2012; Joseph et al., 2013; Kanekar, Sharma, & Bennett, 2015). One study in particular has shown that the peer influence of roommates has an impact on smoking and aggressive behavior (Li & Guo, 2016). Based on gender and predisposition of behaviors, researchers found that the peer influence of roommates on aggressive behavior was

stronger among male students than female students, and that roommate effects on smoking had a negative association on both male and female students who did not smoke before college. The results also suggested that there was no peer effect on sexual behaviors; however, the authors suggested that the lack of an effect may have been because sexual behaviors are a highly private behavior (Li & Guo, 2016).

This study used the framework of the HBM and SCT in order to investigate the effects of health literacy, health locus of control, quality of life, and self-efficacy on health behaviors in college students. In this context, health literacy can be viewed as a part of perceived barriers; health locus of control and self-efficacy are conceptualized as direct variables on outcomes in this model. Each variable will be reviewed in the following section.

Health Literacy

Health literacy is generally defined as, "the capacity of an individual to obtain, interpret and understand basic health information and services in ways that are health-enhancing" (Sihota & Lennard, 2004, p. 11). In general, higher levels of health literacy have been positively associated with better health information, compliance to medical treatment, and better health results (Bohlman et al., 2004); low levels of health literacy have been associated with poorer health outcomes such as higher hospitalization rates and emergency department usage (Baker, 2007; Berkman et al., 2004). Higher levels of health literacy have also been associated with shorter hospitalization periods and less frequent use of health care, which can decrease health care costs (McCray, 2004). Differences in level of health literacy have been found to result in health inequalities, especially among lower socioeconomic groups, ethnic minorities, the elderly, and those with chronic conditions or disabilities (Sihota & Lennard, 2004). The assessment of health literacy is not yet widely used in clinical practice or at the community health level (Chinn

& McCarthy, 2013). Assessing and focusing on improving health literacy could be a potential way to improve health outcomes for many college students.

To date, there are few studies on health literacy and risky behaviors. One study found that higher levels of health literacy were associated with less risky habits, which were defined as smoking, drinking, and lack of exercise, in a sample of Japanese adults (Suka et al., 2015). Another study, conducted by Graf and Patrick (2013), investigated sexual health literacy on risky sex behaviors, which found that participants who received formal sex education scored significantly higher on safe sex knowledge; however, these participants also reported engaging in risky sex behaviors. Additionally, formal sexual education was the least common source of information, with friends, family, and informal sources such as TV or other media sources being much more common. The researchers highlighted that more formal sex education could counterintuitively lead to unhealthy sex behaviors, and that more research is needed in the area of sexual health literacy (Graf & Patrick, 2013). A systematic review conducted by Davey, Holden, and Smith (2015) investigated health literacy in men. In their paper, the researchers discussed that men are more likely to engage in risky lifestyle behaviors, which were defined as tobacco smoking, physical inactivity, risky alcohol consumption, and poor diet. Also, the review focused on ischemic heart disease and type 2 diabetes mellitus as chronic conditions, but ultimately only looked at correlates of men's health literacy in these contexts. The researchers also discussed that the literature on health literacy suffers from a lack of consensus due to different conceptual frameworks on health literacy (Davey, Holden, & Smith, 2015). Therefore, more research is warranted that examines health literacy and risky behaviors across different populations.

Few studies, however, have looked specifically at health literacy among college students. Studies enrolling college students, in fact, have primarily investigated health literacy and medication adherence. One study found that higher health literacy levels were positively associated with the amount of medical care received in adolescents with HIV, but not with medication adherence, which was the main outcome of interest (Murphy et al., 2010). Another study further investigated the lack of a link between health literacy and medication adherence and found evidence to suggest that the presence of a learning disability was linked to lower medication adherence, independent of health literacy level (Dharmapuri et al., 2015).

The current study investigated to what extent health literacy is important for college students in relation to their health behaviors. Health literacy has high relevance considering many students may have recently reached legal age and are now solely responsible for seeking and understanding how to use health services. Previous research in college students has focused primarily on medication adherence. In order to increase our understanding of health literacy, this study investigated the level of health literacy among college students, which was examined by its association to healthy lifestyle behaviors and risky behaviors. Also, given the paucity of research on health literacy, this current study expanded the literature in relation to risky behaviors, especially with sexual behaviors.

Health Locus of Control

Another factor to consider is health locus of control (HLOC). When changing an individual's behavior, it is important to consider the impact of one's health beliefs. HLOC refers to how much individuals believe that they are in control of their current and future health (Wallston, Wallston, & DeVillis, 1978). This construct is an extension of the construct of locus of control, originally conceptualized by Rotter (1966). Individuals can have either high internal

locus of control, which means that they believe they are in control of their health, or high external locus of control, meaning that they think that their health is due to factors outside of their control (e.g., luck or fate). Higher levels of internal locus of control have been associated with more preventative health behaviors, such as better dietary habits and lower rates of excessive drinking and smoking (Masters & Wallston, 2005; Marr & Wilcox, 2015). Those individuals with high external HLOC have shown the opposite, in that they are less likely to engage in preventative healthy behaviors.

The construct of HLOC has been used and validated in samples of college students throughout many studies. Wallston and colleagues (1976) used a sample of young college students in the initial development of the Multidimensional Health Locus of Control scale. Within this sample of college students, the researchers examined the role of HLOC on hypertension. In other studies, researchers studying smoking behaviors in college students found that non-smokers reported a higher internal HLOC than smokers (Martinelli, 2003). A separate study found that smokers were more likely to endorse that their own health was determined by luck or fate (Steptoe & Wardle, 2001). College students with higher reported external locus of control were also more likely to report higher levels of stress (Abouserie, 1994; Gadzella, 1994).

In another example, Marr and Wilcox (2015) investigated the effect of HLOC on health behaviors in college students. Specifically, the researchers tested mediator effects of self-efficacy and social support on internal locus of control on health behaviors, which included physical activity, fruit and vegetable intake, and dietary fat intake. Using an online survey, they gathered data from 838 students from two universities. Marr and Wilcox (2015) found that both self-efficacy and social support mediated associations between internal locus of control, physical activity, and dietary behaviors. Their findings further strengthened the link between locus of

control and health outcomes. Although there is research to suggest that HLOC can predict health behaviors, Marr and Wilcox's study contributes to existing literature by suggesting that individuals with higher levels of HLOC may feel more in charge of their social network. These social networks can include individuals who share similar health-related beliefs and habits. Additionally, having stronger beliefs in one's own abilities to engage in preventative health behaviors may be a possible mechanistic link between locus of control and positive health behaviors and outcomes (Marr & Wilcox, 2015).

Some studies have been conducted specifically looking at general locus of control on risky behaviors in college students. A study conducted by Burnett and colleagues (2014) examined attributional style (locus of control) on substance use and risky sexual behaviors in college students from 3 different universities. The results showed that males with an external locus of control had higher rates of risky sexual behavior and higher rates of both alcohol and drug use. For males and females, higher levels of internal locus of control were correlated with higher drug use and an increased likelihood of engaging in risky sexual behaviors. For reasons unknown, the authors did not elaborate on this last finding, which is important since it is inconsistent with previous literature. For instance, as stated in their paper, the authors discussed that previous findings have shown that an internal locus of control is associated with lower HIV infection risk, and that people are less likely to engage in health-protecting behaviors if they believe in an external orientation for HIV infection (Burnett et al., 2014). In another study on college students, however, Rolison and Scherman (2003) found that locus of control was a suppressor variable in a model with sensation seeking, perceived risks, perceived benefits, peer influence, perceived peer participation, and social desirability on risk-taking frequency. As such,

locus of control was removed from the analysis. The literature on locus of control in regards to risky sexual behaviors appears to have inconsistent findings.

Although HLOC has been used in many studies with college students in the past, there have been few studies that investigate this construct in individuals with chronic conditions. Studies that have included a sample of individuals with chronic conditions have found that having a higher internal HLOC is not consistently associated with better outcomes. For instance, higher internal HLOC was correlated with improved transition readiness from pediatric to adult care in adolescents with chronic conditions, but not with school absences or medication adherence (Nazareth et al., 2015). In a study on cancer chemotherapy patients, individuals with a higher external HLOC were found to have lower levels of physiological arousal and reported less negative affect (Burish et al., 1984). This finding suggests that an external orientation may be advantageous in some situations, which have yet to be fully identified. Burish and colleagues (1984) suggested that having an internal orientation may be maladaptive in the context of some chronic conditions because of a lack of perceived control. Therefore, more research is necessary to assess how having a chronic condition may impact students with either an internal or external locus of control. Such findings may contribute to our overall understanding of orientation of locus of control in students with chronic conditions.

The current study expanded the literature on HLOC by investigating how college students' HLOC was associated with healthy lifestyle behaviors and risky behaviors. Based on previous literature, there appears to be a discrepancy in terms of whether an internal orientation reduces the risk of risky sexual behaviors. This study expanded on this literature and further investigated how locus of control was related to risky sexual behaviors in college students.

Additionally, the study investigated these associations in students both with and without chronic conditions.

Health Self-Efficacy

Based on both the HBM and SCT, an important factor to consider is self-efficacy. Self-efficacy is generally referred to as one's belief in his or her ability to accomplish a specific task, which is tied to social cognitive theory (Bandura, 1977). This construct can also be applied in the context of one's health; self-efficacy influences an individual's belief of changing their behavior for a desired health outcome. Research has found that self-efficacy is a consistent predictor of short-term and long-term success when it comes to health behaviors (Strecher et al., 1986). Self-efficacy has been documented as having a role in changing and maintaining diet, physical activity, smoking habits, safe-sex practices, and drug and alcohol use (Westmaas, Gil-Rivas, & Silver, 2011). Higher self-efficacy has been associated with lower rates of smoking (Scholz et al., 2009), and better adherence to medication (Clark & Dodge, 1999).

Several studies have investigated self-efficacy in specific chronic condition groups, especially in self-management intervention programs (Marks, Allegrante, & Nourig, 2005). For instance, in type I diabetes, self-efficacy has been associated with increased adherence to diet (Nouwen, Urquhart-Law, Hussain, McGovern, & Napier, 2009). One study demonstrated that self-efficacy can influence levels of physical activity in those with chronic obstructive pulmonary disease (COPD). Participants with higher self-efficacy levels increased their physical activity more than participants with lower self-efficacy (Hartman, ten Hacken, Boezen, & de Greef, 2013). In another study with patients with COPD, self-efficacy was found to increase following short-term structured education interventions, which influenced how patients managed

their condition in terms of managing breathing and avoiding breathing difficulty (Kara & Asti, 2004).

A 12-month longitudinal study conducted by Bonsaksen, Fagermoen, and Lerdal (2014) investigated self-efficacy in two groups of patients: those with obesity and those with COPD. Both groups received interventions in the form of patient education courses and were surveyed at 2 weeks, and then at 3, 6, and 12 months. Findings suggested that self-efficacy trajectories differed in each group; patients with COPD had an increase in self-efficacy, but actually decreased in self-efficacy after 12 months, whereas patients with obesity generally increased in self-efficacy throughout the 12 month period. Results suggested that individuals may require assistance in maintaining self-efficacy based on the nature of their specific condition. Based on these results, the authors suggested that obesity patients may view their condition as temporary whereas those with COPD may have more realistic, negative expectations given the nature of the condition's progression. The researchers also suggested that self-efficacy should be further explored using self-efficacy measures specific to each condition.

In terms of risky behaviors, several studies have investigated the association between these behaviors and self-efficacy. In a study conducted by Grevenstein and colleagues (2016), general self-efficacy and other variables (sense of coherence, neuroticism, and extraversion) were investigated as predictors of substance use (tobacco, alcohol, and cannabis) frequency and mental health. Three hundred eighteen students in Germany participated in the study beginning at age 14 until they were 24 years old. The study found that self-efficacy only had incremental validity over sense of coherence and neuroticism in predicting cannabis use, and not with tobacco or alcohol use. Results suggested that lower self-efficacy was associated with cannabis use, however, the data did not support previous findings of refusal self-efficacy predicting

alcohol and tobacco use. This particular study mainly highlighted the importance of sense of coherence in relation to substance use (Gervenstein et al., 2016). Other studies have shown that self-efficacy is associated with sexual behaviors. Bandura (1997) himself stated that weaker self-efficacy is associated with a higher probability of engaging in risky sexual behavior due to psychosocial factors such as peer pressure. In general, these findings have been repeated across other studies; higher self-efficacy has been associated with higher contraceptive use and abstinence (Wang et al., 2003; DiIorio et al., 2004).

With respect to college students, few studies have focused specifically on self-efficacy and either healthy lifestyle behaviors or risky behaviors. One study in obese college students suggested that intervention programs may be more effective in reducing BMI and increasing physical activity levels when specifically focused on self-efficacy (Ickes et al., 2016). Nesoff, Dunkle, and Lang (2016) investigated the role of self-efficacy in condom usage among female college graduates. The researchers found that condom usage varied depending on interpersonal factors and partnership patterns (main partner vs casual partner), regardless of levels of self-efficacy (Nesoff, Dunkle, & Lang, 2016). The current study further examined self-efficacy as a factor in associations with healthy lifestyle behaviors and risky behaviors for college students with and without chronic conditions.

Health-Related Quality of Life

The last variable that was investigated in this study was quality of life. Quality of life, or more specifically, health-related quality of life (HRQOL), is a multidimensional construct used in evaluating aspects that impact health both physically and mentally. According to the Centers for Disease Control and Prevention (2000), HRQOL is defined as "an individual's or group's perceived physical and mental health over time." HRQOL is generally operationalized by at

least three domains: physical, psychological, and social functioning. Physical functioning is defined by the ability to perform daily tasks and includes any symptoms from a disease or condition. Psychological functioning can refer to psychological distress or to a general sense of well-being and can include cognitive functioning. Social functioning includes how individuals manage their social relationships, interactions, and how they integrate socially (Sprangers, 2002). HRQOL can be assessed at the individual level, which includes physical and mental health perceptions, any health-related conditions, functional status, social support, socioeconomic status and other factors. Additionally, HRQOL can also be assessed at the community level, which can ultimately impact a population's health perceptions and functional status.

Several studies have been conducted with HRQOL and chronic condition that focus on HRQOL as a primary or secondary outcome. An extensive review conducted by Megari (2013), examined a number of studies assessing HRQOL in cancer patients, transplanted patients, patients with heart disease, stroke, diabetes, hepatitis C, HIV, and many other conditions. This review found that coexisting chronic conditions, adverse health risk behaviors, depressive symptoms, and even sociodemographic variables, such as gender, could adversely impact HRQOL. However, early treatment of certain conditions, which included but was limited to diabetes, obesity, and ventricular dysfunction, was associated with improved HRQOL. Within the context of chronic condition, HRQOL is important in evaluating a condition's impact by assessing any changes in a patient's reported QOL, especially in the presence of a medical intervention (Megari, 2013). This information can help health providers in making more patient-focused decisions that can improve individual HRQOL (Staquet, Hays, & Fayers, 1998).

Although there have been many studies assessing HRQOL in individuals with chronic conditions, there have been relatively few studies that examine HRQOL in college students

specifically. One study investigated HRQOL among college students who exhibited heavy drinking patterns, and found that depression had a stronger association with HRQOL than alcohol abuse (Monahan et al., 2012). In other studies that involved college student samples, researchers investigated spiritual well-being, visual impairment, and physical activity related to HRQOL (Anye et al., 2013; Masaki, 2015; Pedišić et al., 2014).

Across several studies, HRQOL has been investigated alongside risky behaviors. One study examined multiple health-risk behaviors (e.g., substance use [alcohol, cigarettes, cannabis, and other illicit drugs], low physical activity, and sexual intercourse without a condom) in a sample of Swiss men (Dey et al., 2014). The researchers examined associations with these behaviors and quality of life (QOL; physical and mental) within the past four weeks. Results showed that one-third of the sample reported no health-risk behaviors, one-third reported one health-risk behavior, and the remaining third reported two to seven risk behaviors. Findings also demonstrated that those who engaged in health-risk behaviors were more likely to report below average QOL. Specifically, cigarette smoking and low physical activity were associated with below average physical and mental QOL, drinking was associated with below average physical QOL, cannabis use and other illicit drug use were associated with lower mental QOL, and sexual intercourse without a condom was not associated with QOL (Dey et al., 2014).

In another study, Zahran and colleagues (2007) investigated young adults aged 18-24 in regards to HRQOL and risky health behaviors. The researchers assessed education level (secondary education, technical school or college, or graduate school), risky behaviors (physical activity, cigarette smoking, binge drinking, and risky sex behaviors), current asthma status, and HRQOL (physical and mental unhealthy days). It was found that as education level increased, physical activity, smoking, and risky sexual behaviors all decreased. Another finding was that

binge drinking increased as education level increased. In terms of HRQOL, the researchers found that HRQOL did not significantly differ based on education level, but by risky behaviors. The results showed that physical activity status had no association with HRQOL, current smokers reported worse HRQOL than non-smokers, and binge drinkers reported more mentally unhealthy days, but not physically unhealthy days compared to non-binge drinkers. Additionally, students who engaged in risky sex behaviors reported significantly more physically unhealthy days and twice as many mentally unhealthy days than students who reported none of those behaviors (Zahran et al., 2007).

The current study expanded the existing body of literature on health behaviors by examining HRQOL across a sample of college students, including those with and without chronic conditions. Additionally, this study investigated the association between HRQOL and healthy lifestyle behaviors as well as risky behaviors in college students. Given that college students are more likely to engage in risky behaviors, their HRQOL is likely to be negatively impacted as well. This study provided findings on which health behaviors are associated with HRQOL, which in turn can be targeted in research and interventions to improve the health outcomes of college students.

Chronic Condition Status as a Moderator

Based on the reviewed literature, having a chronic condition could impact the association between health-related factors and health behaviors in different ways. Since individuals with chronic conditions face unique challenges compared to individuals without a chronic condition, it is likely that there are differences in how these variables (health literacy, HLOC, health self-efficacy, HRQOL) impact their healthy and risky behaviors.

In terms of health literacy, it makes intuitive sense that those with chronic conditions would have higher health literacy due to utilizing health services to manage their condition. In order to manage their conditions effectively, individuals must maintain ongoing patient-provider collaboration and have the skills to act on health information (FitzGerald & Poureslami, 2014). As such, having a chronic condition was hypothesized to strengthen the association between health literacy and healthy lifestyle behaviors. Additionally, it was hypothesized that chronic condition status would strengthen the association between health literacy and risky behaviors, which we expected would be a negative association in individuals with a chronic condition.

In considering HLOC, it would also be expected that having a chronic condition would strengthen associations with both healthy lifestyle and risky behaviors. Although the literature has inconsistent findings on having a high internal orientation on health behaviors in individuals with chronic conditions (Nazareth et al., 2015; Burish et al., 1984), higher levels of internal locus of control have been associated with more preventative health behaviors in general (Masters & Wallston, 2005; Marr & Wilcox, 2015). Additionally, having a chronic condition may strengthen these associations for risky behaviors, especially for individuals with low levels of internal locus of control. Those individuals may feel like their chronic condition, and by extension, their health is beyond their control, which would increase the likelihood of engaging in risky behaviors, consistent with previous literature on locus of control and risky behaviors (Burnett et al., 2014; Rolison & Scherman, 2003).

With respect to self-efficacy, having a chronic condition may also impact the association between self-efficacy and healthy and risky behaviors. Previous studies have shown that higher self-efficacy is associated with better outcomes in groups with chronic conditions (Marks, Allegrante, & Nourig, 2005; Nouwen, Urquhart-Law, Hussain, McGovern, & Napier, 2009;

Hartman, ten Hacken, Boezen, & de Greef). By maintaining higher levels of self-efficacy, individuals with a chronic condition should display healthy lifestyle behaviors and less risky behaviors. As such, maintaining these levels of self-efficacy would be more salient to these individuals compared to those without a chronic condition.

Lastly, in terms of HRQOL, it was expected that a chronic condition would have an impact on an individual's healthy and risky behaviors. The literature has shown that having a chronic condition is associated with depressive symptoms, adverse health risk behaviors, and lower QOL (Megari, 2013). Generally, individuals with chronic conditions report lower QOL, especially those with concurrent medical conditions (Fortin et al., 2004). As such, it was expected that having a chronic condition would weaken, or have a suppressive effect on associations between HRQOL and both healthy lifestyle and risky behaviors.

The Current Study

The main focus of this study was to assess differences in health behaviors in college students. In this study, health behaviors were separated into two dimensions: healthy lifestyle behaviors and risky behaviors. Healthy lifestyle behaviors were operationalized as preventative and wellness maintenance behaviors, as well as dietary behaviors and physical activity. Risky behaviors were further broken down into risky sexual behaviors and substance use risk (i.e., drug and alcohol use). **My first aim** was to assess how multiple factors (HLOC, health literacy, health self-efficacy, and HRQOL) predicted healthy lifestyle behaviors (Figure 2). I hypothesized that higher levels of internal HLOC, health literacy, health self-efficacy, and HRQOL would be associated with a greater number of healthy lifestyle behaviors. **My second aim** was to assess how the same factors (HLOC, health literacy, health self-efficacy, and HRQOL) predicted risky behaviors (Figure 3). I hypothesized that higher levels of internal

HLOC, health literacy, health self-efficacy, and HRQOL would be associated with a fewer number of risky behaviors.

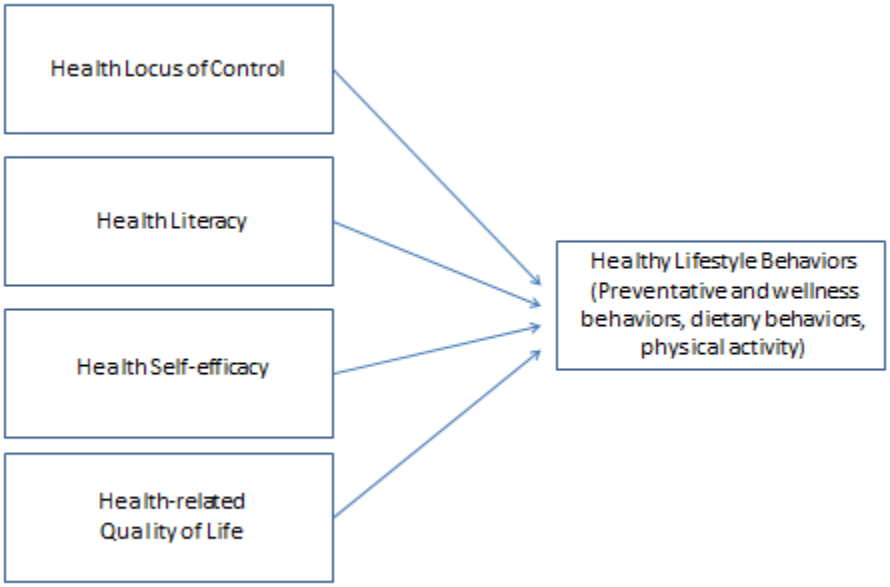

Figure 2. Predictor variables and healthy lifestyle behaviors

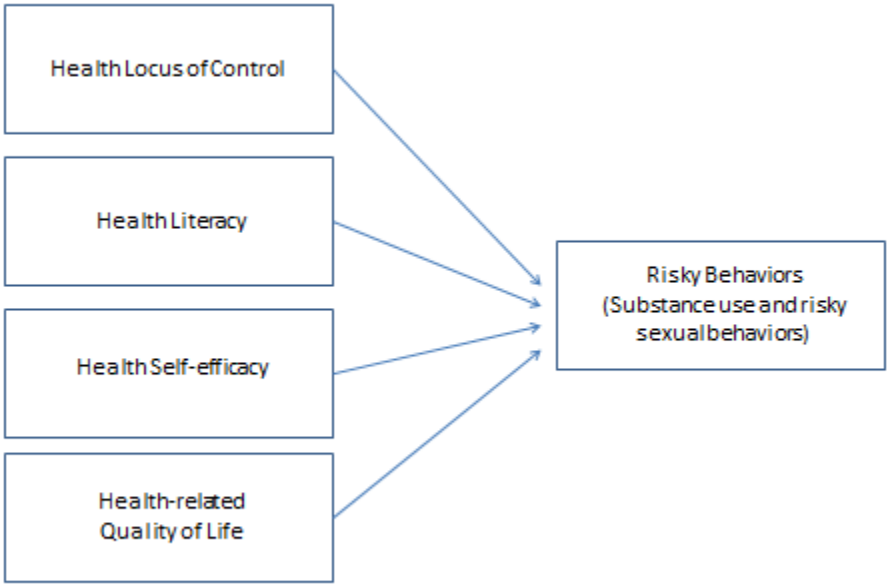

Figure 3. Predictor variables and risky behaviors

My third aim was to determine the moderating effect of the presence of a chronic health condition on associations between the previously described factors and healthy lifestyle behaviors in college students (Figure 4). As such, my hypotheses for the third aim were as follows: 1) the presence of chronic condition was expected to strengthen the association between high internal HLOC and healthy lifestyle behaviors; 2) the presence of chronic condition was expected to strengthen the association between health literacy and healthy lifestyle behaviors; 3) the presence of chronic condition was expected to strengthen the association between health self-efficacy and healthy lifestyle behaviors; and 4) the presence of chronic condition was expected to weaken the association between HRQOL and healthy lifestyle behaviors.

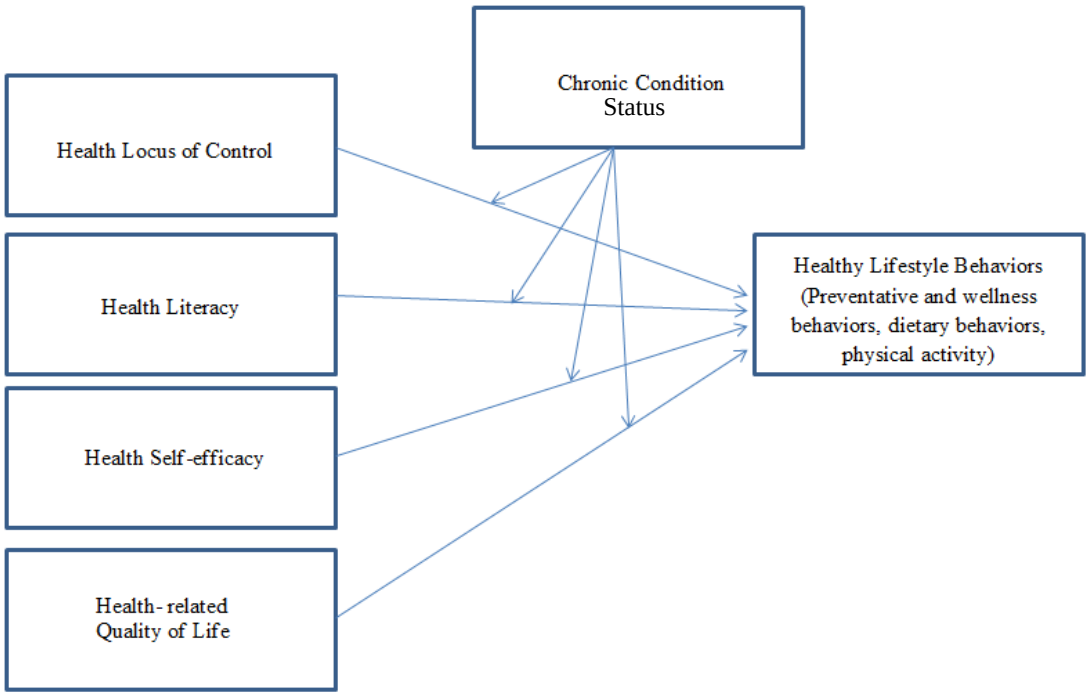

Figure 4. Chronic condition status as a moderator between predictor variables and healthy lifestyle behaviors

Similarly, **my fourth aim** was to assess the moderating effect of the presence of a chronic condition on associations between factors drawn from the HBM and risky behaviors

(Figure 5). My hypotheses for the fourth aim were as follows: 1) the presence of chronic condition would strengthen the association between high internal HLOC and risky behaviors; 2) the presence of chronic condition would strengthen the association between health literacy and risky behaviors; 3) the presence of chronic condition would strengthen the association between health self-efficacy and risky behaviors; and 4) the presence of chronic condition would weaken the association between HRQOL and risky behaviors.

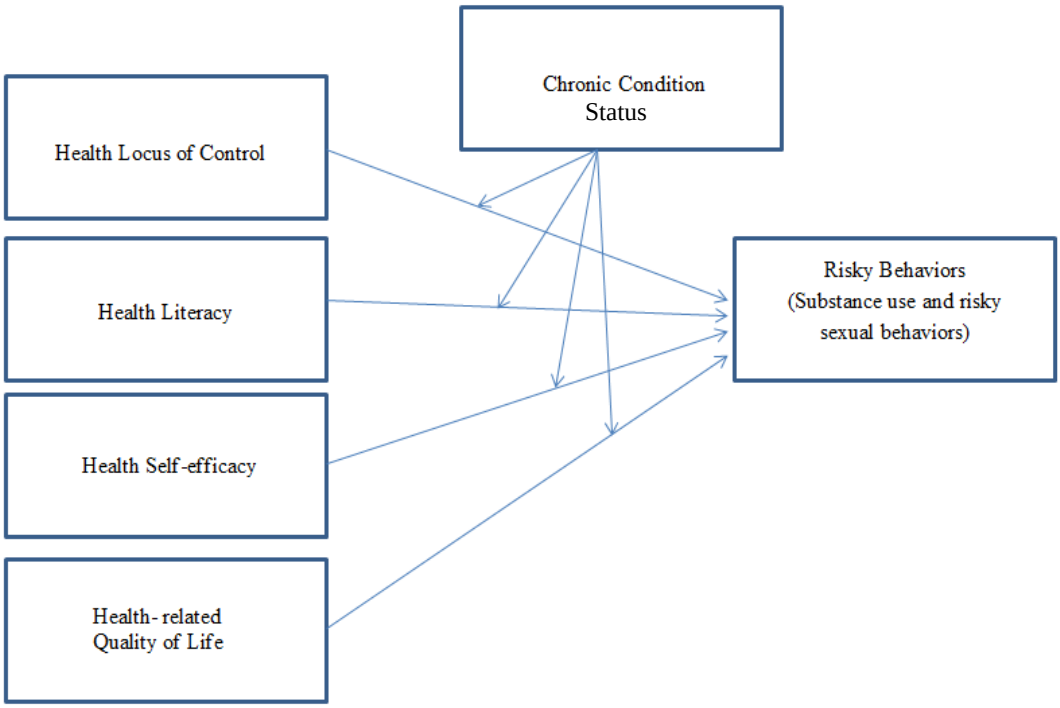

Figure 5. Chronic condition status as a moderator between predictor variables and risky behaviors

In sum, this study investigated and evaluated how these identified factors (HLOC, health literacy, health self-efficacy, and HRQOL) influenced college students' reported healthy lifestyle behaviors and risky behaviors. Further, we investigated whether or not the presence of a chronic condition moderated the effect of the association between each factor and healthy lifestyle behaviors and risky behaviors. The findings from this study may help college health centers

develop better educational materials or strategies to address college student health, especially for those with chronic conditions. Additionally, the results may have broader implications, in that findings from this study could help health care providers assist adolescents in the transition to college. Having a thorough, structured health care transition plan can optimize the care of college students (Cooley & Sagerman, 2011). By preemptively informing adolescents about how to seek health services and how to manage one's own health, college students can become healthier individuals as they enter adulthood and manage chronic conditions. These students may be away from home and family for extended periods of time, which makes it even more vital that they learn how to navigate their health care systems and receive the help they need.

Method

Participants

This study included a total of 393 participants who were current undergraduate students at VCU and were aged 18 years and older. Students participated in the study regardless of whether they had a chronic condition. Specific inclusion criteria were that participants must be at least 18 years of age, currently enrolled as a VCU student, and able to read English. Individuals were excluded if they were not currently an undergraduate student at VCU. Participants signed up for the study through the online VCU SONA system, where they completed a pre-screen for age. If participants did not pass the pre-screen, then they were not allowed to sign up for the study. Informed consent was administered and obtained online.

Design and Procedure

In this study, participants were recruited through SONA (the online experimental management system provided by the VCU Department of Psychology). Students who were interested in participating in the study were asked to read consent information and click a button

to indicate their agreement to participate in this study. Following the consent screen, the students were provided with a link to Qualtrics, a secure web application used to build online surveys and databases, where the survey was housed. All participants were assigned a random ID through Qualtrics, ensuring that all responses were completely anonymous. After the consent page, the participants completed a demographic survey before the main questionnaire. The main questionnaire consisted of various measures and scales, which took approximately 45 minutes to an hour to complete. Following completion of the questionnaire, students received one SONA credit to use for an applicable psychology course. They also had the option to complete the questionnaire and opt not to receive credit.

Several questionnaires in this study were piloted with IRB approval in the spring semester of 2016 in order to determine how many VCU students reported a chronic condition. Based on pilot data, which yielded 276 participant responses, 83 participants (30.1%) indicated that they had a chronic condition. The most commonly indicated chronic condition was asthma (23.1%), followed by attention deficit hyperactivity disorder (ADD/ADHD; 8.4%). Data collection for the current study ran during the spring 2017 academic semester (January through May).

Measures

Demographic Information

Participants completed a demographic questionnaire, which included information about their age, weight, height, gender identity, race/ethnicity, sexual orientation, relationship status, caregiver status, whether or not they were a first generation college student, academic class standing, expected graduation date, academic major and minors, number of credits enrolled for the current semester, grade point average, start time of earliest class, current place of residence,

employment status, family household income, household size, and extracurricular activities. This questionnaire was created to capture a wide variety of information reflective of a college setting from each participant that is more descriptive than other demographic forms.

Physical Health Assessment

Participants answered a short physical health assessment form which identified whether or not they had a chronic condition. The conditions listed on this form were based on conditions that are listed on school health forms (Virginia Department of Health, 2016). If participants answered "yes" to having a chronic condition, they were also asked to identify which conditions they may have, the age when they received a medical diagnosis, and any medications for their conditions.

Multidimensional Health Locus of Control

The Multidimensional Health Locus of Control (MHLC) evaluates an individual's locus of control across three dimensions in regards to their health, including internal and external locus of control (Wallston, Wallston, & DeVillis, 1978). This questionnaire is comprised of two forms, Form A and Form B, which have 18 items each. Each form contains 6 items for each of the dimensions: internality (e.g., "I am in control of my health"), powerful others (e.g., "Health professionals control my health"), and chance (e.g., "No matter what I do, I'm likely to get sick"). Each item uses a 6-point Likert scale, with 1 being "strongly disagree" and 6 being "strongly agree." Total scores for each subscale are found by calculating the sums of responses associated with each subscale, which can range from 0 to 36. Higher scores on internality suggest an internal-oriented HLOC, whereas lower scores suggest an external orientation. High scores on the powerful others subscale indicate strong beliefs in external control by powerful

others, and high scores on the chance subscale indicates beliefs that one's health is determined by fate, luck, or factors beyond their own control.

In the original validation study, reliability for Form A was as follows: Cronbach's α reliability coefficients were 0.71 for internality, 0.72 for powerful others, and 0.69 for chance subscales. In Form B, Cronbach's α reliability coefficients were 0.66 for internality, 0.72 for powerful others, and 0.69 for chance subscales. Confirmatory factor analysis was conducted for Forms A and B in order to assess validity. Three-factor CFA was run and results were as follows for Form A, χ^2 (132) = 460.90, p <.001, and for Form B, χ^2 (132) = 356.59, p < .001 (Ross et al., 2015). Each subscale on Form A is highly correlated with the subscales on Form B. In the current study, each subscale on Form A was significantly correlated with its equivalent on Form B, *ps* < 0.001. As such, only Form A was used for analyses. In the current study, Cronbach's α reliability coefficients for Form A were 0.51 for internality, 0.62 for chance, and 0.49 for powerful others subscales. Overall, Form A of the MHLC had a Cronbach's α reliability coefficient of 0.78 in the current study.

Interpersonal Support Evaluation List

The Interpersonal Support Evaluation List – College student version (ISEL – C) is a scale that measures perceptions of social support (Cohen, Mermelstein, Kamarck, & Hoberman, 1985). The ISEL consists of four subscales (tangible, belonging, appraisal, and self-esteem scales) with 12 items in each subscale. Each item is evaluated on a 4-point Likert scale with 1 being "Definitely false" to 4 being "Definitely true." Example items from each subscale are as follows: tangible ("I know someone at school or in town who would bring my meals to my room or apartment if I were sick"), belonging ("I hang out in a friend's room or apartment quite a lot"), appraisal ("I know someone who I see or talk to often with whom I would feel perfectly

comfortable talking about any problems I might have adjusting to college life"), and self-esteem ("Most people who know me well think highly of me"). In the original validation study, the ISEL was correlated at r = 0.46 with the Inventory of Socially Support Behaviors, r = 0.74 with the Rosenberg Self-esteem Scale, and r = 0.40 with the appraisal scale of the Colwill and Spinner Privacy Measure. The scale's internal reliability has been reported as ranging from α = 0.77 to 0.86 for overall reliability, and α = 0.77 to 0.92 for appraisal, α = 0.60 to 0.68 for the self-esteem, α = 0.75 to 0.78 for belonging, and α = 0.71 to 0.74 for tangible support subscales (Cohen, Mermelstein, Kamarck, & Hoberman, 1985). In the current study, the Cronbach's α reliability coefficients were 0.84 for tangible support, 0.82 for belonging, 0.92 for appraisal, and 0.77 for self-esteem subscales. Overall, the ISEL had a Cronbach's α reliability coefficient of 0.93 in the current study. The ISEL was included in this study as a covariate, and was theoretically-derived from the SCT.

All Aspects of Health Literacy Scale

The All Aspects of Health Literacy Scale (AAHLS) is a 16-item scale designed to measure health literacy in primary care settings, focusing on three subscales (functional, communicative, and critical health literacy; Chinn & McCarthy, 2013). The AAHLS items evaluate health (e.g., "General health rating"), functional health literacy ("How often do you need someone to help you when you are given information to read by your doctor, nurse, or pharmacist?"), communicative health literacy (e.g., "When you talk to a doctor or nurse, do you ask the questions you need to ask?"), and critical health literacy (e.g., "Are you the sort of person who might question your doctor or nurse's advice based on your own research?"). A mix of response scales are used throughout the measure. The first three items have individual response scales, while items 4 through 14 are answered with a 3-point scale of either "rarely,"

"sometimes," or "often." The last two items are dichotomous choices. The AAHLS is scored according to each subscale's mean item scores and proportion of responses, although there is no established cut-off for "adequate" health literacy.

In the original validation study, the psychometric properties of the AAHLS have been established as having a Cronbach's α of 0.75. For the subscales, Cronbach's α was 0.82 for functional health literacy, 0.69 for communicative health literacy, and 0.42 for critical health literacy. Factor analysis was also completed, which reported four factors with eigenvalues of 3.78, 1.83, 1.38, and 1.31. Construct validity was also assessed, which found that functional health literacy was significantly associated with communicative health literacy, ($r = 0.393$, $p < 0.001$), functional health literacy was significantly associated with critical health literacy, ($r = 0.59$, $p = 0.036$), and communicative and critical health literacy were significantly associated ($r = 0.186$, $p = 0.017$) (Chinn & McCarthy, 2013). In the current study, the Cronbach's α reliability coefficients were 0.43 for functional, 0.84 for communicative, and 0.80 for critical health literacy subscales. Overall, the AAHLS had a Cronbach's α of 0.78 for the current sample. The AAHLS was included in this study due to several reasons. First, other scales measuring health literacy conceptualized the construct as more closely related to reading, writing, and numeracy skills, whereas the AAHLS assesses health literacy using cognitive and social skills. Additionally, other scales, such as the Test of Functional Health Literacy in Adults (Parker et al., 1995) can take up to 30 minutes to complete and some, such as the Newest Vital Sign instrument require special training to administer in person (Welch, Van Geest, & Caskey, 2011).

Chronic Disease Self-Efficacy Scales

The Chronic Disease Self-Efficacy Scales (CDSES) measure a variety of subscales related to one's self-efficacy in managing their chronic condition (Lorig et al., 1996). The measure includes 33 items that span across 10 different subscales. Each item is evaluated on a 10-point scale with 1 being "not at all confident" and 10 being "totally confident." All of the subscales are categorized into three broad categories, "Self-efficacy to perform self-management behaviors," "General self-efficacy," and "Self-efficacy to achieve outcomes." The first category includes the exercise regularly scale (e.g., "How confident are you that you can do aerobic exercise such as walking, swimming, or bicycling three to four times each week?"), get information about disease scale (e.g., "How confident are you that you can get information about your disease from community resources?"), obtain help from community, family, friends scale (e.g., "How confident are you that you can get emotional support from friends and family?"), and the communicate with physicians scale (e.g., "How confident are you that you can ask your doctor things about your illness that concerns you?"). The "General self-efficacy" category only includes the manage disease in general scale (e.g., "How confident are you that you can do the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?"). The last category, "Self-efficacy to achieve outcomes," includes the "do chores" scale (e.g., "How confident are you that you can get your shopping done despite your health problems?"), social/recreational activities scale (e.g., "How confident are you that you can continue to do your hobbies and recreation?"), manage symptoms scale (e.g., "How confident are you that you can reduce your physical discomfort or pain?"), one item on managing shortness of breath, and the control/manage depression scale (e.g., "How confident are you that you can keep yourself from feeling lonely?"). This measure is scored by taking the mean of the items for each scale, and higher average scores indicate higher self-efficacy. In the original validation study,

internal consistency was assessed for the exercise regularly scale (α = .83), obtain help form community, family, friends scale (α = .77), communication with physician scale (α = .90), manage disease in general scale (α = .87), do chores scale (α = .91), do social/recreational activities scale (α = .82), manage symptoms scale (α = .91), and the control/manage depression scale (α = .92; Lorig et al., 1996).

This measure was modified for use in the current study in order to be more easily answered by participants. Since participants did not have to identify as having a chronic condition, any instance of the word "disease" was replaced with "health" and the instructions were changed to ask about participants' health in general. In the current study, the Cronbach's α reliability coefficients were 0.94 for management, 0.96 for general, and 0.97 for outcome self-efficacy subscales. Overall, the modified CDSES had a Cronbach's α reliability of 0.98 in this study.

PedsQL Young Adult Inventory

The PedsQL Young Adult Inventory is a measure designed to assess QOL for individuals who are 18 years and older (Varni, Seid, & Kurtin, 2001). This measure includes 23 items that evaluate four domains of functioning associated with QOL. Each subscale asks "how much of a problem has this been for you?" in the past one month in regards to physical functioning (e.g., "It is hard for me to do sports activity or exercise"), emotional functioning (e.g., "I feel afraid or scared"), social functioning (e.g., "I have trouble getting along with other young adults"), and school functioning (e.g., "I have trouble keeping up with my work or studies"). Each item is scored on a 5-point Likert scale from 0 being "never" to 4 being "almost always." Items are reverse scored and then linearly transformed to a 0-100 scale where 0=100, 1=75, 2=50, 3=25, and 4=0. A psychosocial health summary score is obtained by taking the sum of the items over

the number of items in the emotional, social, and school functioning scales. A physical health summary score is obtained by taking the physical functioning scale score, and a total score can be found by taking the sum of all items over the number of items total. In its original validation, Cronbach's α was reported for the whole inventory (α = 0.86) and for each subscale: physical (α = 0.76), emotional (α = 0.71), psychosocial (α = 0.83), social (α = 0.78), and school (α = 0.75). The PedsQL has been significantly correlated with the SF-8, a measure of HRQOL (Varni & Limbers, 2009). In the current study, the ISEL had a Cronbach's α reliability coefficient of 0.94. Individual subscales were not examined in analyses.

Health Behaviors Questionnaire

The Health Behaviors Questionnaire (HBQ) is a 40-item measure designed to evaluate two dimensions of health behaviors (Vickers, Conway, & Hervig, 1990). In terms of health behaviors, this measure evaluates preventive behaviors and risk taking behavior. Within preventive behavior, two subsets of behavior are included: wellness maintenance behaviors (e.g., "I exercise to stay healthy") and accident control behaviors (e.g., "I learn first aid techniques"). Risk taking behaviors include traffic-related risk taking (e.g., "I speed while driving") and risk taking through exposure to hazardous substances (e.g., "I don't take chemical substances which might injure my health [e.g., food additives, drugs, stimulants]"). The questionnaire uses a 5-point Likert scale, with 1 being "strongly disagree," 3 being "neither agree not disagree," and 5 being "strongly agree." Scores are calculated by summing each item related to either preventive behaviors or risk taking behaviors, with items 17, 18, and 26 being reverse scored. In its validation, the questionnaire was tested using confirmatory factor analysis, using a four-factor group-invariant model, which was reported as $x^2 = 2400.32$, BBI = 0.486; TLI – 0.665, BBI parsimony index = 0.466; TLI parsimony index = 0.638) (Vickers, Conway, & Hervig, 1990).

Across five validation studies, Cronbach's α ranged from 0.74 – 0.82 for the wellness subscale, 0.57 – 0.73 for the accident control subscale, 0.64 – 0.75 for the traffic risks subscale, and 0.44 – 0.60 for the substance risks subscale (Vickers, Conway, & Hervig, 1990). In the current study, only the preventative behaviors subscales were used for analyses since risk taking behaviors were assessed using other measures. Cronbach's α in the current study were 0.78 for wellness maintenance, 0.64 for accident prevention, and 0.68 for general behaviors subscales.

Dietary Behavior and Physical Activity Questionnaire

The Dietary Behavior and Physical Activity Questionnaire (DBPAQ) is a 15-item test that measures food consumption and levels of physical activity over the past 7 days. Items for this questionnaire were taken from the upcoming 2017 version of the Youth Risk Behavior Surveillance System (YRBSS) surveys (Centers for Disease Control and Prevention, 2016). In this questionnaire, 11 items assess dietary behaviors, which ask about fruit juice, fruit, green salad, potato, carrot, other vegetable, soda, sports drink, water, and milk consumption over the past 7 days. Responses range from "I did not eat/drink…" to "4 or more times/glasses per day." There is an additional item that asks about how many times the participant ate breakfast over the past 7 days. The remaining 4 items assess physical activity and inactivity, which ask about how many times the participant engaged in physical activity for at least 60 minutes per day and how many times the participant engaged in strengthening or muscle toning activities over the past 7 days. The last two items ask about TV and video game or social media usage on a typical day. Several items from the original YRBSS survey were omitted because they were specific to high-school students (e.g., "In an average week when you are in school, on how many days do you go to physical education (PE) classes?"). The items from the YRBSS questionnaire have been tested for reliability, which found that about 75% of the items had reliability scores of Cohen's

kappa = 61% - 100% (Brener et al., 2013). These items were included as part of operationalizing healthy lifestyle behaviors. Although the YRBSS was originally created for high school students, items from these surveys have been used in college populations, for example in studies investigating weight perception on health behaviors of college students (Osborn et al., 2016).

AUDIT-C Questionnaire

The Alcohol Use Disorders Identification Test-C (AUDIT-C) Questionnaire is a short 3-item screening test for heavy drinking and alcohol abuse or dependence (Bush et al., 1998). Each item has responses on a 5-point Likert scale which ranges from 0 to 4. The first item asks "How often do you have a drink containing alcohol?" with responses ranging from "never" to "4 or more times a week." The second item asks "How many standard drinks containing alcohol do you have on a typical day?" with responses ranging from "1 or 2" to "10 or more." The last item asks "How often do you have six or more drinks on one occasion?" with responses ranging from "never" to "daily or almost daily." The measure is scored from 0 to 12; patients are considered at risk for alcohol abuse or dependence starting with a score of 4 for men or a score of 3 for women. In its original validation, the AUDIT-C was assessed by its likelihood ratios, which was measured using areas under the operating characteristic curves (AUROCs). In validating this questionnaire, a higher AUROC score indicates stronger performance of the test. AUROCs of the AUDIT-C are as follows, 0.891, 95% CI [0.877-0.904] for detecting heavy drinking, and 0.786, 95% CI [0.762-0.810] for detecting active alcohol abuse or dependence (Bush et al., 1998). The AUDIT-C was included in this study as a measure of risky behaviors.

Substance Use Questionnaire

A substance use questionnaire was included in order to assess risky behaviors related to substance use. The measure includes 25 items that assess use across a variety of substances.

The first two items ask about illicit substance use and frequency of use, which include marijuana, ecstasy, methamphetamine, and other substances. The rest of the questionnaire assesses smoking habits in terms of how many cigarettes, cigars, cigarillos, electronic cigarettes (e-cigs) per day and duration of smoking habit in days, months, and years. This measure was used by Benotsch and colleagues (2013), which is similar to measures employed in previous studies (Benotsch et al., 2006).

Sexual Behaviors and Partner Relationships Measure

A sexual behavior questionnaire was included to assess another dimension of risky behavior. This questionnaire consists of 8 items that ask about number of lifetime partners, condom usage in the past 3 months, instances of sex after drinking too much in the past 3 months, instances of sex while under the influence of drugs in the past 3 months, number of male partners in the past 3 months, number of female partners in the past 3 months, instances of unprotected sex in the past 3 months, and if the respondent has ever had a sexually transmitted disease. This measure was originally used by Benotsch and colleagues (2011), who noted that measures like these were reliable in assessing self-reported sexual behaviors and provided indices of risk similar to measures that examined partner-by-partner sexual behaviors.

Data Analysis Plan

Based on a power analysis using G*Power (Erdfelder, Lang, & Buchner, 2007), the minimum sample size required was 109 participants. The power analysis revealed that this sample size is required for an α error probability of 0.05, with four predictor variables to obtain statistical power of 0.80 to detect a medium effect size of $f^2 = 0.15$. Based on pilot data, we expected that approximately 30% of participants would report a chronic condition.

Prior to running the main analyses, descriptive statistics were run for missing data and outliers. Significant outliers were excluded from analyses. The data were checked for normality, linearity, and homoscedasticity. Transformations were not necessary based on the assumptions of linear regression tests (Baron & Kenny, 1986). Analyses were conducted with IBM SPSS 24 statistics software. Descriptive statistics were also run for demographic and physical health status, in order to determine the characteristics of the sample. Before conducting any main analyses, each measure and questionnaire was scored appropriately to obtain raw scores. Correlation analyses and an ANOVA were run to determine covariates as appropriate, such as gender, age, peer support/influence (measured by the ISEL - C), and income.

In order to test our main hypotheses, a number of analyses were conducted. Our first aim was to assess how our independent variables (HLOC [assessed by the MHLC], health literacy [assessed by the AAHLS], self-efficacy [assessed by the CDSES], and HRQOL [assessed by the PedsQL Young Adult Inventory]) predicted our outcome variable, healthy lifestyle behaviors (Table 1); our second aim was to assess how those same variables predicted risky behaviors. Healthy lifestyle behaviors were operationalized as preventative and wellness maintenance behaviors using the HBQ, and dietary behaviors and physical activity with the DBPAQ. In the HBQ, the risky behaviors subscales were not evaluated, as risky behaviors were captured using other measures. For risky behaviors, drug and alcohol use were assessed through the AUDIT-C and Substance Use Questionnaire, separately from risky sexual behaviors, which were determined through the Sexual Behaviors and Partner Relationships Measure. To test these first two aims, linear regression analyses were run between each variable and healthy lifestyle behaviors as measured by the HBQ and DBPAQ, and again for each variable and risky behaviors as measured by the AUDIT-C, Substance Use Questionnaire, and the Sexual Behaviors and

Partner Relationships Measure, all as separate analyses. Covariates were entered into step 1 of the model. Subscales of each measure were entered simultaneously into step 2 of the model to account for multicollinearity.

Table 1. Variables and measures table

Variable	Measure
Health locus of control	Multidimensional Health Locus of Control (MHLC)
Social support (covariate)	Interpersonal Support Evaluation List – College student version (ISEL - C)
Health literacy	All Aspects of Health Literacy Scale (AAHLS)
Health self-efficacy	Chronic Disease Self-Efficacy Scales (CDSES)
Health-related quality of life	PedsQL Young Adult Inventory
Healthy lifestyle behaviors – wellness and preventative behaviors	Health Behaviors Questionnaire (HBQ)
Healthy lifestyle behaviors – diet and physical activity	Dietary Behavior and Physical Activity Questionnaire (DBPAQ)
Risky behaviors – substance use	Alcohol Use Disorders Identification Test-C (AUDIT-C), Substance Use Questionnaire
Risky behaviors – risky sexual behaviors	Sexual Behaviors and Partner Relationships Measure

The third aim was to assess the moderating effect of chronic condition status (coded as yes [1] versus no [0]) on the associations between our predictor variables and healthy lifestyle behaviors; the fourth aim was to assess chronic condition as a moderator on these same variables and risky behaviors. For these analyses, chronic condition was dichotomized as "yes/no." Prior to analyses, the independent and moderator variables were centered and a product term was created from the centered variables (Baron & Kenny, 1986). The dichotomized chronic condition variable was entered as a moderator in a multiple regression analysis for each variable individually with healthy lifestyle behaviors, which were separated into healthy behaviors (HBQ) and dietary behaviors/physical activity (DBPAQ). The same analyses were conducted for risky

behaviors, which were separated into drug and alcohol use (AUDIT-C and Substance Use Questionnaire) and risky sexual behaviors (Sexual Behaviors and Partner Relationships Measure). The same measures (HLOC [assessed by the MHLC], health literacy [assessed by the AAHLS], self-efficacy [assessed by the CDSES], and HRQOL [assessed by the PedsQL Young Adult Inventory]) were used to evaluate these outcome variables as outlined in aims one and two. For the MHLC, the three subscales were combined for ease of statistical analysis. We obtained a total score for the MHLC by reverse scoring the powerful others and chance subscales, and then combining them with the internality subscale. In the moderation analyses, covariates were entered into step 1, the predictor variables (e.g., health literacy) were entered into step 2, followed by the interaction term of chronic condition and the predictor variables into step 3 (e.g., health literacy x chronic condition status). Post hoc probing analyses were conducted for significant moderator effects to determine which of the simple slopes differed from zero (Holmbeck, 2002).

Results

Demographics

Participants (N = 393) were between 18 and 32 years old (M = 19.95 years, SD = 1.97). Of the respondents, 66.1% identified as female, 42.8% identified as White/Anglo-American, 88.4% identified as heterosexual, and 61.9% were single/never married (See Table 2 for full sample demographics).

Table 2. Demographic Information

Gender/Gender Identity	**n (%)**

Male	128 (32.9)
Female	257 (66.1)
Transgender	2 (0.5)
Other	2 (0.5)
Race/Ethnicity	**n (%)**
Black/African-American	81 (20.8)
White/Anglo-American	167 (42.8)
Latino	30 (7.7)
Asian	67 (17.2)
Native Hawaiian or Other Pacific Islander	3 (0.8)
Mixed or Multi-racial	31 (7.9)
Other	11 (2.8)
Sexual Orientation	**n (%)**
Heterosexual	342 (88.4)
Bisexual	24 (6.2)
Gay/Lesbian	10 (2.6)
Queer	4 (1.0)
Other	7 (1.8)
Relationship Status	**n (%)**
Single/Never Married	242 (61.9)
In a Relationship/Never Married	142 (36.3)
Married	6 (1.5)
Separated	1 (0.3)
Academic Class	**n (%)**
Freshman	149 (38.1)

Sophomore	103 (26.3)
Junior	86 (22)
Senior	53 (13.6)
First Generation College Student	**n (%)**
Yes	122 (31.2)
No	269 (68.8)
Annual Household Income	**n (%)**
Less than $14,999	15 (3.9)
$15,000 - $29,999	43 (11.3)
$30,000 - $59,999	71 (18.6)
$60,000 - $99,999	92 (24.1)
$100,000 - $199,999	112 (29.4)
$200,000 and above	48 (12.6)

In terms of chronic condition status, 26% (n = 101) of participants self-reported that they had been diagnosed with a physical or mental condition by a doctor, nurse, or other medical professional. Of those who identified as having a chronic condition, the most frequent condition reported was asthma (22.9%). For a list of all chronic conditions reported, refer to Table 3. Those who reported "Other" were asked to identify their chronic condition. Instances of anxiety and depression under "Other" were counted towards the correct category. Since there were many individual conditions (e.g. anemia, eating disorder, and narcolepsy) reported under "Other," they were not listed individually in Table 3.

Table 3. Chronic Conditions Reported

Chronic Condition	n (%)
Asthma	57 (22.9)
Exercise-induced Asthma	0 (0)
Allergic Rhinitis	12 (5.4)
Diabetes	4 (1.8)
Cystic Fibrosis	0 (0)
Sickle Cell Disease	1 (0.5)
Cerebral Palsy	2 (0.9)
Heart Condition	7 (3.2)
Seizure Disorder	3 (1.4)
Rheumatoid Arthritis	2 (0.9)
Hypertension	2 (0.9)
Crohn's Disease/Ulcerative Colitis	1 (0.5)
HIV/AIDS	0 (0)
Cancer	1 (0.5)
Anxiety and/or Depression	8 (3.8)
ADHD	26 (11.4)
Other	35 (14.9)

Descriptives

Descriptive statistics for all variables are presented in Table 4. Values in Table 4 are based on the scored values of each scale and subscale; higher values signify higher levels of reported behavior for each subscale. Overall, this sample of college students reported higher internal HLOC compared to external HLOC. Additionally, this sample reported relatively high levels of communicative health literacy, self-efficacy, HRQOL, and social support. In terms of risky behaviors, this sample reported relatively low levels of drinking, smoking, substance use, and risky sexual behaviors. All variables were assessed for normality by examining skewness

and kurtosis. Based on a sample size greater than 300, variables were considered non-normal if absolute skew values were greater than 2, and if absolute kurtosis values were greater than 7 (Kim, 2013). Almost all of the substance use and sexual behavior variables exhibited non-normality based on absolute skew values and/or absolute kurtosis values (Table 5). Transformations for these variables were not conducted based on the assumptions of linear regression tests (Cohen et al., 2003). All other variables fell within acceptable limits for normality based on skewness and kurtosis.

Table 4. Descriptive Statistics

	M	*SD*	Range	Possible Range
Health locus of control - Internality	22.41	3.91	6-36	6-36
Health locus of control - Chance	19.23	4.48	6-36	6-36
Health locus of control - Powerful others	19.16	3.97	6-36	6-36
Functional health literacy	1.83	0.44	1-3	1-3
Communicative health literacy	2.52	0.56	1-3	1-3
Critical health literacy	2.04	0.53	1-3	1-3
Management self-efficacy	7.38	2.04	1-10	1-10
General self-efficacy	7.28	2.20	1-10	1-10
Outcome self-efficacy	7.14	2.06	1-10	1-10
Health-related quality of life	73.82	16.78	0-100	0-100
Wellness maintenance behaviors	3.13	0.69	1-5	1-5
General health behaviors	3.23	0.52	1-5	1-5
Accident prevention behaviors	3.19	0.71	1-5	1-5
Diet	41.14	7.86	22-60	0-67

Physical activity	4.71	3.97	0-14	0-14
Screen time/physical inactivity	4.88	2.92	0-12	0-12
Alcohol use	2.90	2.28	0-10	0+
Substance use	1.27	2.43	0-19	0+
Tobacco use	4.87	14.85	0-132	0+
Lifetime number of sexual partners	5.14	9.57	0-52	0+
Condom use	4.14	2.70	0-7	0+
Sex after drinking	1.11	4.22	0-25	0+
Sex under influence of drugs	1.04	3.60	0-30	0+
Social support	141.54	21.31	66-189	48-204

Table 5. Skewness and Kurtosis

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Substance use in past 3 months	3.6	0.129	17.618	0.257
Tobacco use in past 30 days	4.693	0.123	27.783	0.246
Sexual partners in lifetime	4.92	0.129	34.366	0.258
Having sex after having too much to drink	9.136	0.137	109.575	0.273
Having sex under the influence of drugs in past 3 months	5.146	0.138	30.408	0.275
Number of men had sex with in past 3 months	5.561	0.137	37.567	0.273
Number of women had sex with in past 3 months	8.034	0.137	86.296	0.274
Unprotected sex in past 3 months	4.088	0.140	20.690	0.279

Covariate Testing

Covariate testing revealed that age, social support, income, and gender were significantly associated with several outcome variables. Age was significantly associated with physical activity (r = -0.109, p = 0.038), number of sexual partners (r = 0.194, p <0.001), and condom usage (r = -0.105, p = 0.046). Social support was significantly associated with wellness maintenance behaviors (r = 0.201, p < 0.001), general health behaviors (r = 0.219, p < 0.001), accident prevention behaviors (r = 0.218, p < 0.001), alcohol consumption (r = 0.138, p < 0.02), diet (r = 0.136, p = 0.017), and instances of unprotected sex (r = 0.185, p = 0.003). Income was significantly associated with wellness maintenance behaviors (r = 0.114, p = 0.032), alcohol consumption (r = 0.137, p = 0.014), diet (r = 0.155, p = 0.004), and physical activity (r = 0.142, p = 0.007). ANOVA tests revealed that alcohol consumption (F(3, 318) = 3.177, p = 0.024), and screen time/physical inactivity (F(3, 364) = 3.002, p = 0.031), differed across gender/gender identities. Covariates were controlled for accordingly in all analyses based on theoretical considerations.

Aim 1: Regression Analyses

The first aim of this study was to assess how health-related factors (HLOC, health literacy, health self-efficacy, HRQOL) were associated with healthy lifestyle behaviors. In this study, healthy lifestyle behaviors were divided into wellness maintenance, general health behaviors, accident prevention behaviors, dietary behaviors, and physical activity (exercise and screen time/physical inactivity). Covariates were entered into step one of the analyses. Predictor variables and relevant subscales were then entered into step two of the model. Results are presented in the following section by predictor variable.

Health Locus of Control

HLOC, specifically higher internality, significantly predicted general health behaviors and accident prevention behaviors, after controlling for social support (see Table 6). HLOC, specifically higher levels of belief in powerful others, significantly predicted more screen time/physical inactivity after controlling for covariates. HLOC did not significantly predict wellness maintenance, diet, or physical activity after controlling for appropriate covariates.

Table 6. Regression Analyses of Health Locus of Control and Outcome Variables

Wellness maintenance						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.007	0.002	0.199**	0.006	0.002	0.195**
Household income	0.058	0.029	0.111*	0.06	0.029	0.195**
Internality				0.021	0.012	0.119
Chance				0.01	0.012	0.064
Powerful others				0.019	0.013	0.109
R^2	0.056**			0.116**		
ΔR^2				0.06**		
General health behaviors						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.005	0.001	0.228**	0.005	0.001	0.194**
Internality				0.037	0.008	0.277**
Chance				0.015	0.008	0.133
Powerful others				0.01	0.008	0.082
R^2	0.052**			0.226**		
ΔR^2				0.174**		
Accident prevention						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*

Social support	0.007	0.002	0.219**	0.007	0.002	0.197**
Internality				0.039	0.012	0.212**
Chance				0.00	0.011	0.002
Powerful others				0.023	0.012	0.132
R^2	0.048**			0.137**		
ΔR^2				0.089**		

Diet

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	0.083	0.813	0.006	0.262	0.823	0.018
Household income	1.006	0.333	0.168**	1.036	0.337	0.173**
Internality				0.211	0.141	0.1
Chance				-0.104	0.136	-0.058
Powerful others				-0.034	0.149	-0.017
R^2	0.028*			0.035		
ΔR^2				0.007		

Physical activity

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	-0.927	0.4	-0.126*	-0.901	0.406	-0.122*
Household income	0.352	0.164	0.117*	0.352	0.166	0.118*
Age	-0.223	0.107	-0.113*	-0.23	0.108	-0.117*
Internality				0.028	0.07	0.026
Chance				0.015	0.067	0.017
Powerful others				0.008	0.072	0.008
R^2	0.046**			0.048		
ΔR^2				0.002		

Screen time/Physical inactivity

	Step 1			Step 2		

Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	-0.109	0.299	-0.02	-0.065	0.299	-0.012
Household income	0.112	0.122	0.051	0.08	0.122	0.036
Age	0.125	0.08	0.087	0.106	0.08	0.073
Internality				0.013	0.052	0.016
Chance				0.008	0.049	0.011
Powerful others				0.121	0.053	0.162*
R^2	0.01			0.041*		
ΔR^2				0.031*		

*$p < 0.05$, **$p < 0.01$

Health Literacy

Health literacy, specifically functional and critical health literacy, significantly and positively predicted wellness maintenance after controlling for covariates (see Table 7). Higher levels of functional and communicative self-health literacy also significantly predicted more general health behaviors after controlling for covariates. Health literacy, specifically communicative health literacy, significantly predicted accident prevention behaviors. Critical health literacy positively predicted physical activity after controlling for gender, income, and age. Health literacy did not predict diet or screen time/physical inactivity after controlling for covariates.

Table 7. Regression Analyses of Health Literacy and Outcome Variables

	Wellness maintenance					
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.006	0.002	0.19**	0.005	0.002	0.162**
Household income	0.061	0.029	0.117*	0.056	0.027	0.107*
Functional				0.232	0.085	0.144**

Communicative				-0.039	0.082	-0.029
Critical				0.384	0.075	0.29**
R^2	0.054**			0.162**		
ΔR^2				0.108**		

General health behaviors

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.005	0.001	0.216**	0.003	0.001	0.135*
Functional				0.168	0.063	0.145**
Communicative				0.204	0.061	0.208**
Critical				0.025	0.056	0.026
R^2	0.047**			0.12**		
ΔR^2				0.073**		

Accident prevention

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.007	0.002	0.219**	0.005	0.002	0.16**
Functional				0.158	0.088	0.097
Communicative				0.184	0.086	0.132*
Critical				0.12	0.079	0.089
R^2	0.048**			0.094**		
ΔR^2				0.046**		

Diet

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	0.119	0.783	0.008	0.202	0.785	0.014
Household income	1.031	0.32	0.175**	1.079	0.319	0.183**
Functional				-0.183	1.018	-0.01
Communicative				-0.464	0.838	-0.033

Critical				2.129	0.876	0.144*
R^2	0.03*			0.048		
ΔR^2				0.018		

Physical activity

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	-0.837	0.388	-0.114*	-0.802	0.387	-0.11*
Household income	0.409	0.159	0.137*	0.44	0.158	0.148**
Age	-0.184	0.105	-0.093	-0.159	0.105	-0.08
Functional				0.199	0.49	0.022
Communicative				-0.638	0.418	-0.09
Critical				1.194	0.435	0.159**
R^2	0.045**			0.067*		
				0.022*		

Screen time/Physical inactivity

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	-0.208	0.292	-0.038	-0.247	0.292	-0.046
Household income	0.08	0.119	0.036	0.059	0.119	0.027
Age	0.106	0.079	0.073	0.095	0.079	0.065
Functional				0.18	0.37	0.027
Communicative				0.466	0.315	0.089
Critical				-0.643	0.329	-0.116
R^2	0.008			0.021		
ΔR^2				0.013		

*$p < 0.05$, **$p < 0.01$

Health Self-Efficacy

Health self-efficacy did not significantly predict wellness maintenance behaviors, general health behaviors, accident prevention behaviors, diet, physical activity, or screen time/physical inactivity after controlling for covariates. Results suggest that model significance was primarily driven by covariates (See Table 8).

Table 8. Regression Analyses of Self-Efficacy and Outcome Variables

Wellness maintenance						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.005	0.002	0.152**	0.002	0.002	0.057
Household income	0.052	0.031	0.097	0.05	0.03	0.094
Management				0.02	0.039	0.059
General				0.075	0.039	0.238
Outcome				-0.012	0.036	-0.035
R^2	0.034**			0.092**		
ΔR^2				0.058**		
General health behaviors						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.005	0.001	0.218**	0.001	0.002	0.056
Management				0.025	0.028	0.097
General				0.041	0.027	0.173
Outcome				0.038	0.026	0.147
R^2	0.048**			0.178**		
ΔR^2				0.13**		
Accident prevention						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.008	0.002	0.231**	0.004	0.002	0.109

Management				0.026	0.04	0.07
General				0.063	0.039	0.19
Outcome				0.022	0.037	0.06
R^2	0.054**			0.131**		
ΔR^2				0.077**		

Diet

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	0.37	0.855	0.024	0.292	0.858	0.019
Household income	0.911	0.334	0.153**	0.81	0.335	0.136**
Management				0.963	0.409	0.249*
General				-0.304	0.427	-0.086
Outcome				-0.34	0.41	-0.09
R^2	0.023*			0.043		
ΔR^2				0.02		

Physical activity

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	-1.32	0.414	-0.172**	-1.286	0.414	-0.167**
Household income	0.441	0.164	0.146**	0.391	0.165	0.129*
Age	-0.239	0.107	-0.121*	-0.238	0.107	-0.12*
Management				0.239	0.199	0.122
General				-0.018	0.206	-0.01
Outcome				0.105	0.201	0.054
R^2	0.071**			0.096*		
ΔR^2				0.025*		

Screen time/Physical inactivity

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*

Gender identity	-0.227	0.317	-0.04	-0.288	0.32	-0.05
Household income	0.068	0.125	0.03	0.049	0.127	0.022
Age	0.089	0.082	0.061	0.074	0.082	0.05
Management				0.21	0.153	0.145
General				-0.106	0.159	-0.08
Outcome				-0.166	0.155	-0.115
R^2	0.006			0.016		
ΔR^2				0.01		

*$p < 0.05$, **$p < 0.01$

Health-Related Quality of Life

HRQOL significantly predicted physical activity after controlling for relevant covariates. Higher reported HRQOL was associated with more physical activity. HRQOL did not significantly predict any other healthy lifestyle behavior (wellness maintenance, general health behaviors, accident prevention behaviors, diet, or screen time/physical inactivity) above and beyond covariates (See Table 9).

Table 9. Regression Analyses of HRQOL and Outcome Variables

Wellness maintenance						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.006	0.002	0.169**	0.005	0.002	0.15*
Household income	0.044	0.03	0.085	0.042	0.031	0.08
HRQOL				0.002	0.003	0.057
R^2	0.038**			0.04		
ΔR^2				0.002		
General health behaviors						
	Step 1			Step 2		

Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.005	0.001	0.216**	0.005	0.002	0.189**
HRQOL				0.002	0.002	0.074
R^2	0.046**			0.051		
ΔR^2				0.005		

Accident prevention

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.007	0.002	0.211**	0.007	0.002	0.2**
HRQOL				0.001	0.003	0.031
R^2	0.045**			0.045		
ΔR^2				0		

Diet

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	-0.041	0.812	-0.003	0.128	0.816	0.009
Household income	0.723	0.336	0.122*	0.675	0.337	0.114*
HRQOL				0.045	0.027	0.095
R^2	0.015			0.024		
ΔR^2				0.009		

Physical activity

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	-0.957	0.402	-0.131*	-0.831	0.4	-0.114*
Household income	0.362	0.168	0.12*	0.316	0.167	0.104
Age	-0.188	0.111	-0.94	-0.165	0.11	-0.082
HRQOL				0.036	0.013	0.153**
R^2	0.044**			0.067**		
ΔR^2				0.023**		

	Screen time/Physical inactivity					
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender identity	-0.11	0.297	-0.021	-0.164	0.298	-0.031
Household income	0.138	0.123	0.063	0.157	0.124	0.071
Age	0.118	0.082	0.081	0.108	0.082	0.074
HRQOL				-0.015	0.01	-0.089
R^2	0.01			0.018		
ΔR^2				0.008		

*$p < 0.05$, **$p < 0.01$

Aim 2: Regression Analyses

The second aim of this study was to assess how health-related factors (HLOC, health literacy, health self-efficacy, HRQOL) predicted risky behaviors. Risky lifestyle behaviors were divided into alcohol use, substance use (in the past 3 months), tobacco use, and risky sexual behaviors (lifetime number of sex partners, condom usage in the past 3 months, sex after drinking in the past 3 months, sex under the influence of drugs in the past 3 months). Results are presented in the following section by predictor variable.

Health Locus of Control

As seen in Table 10, HLOC significantly predicted tobacco use in that higher internality was associated with less tobacco use. HLOC was not a significant predictor of any other risky behaviors after controlling for relevant covariates.

Table 10. Regression Analyses of Health Locus of Control and Outcome Variables

	Alcohol use					
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*

Social support	0.016	0.007	0.15*	0.02	0.007	0.182**
Household income	0.158	0.104	0.092	0.135	0.106	0.079
Gender identity	-0.55	0.251	-0.133*	-0.592	0.251	-0.143*
Internality				-0.088	0.044	-0.149*
Chance				0.04	0.041	0.078
Powerful others				0.04	0.045	0.07
R^2	0.056**			0.073		
ΔR^2				0.017		

Substance use

Variable	*B*	*SE B*	*β*
Internality	-0.027	0.039	-0.046
Chance	-0.028	0.038	-0.056
Powerful others	0.089	0.04	0.156*
R^2	0.015		

Tobacco use

Variable	*B*	*SE B*	*β*
Internality	-0.626	0.218	-0.183**
Chance	-0.27	0.215	-0.09
Powerful others	0.341	0.23	0.101
R^2	0.047**		

Lifetime number of sex partners

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	0.983	0.219	0.242**	1.035	0.219	0.255**
Internality				-0.102	0.14	-0.046
Chance				-0.238	0.134	-0.125
Powerful others				0.059	0.144	0.027
R^2	0.058**			0.077		
ΔR^2				0.019		

Condom use						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	-0.038	0.076	-0.104	-0.154	0.077	-0.116*
Social support	0.005	0.007	0.039	0.002	0.007	0.013
Internality				0.09	0.05	0.124
Chance				0.055	0.047	0.09
Powerful others				-0.104	0.05	-0.153*
R^2	0.012			0.036		
ΔR^2				0.024		

Sex after drinking			
Variable	*B*	*SE B*	*β*
Internality	-0.041	0.053	-0.053
Chance	0.041	0.05	0.062
Powerful others	0.065	0.053	0.087
R^2	0.013		

Sex under influence of drugs			
Variable	*B*	*SE B*	*β*
Internality	-0.012	0.07	-0.013
Chance	-0.073	0.066	-0.087
Powerful others	0.051	0.07	0.053
R^2	0.006		

*$p < 0.05$, **$p < 0.01$

Health Literacy

Health literacy was not a significant predictor of any risky behaviors (alcohol use, substance use, tobacco use, lifetime number of sex partners, condom use, sex after drinking, or

sex under influence of drugs) after controlling for relevant covariates. Complete results are presented in Table 11.

Table 11. Regression Analyses of Health Literacy and Outcome Variables

Alcohol use						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.014	0.006	0.134*	0.014	0.007	0.135*
Household income	0.142	0.099	0.085	0.152	0.1	0.091
Gender identity	-0.628	0.243	-0.154*	-0.597	0.245	-0.146*
Functional				-0.265	0.321	-0.05
Communicative				-0.126	0.293	-0.03
Critical				0.26	0.277	0.061
R^2	0.056**			0.061		
ΔR^2				0.005		

Substance use			
Variable	*B*	*SE B*	*β*
Functional	0.281	0.306	0.051
Communicative	-0.207	0.264	-0.047
Critical	0.176	0.276	0.038
R^2	0.004		

Tobacco use			
Variable	*B*	*SE B*	*β*
Functional	-0.011	1.808	0
Communicative	0.753	1.553	0.028
Critical	0.646	1.634	0.023
R^2	0.002		

Lifetime number of sex partners						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*

Age	1.003	0.217	0.243**	0.996	0.218	0.241**
Functional				-0.81	1.047	-0.042
Communicative				-0.061	0.887	-0.004
Critical				0.198	0.913	0.013
R^2	0.059**			0.061		
ΔR^2				0.002		

Condom use

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	-0.143	0.075	-0.108	-0.154	0.076	-0.116*
Social support	0.005	0.007	0.038	0.001	0.008	0.009
Functional				0.104	0.36	0.017
Communicative				0.53	0.348	0.099
Critical				-0.178	0.319	-0.034
R^2	0.013			0.021		
ΔR^2				0.008		

Sex after drinking

Variable	*B*	*SE B*	*β*
Functional	0.309	0.372	0.048
Communicative	-0.5	0.315	-0.101
Critical	0.621	0.329	0.119
R^2	0.016		

Sex under influence of drugs

Variable	*B*	*SE B*	*β*
Functional	-0.422	0.505	-0.049
Communicative	-0.124	0.421	-0.019
Critical	0.894	0.44	0.129*
R^2	0.016		

*$p < 0.05$, **$p < 0.01$

Health Self-Efficacy

Health self-efficacy was not a significant predictor of any risky behaviors (alcohol use, substance use, tobacco use, lifetime number of sex partners, condom use, sex after drinking, or sex under influence of drugs) after controlling for relevant covariates. Complete results are presented in Table 12.

Table 12. Regression Analyses of Health Self-efficacy and Outcome Variables

Alcohol use						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.014	0.007	0.133*	0.006	0.007	0.057
Household income	0.219	0.101	0.134*	0.211	0.101	0.129*
Gender identity	-0.378	0.264	-0.088	-0.359	0.265	-0.083
Management				0.197	0.136	0.18
General				-0.077	0.133	-0.077
Outcome				0.062	0.125	0.059
R^2	0.048**			0.070		
ΔR^2				0.022		

Substance use			
Variable	*B*	*SE B*	*β*
Management	-0.133	0.127	-0.11
General	0.061	0.136	0.054
Outcome	0.006	0.131	0.005
R^2	0.005		

Tobacco use			
Variable	*B*	*SE B*	*β*
Management	-1.719	0.6	-0.233*
General	1.178	0.803	0.172

Outcome	-0.057	0.773	-0.008
R^2	0.017		

Lifetime number of sex partners

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	0.989	0.221	0.241**	0.962	0.222	0.235**
Management				0.524	0.417	0.13
General				-1.088	0.428	-0.292*
Outcome				0.614	0.414	0.153
R^2	0.058**			0.077		
ΔR^2				0.019		

Condom use

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	-0.137	0.077	-0.103	-0.135	0.077	-0.101
Social support	0.003	0.008	0.019	-0.003	0.008	-0.022
Management				-0.055	0.157	-0.041
General				0.235	0.154	0.19
Outcome				-0.031	0.145	-0.024
R^2	0.011			0.029		
ΔR^2				0.018		

Sex after drinking

Variable	*B*	*SE B*	*β*
Management	-0.031	0.155	-0.022
General	0.113	0.161	0.088
Outcome	-0.147	0.15	-0.108
R^2	0.005		

Sex under influence of drugs

Variable	*B*	*SE B*	*β*

Management	0.246	0.209	0.131
General	0.143	0.217	0.083
Outcome	-0.283	0.208	-0.157
R^2	0.012		

*$p < 0.05$, **$p < 0.01$

Health-Related Quality of Life

HRQOL significantly predicted substance use, tobacco use, and condom use after controlling for relevant covariates. Higher HRQOL was associated with lower substance use, lower tobacco use, and higher condom use. HRQOL was not a significant predictor of alcohol use, lifetime number of sex partners, sex after drinking, or sex under influence of drugs. Complete results are presented in Table 13.

Table 13. Regression Analyses of HRQOL Predicting Outcome Variables

Alcohol use						
	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Social support	0.017	0.007	0.162*	0.022	0.007	0.205**
Household income	0.142	0.104	0.085	0.157	0.104	0.094
Gender identity	-0.517	0.252	-0.127*	-0.596	0.254	-0.146*
HRQOL				-0.017	0.009	-0.129
R^2	0.057**			0.071		
ΔR^2				0.014		

Substance use			
Variable	*B*	*SE B*	*β*
HRQOL	-0.024	0.008	-0.172
R^2	0.03**		

Tobacco use

Variable	*B*	*SE B*	*β*
HRQOL	-0.191	0.051	-0.203**
R^2	0.041**		

Lifetime number of sex partners

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	1.038	0.218	0.259**	1.037	0.219	0.259**
HRQOL				-0.001	0.027	-0.003
R^2	0.067**			0.067		
ΔR^2				0		

Condom use

	Step 1			Step 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Age	-0.178	0.078	-0.134*	-0.164	0.077	-0.146*
Social support	0.003	0.007	0.027	-0.003	0.008	-0.021
HRQOL				0.023	0.01	0.143*
R^2	0.019			0.037*		
ΔR^2				0.018*		

Sex after drinking

Variable	*B*	*SE B*	*β*
HRQOL	-0.013	0.01	-0.077
R^2	0.006		

Sex under influence of drugs

Variable	*B*	*SE B*	*β*
HRQOL	-0.014	0.013	-0.064
R^2	0.004		

*$p < 0.05$, **$p < 0.01$

Aim 3: Moderation Analyses

The third aim of this study was to determine the moderating effect of the presence of a chronic condition on associations between the previously described factors (HLOC, health literacy, health self-efficacy, HRQOL) and healthy lifestyle behaviors. Healthy lifestyle behaviors were divided into wellness maintenance, general health behaviors, accident prevention behaviors, dietary behaviors, and physical activity (exercise and screen time/physical inactivity). Results are presented in the following section by predictor variable. As described by Holmbeck (2002), post hoc probing analyses were conducted for any significant interactions to determine which of the simple slopes differed from zero.

Health Locus of Control

Analyses found that chronic condition status was a significant moderator of the association between HLOC and screen time/physical inactivity, $\Delta R^2 = 0.012$, $\Delta F(1, 325) = 3.940$, $p = 0.048$. As illustrated in Figure 6, the simple slope for the chronic condition group was significant, $b = 0.102$, $t(325) = 3.132$, $p = 0.002$; higher HLOC was associated with more screen time/physical inactivity in students with a chronic condition. The simple slope for the no chronic condition group was not significant, $b = 0.028$, $t(325) = 1.543$, $p = 0.124$.

Chronic condition status did not have a significant moderating effect on the association between HLOC and wellness maintenance behaviors, general health behaviors, accident prevention behaviors, diet, or physical activity.

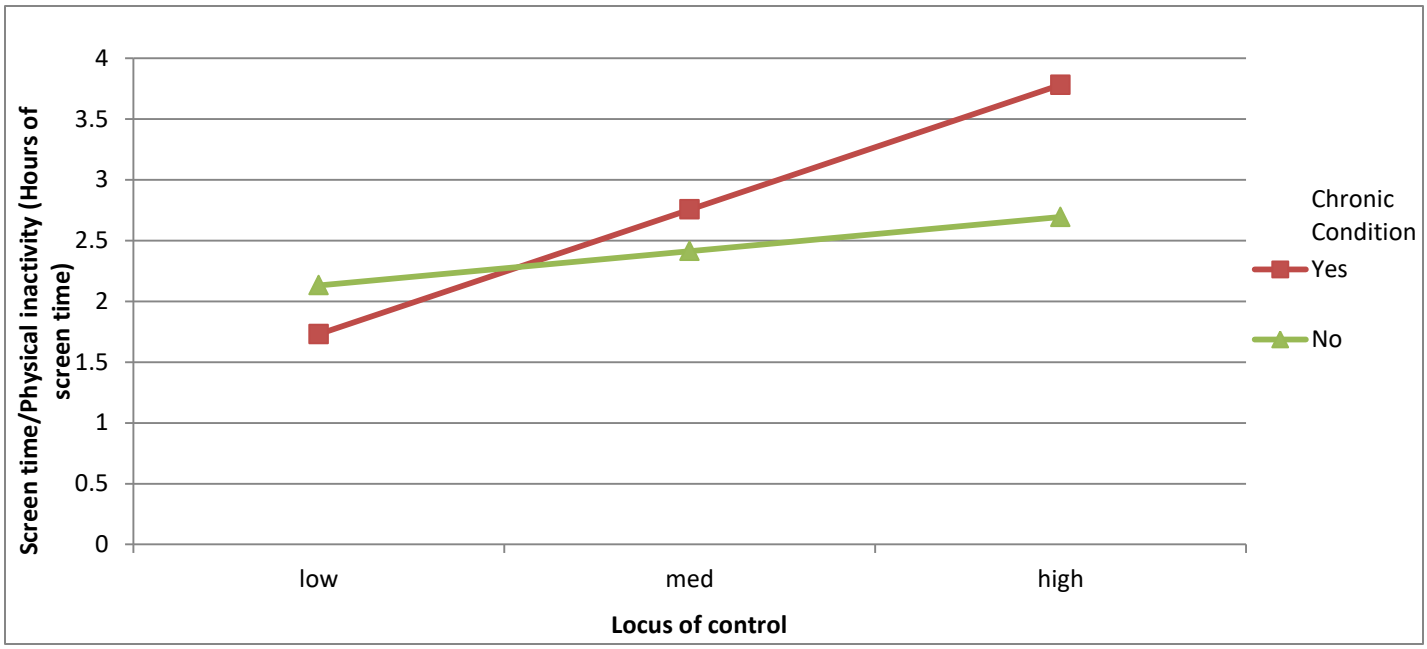

Figure 6. Simple slopes of moderation of chronic condition status on HLOC and screen time/physical inactivity

Health Literacy

An analysis with health literacy, chronic condition status, and social support revealed that chronic condition was a significant moderator in the association between health literacy and accident prevention behaviors, $\Delta R^2 = 0.022$, $\Delta F(1, 317) = 7.933$, $p = 0.005$. As illustrated in Figure 7, the simple slope for the chronic condition group was significant, $b = 0.353$, $t(317) = 4.398$, $p < 0.001$. The simple slope for the no chronic condition group was also significant, $b = 0.102$, $t(317) = 2.436$, $p = 0.015$. Chronic condition status was also a significant moderating variable in the association between health literacy and diet, $\Delta R^2 = 0.012$, $\Delta F(1, 330) = 4.057$, $p = 0.045$. The simple slope for the chronic condition group was significant, $b = 1.903$, $t(330) = 2.457$, $p = 0.015$, such that the association between health literacy and diet was stronger for those with chronic conditions (Figure 8). The simple slope for the no chronic condition group was not significant, $b = 0.094$, $t(330) = 0.206$, $p = 0.837$.

Moderation analyses revealed that chronic condition status was not a significant moderator in the association between health literacy and wellness maintenance behaviors, general health behaviors, physical activity, or screen time/physical inactivity.

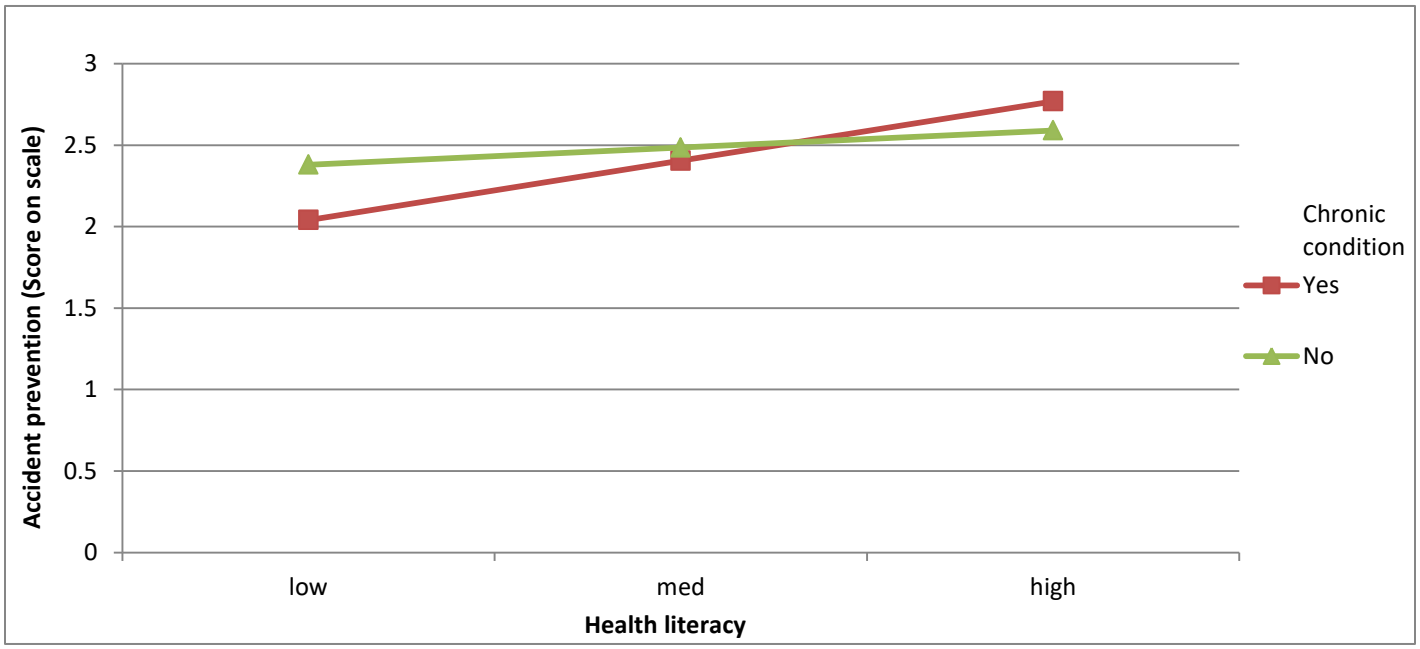

Figure 7. Simple slopes of moderation of chronic condition status on health literacy and accident prevention

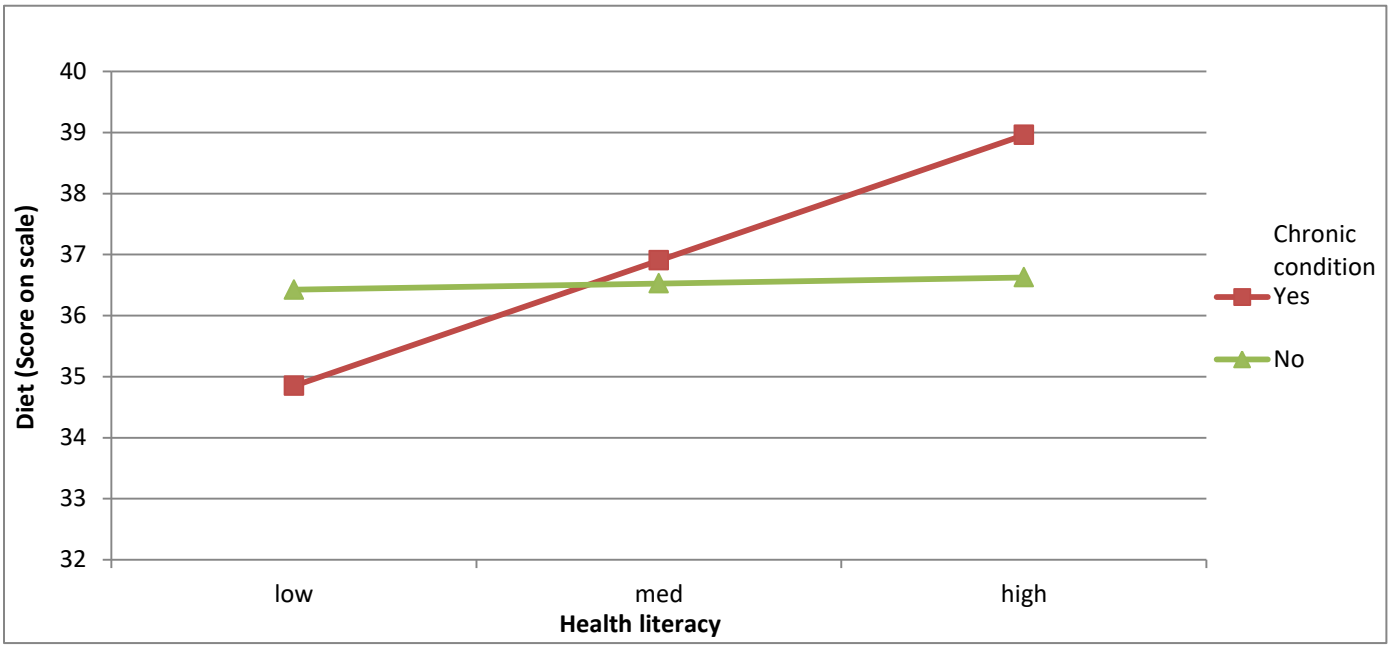

Figure 8. Simple slopes of moderation of chronic condition status on health literacy and diet

Health Self-Efficacy

Health self-efficacy and chronic condition were entered into step 2, along with social support and income as control variables in step 1. Chronic condition status had a significant moderating effect in the association between health self-efficacy and wellness maintenance behaviors, $\Delta R^2 = 0.015$, $\Delta F(1, 283) = 4.67$, $p = 0.032$. As illustrated in Figure 9, the association between health self-efficacy and wellness maintenance differed across levels of self-efficacy regardless of chronic condition status. The simple slope for the chronic condition group was significant, $b = 0.056$, $t(283) = 3.92$, $p < 0.001$. The simple slope for the no chronic condition group was also significant, $b = 0.022$, $t(283) = 2.692$, $p = 0.008$. Chronic condition was a significant moderating variable in the association between health self-efficacy and diet, $\Delta R^2 = 0.017$, $\Delta F(1, 311) = 5.52$, $p = 0.019$. The simple slope for the chronic condition group was significant, $b = 0.414$, $t(311) = 2.645$, $p = 0.009$, such that the association between health self-

efficacy and diet was stronger for those with chronic conditions (Figure 10). The simple slope for the no chronic condition group was not significant, b = -0.003, $t(311)$ = -0.035, p = 0.972.

Moderation analyses revealed that chronic condition status did not significantly moderate the association between health self-efficacy and general health behaviors, accident prevention behaviors, physical activity, or screen time/physical inactivity.

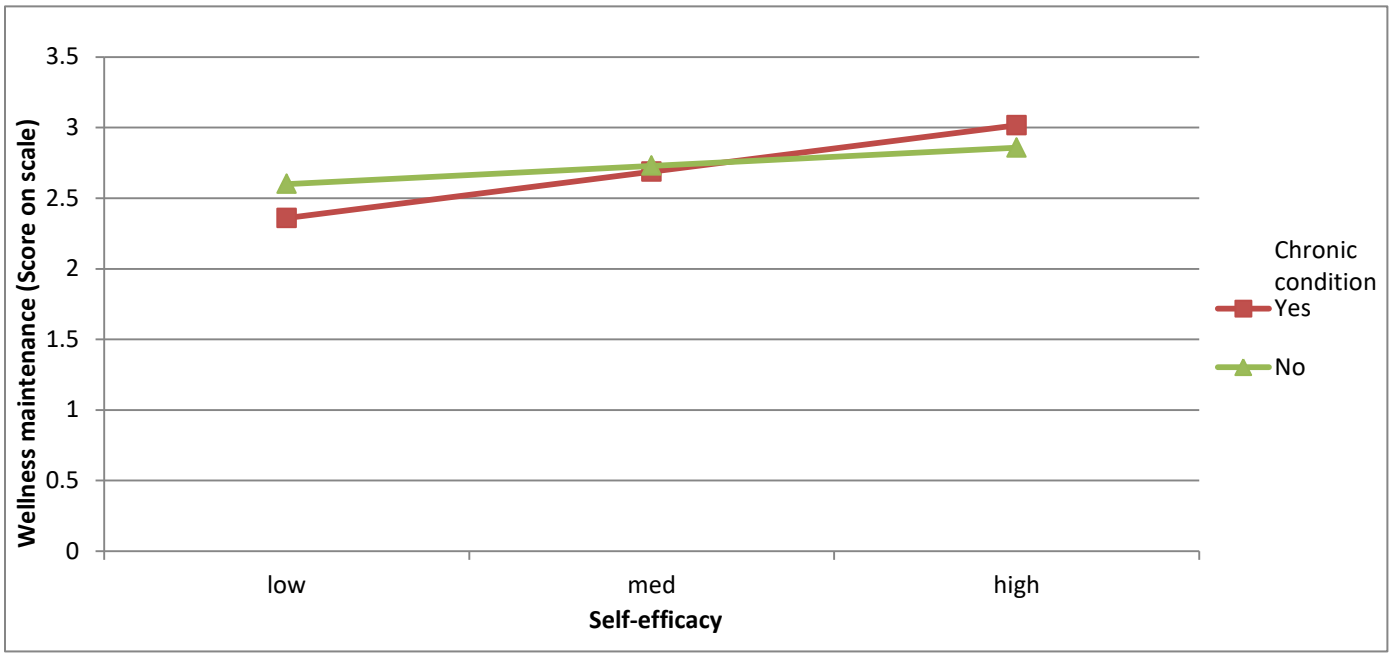

Figure 9. Simple slopes of moderation of chronic condition status on self-efficacy and wellness maintenance

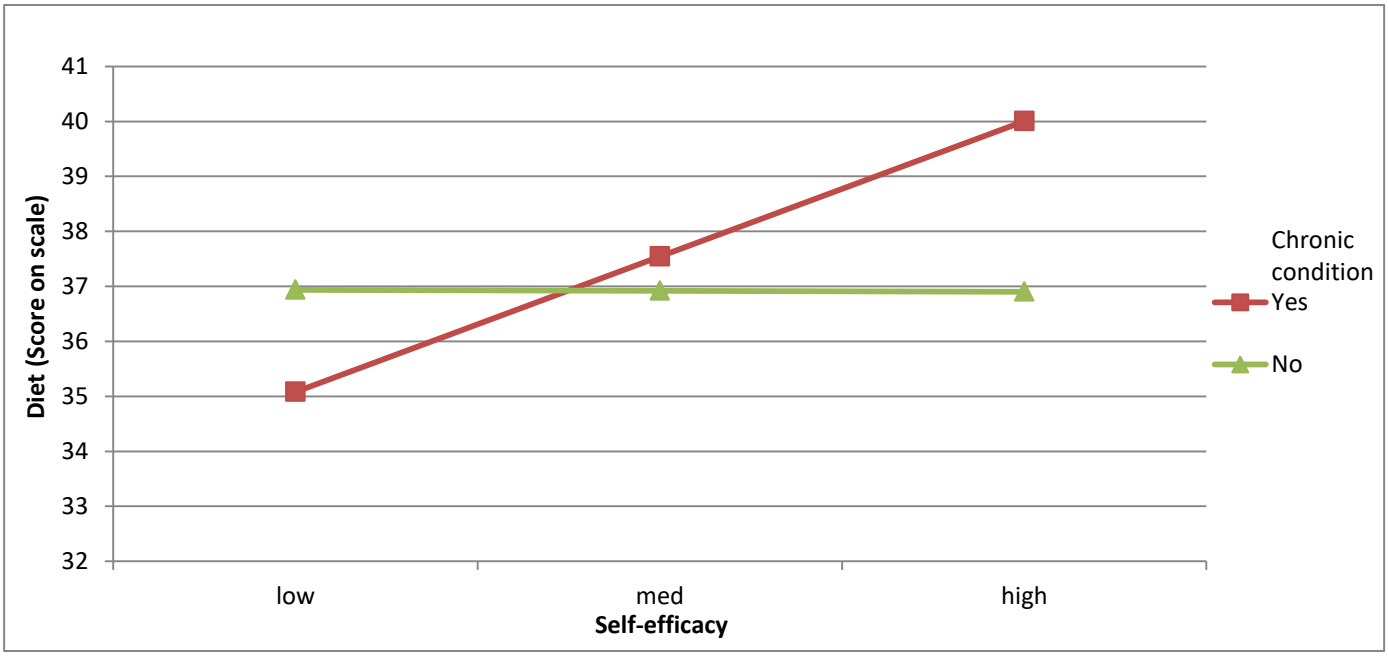

Figure 10. Simple slopes of moderation of chronic condition status on self-efficacy and diet

Health-Related Quality of Life

A hierarchical regression analysis evaluated the influence of chronic condition on the association between HRQOL and healthy lifestyle behaviors. HRQOL and chronic condition were entered into step 2, along with any covariates in step 1. The interaction term was entered into step 3. Chronic condition did not significantly moderate any associations between HRQOL and healthy lifestyle behaviors.

Aim 4: Moderation Analyses

The final aim of this study was to determine the moderating effect of the presence of a chronic condition on associations between the previously described factors (HLOC, health literacy, health self-efficacy, HRQOL) and risky behaviors. Risky lifestyle behaviors were divided into alcohol use, substance use (in the past 3 months), tobacco use, and risky sexual behaviors (lifetime number of sex partners, condom usage in the past 3 months, sex after

drinking in the past 3 months, sex under the influence of drugs in the past 3 months). Results are presented in the following section by predictor variable.

Health Locus of Control

An analysis with HLOC and chronic condition status in step 1 found that chronic condition status was a significant moderator of the association between HLOC and sex after drinking, $\Delta R^2 = 0.13$, $\Delta F(1, 289) = 4.045$, $p = 0.045$. As illustrated in Figure 11, the simple slope for the chronic condition group was significant, $b = 1.508$, $t(289) = 2.411$, $p = 0.017$; those with chronic conditions were more likely to engage in sex after drinking too much as locus of control increased. The simple slope for the no chronic condition group was not significant, $b = 0.006$, $t(289) = 0.284$, $p = 0.776$.

A hierarchical regression analysis revealed that chronic condition status did not have a significant moderating effect on the association between HLOC and alcohol use, substance use, or tobacco use, lifetime number of sex partners, condom use, or sex under the influence of drugs.

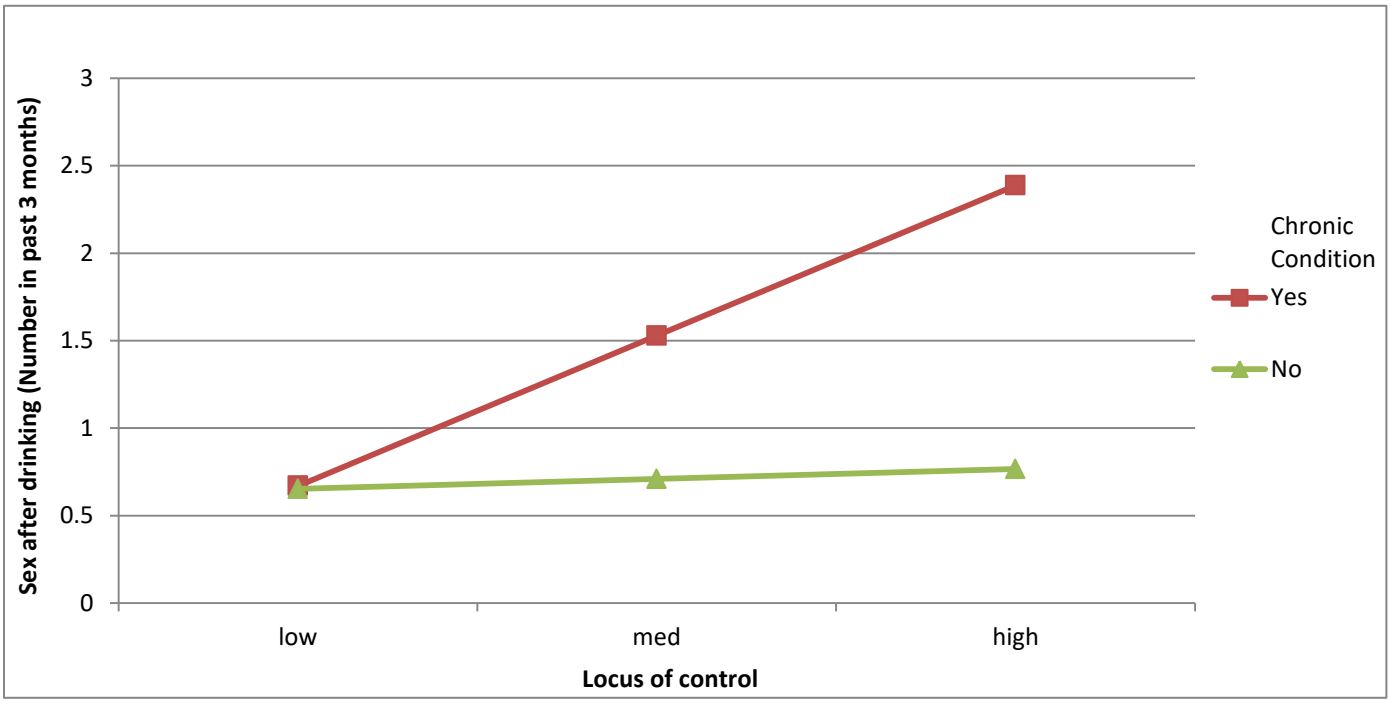

Figure 11. Simple slopes of moderation of chronic condition status on locus of control and sex after drinking

Health Literacy

Hierarchical regression analysis evaluated the influence of chronic condition status on the association between health literacy and risky behaviors. Health literacy and chronic condition status were entered into step 2, along with any covariates in step 1. The interaction term was entered into step 3. Chronic condition status did not have a significant moderating effect on the association between health literacy and substance-related risky behaviors (alcohol use, substance use, tobacco use) or between health literacy and risky sexual behaviors (lifetime number of sex partners, condom use, sex after drinking, sex under influence of drugs).

Health Self-Efficacy

An analysis evaluated health self-efficacy, chronic condition status, and age. Chronic condition status significantly moderated the association between health self-efficacy and condom

use, $\Delta R^2 = 0.018$, $\Delta F(1, 288) = 5.362$, $p = 0.021$. As seen in Figure 12, the simple slope for the no chronic condition group was significant, $b = 0.084$, $t(288) = 3.045$, $p = 0.003$, such that as self-efficacy increased, condom use also increased. The simple slope for the chronic condition group was not significant, $b = -0.093$, $t(288) = -1.734$, $p = 0.084$.

Analyses revealed that chronic condition status did not have a significant moderating effect on the association between health self-efficacy and alcohol use, substance use, tobacco use, lifetime number of sex partners, sex after drinking, or sex under the influence of drugs.

Figure 12. Simple slopes of moderation of chronic condition status on self-efficacy and condom use

Health-Related Quality of Life

Hierarchical regression analyses evaluated the influence of chronic condition status on the association between HRQOL and risky behaviors. HRQOL and chronic condition were entered into step 2, along with any relevant covariates in step 1. The interaction term was entered into step 3. Chronic condition status did not significantly moderate the association

between HRQOL and substance-related risky behaviors (alcohol use, substance use, tobacco use) or risky sexual behaviors (lifetime number of sex partners, condom use, sex after drinking, sex under influence of drugs).

Discussion

The current study examined how health-related factors predicted health behaviors among college students with and without chronic conditions. Results suggest that a number of study hypotheses were supported. For instance, aspects of HLOC, health literacy, and HRQOL were significant predictors of both healthy lifestyle behaviors and risky behaviors. In terms of chronic condition status, our hypothesis was supported in that chronic condition status served as a moderator in associations between HLOC, health literacy, and health self-efficacy and our outcome variables, healthy lifestyle behaviors and risky behaviors. Differences in reported health-related factors and health behaviors may also be due to the nature of specific chronic conditions. Findings are discussed in further detail below based on each health-related factor.

Health Locus of Control

In this sample of college students, we found that HLOC predicted a number of healthy lifestyle behaviors. Specifically, higher internality was associated with more general health behaviors and accident prevention behaviors. Higher external locus of control was also associated with more screen time/physical inactivity. These findings are consistent with previous literature, in that higher levels of internal locus of control have been associated with more preventative health behaviors in samples of college students from several universities across the United States (Masters & Wallston, 2005; Marr & Wilcox, 2015). In the study conducted by Marr and Wilcox (2015), higher internal locus of control significantly and positively predicted physical activity. As such, it was also expected in our study that students

who reported higher external locus of control would exhibit more physical inactivity. This expectation was due to research that suggests individuals with an external orientation are less likely to engage in preventative health behaviors. The reverse, however, was not supported by our findings; higher internality did not predict more physical activity in our sample. It may be that this particular sample of college students was physically active, regardless of their internality. This particular sample reported an average of 2.7 days of regular physical activity (at least 60 minutes per day) and 1.9 days of resistance training per week. Based on the Physical Activity Guidelines for Americans (US Department of Health and Human Services, 2008), our sample of students met the minimum guidelines of 150 minutes of aerobic activity and at least 2 days of muscle-strengthening per week. In terms of other healthy lifestyle behaviors (general health behaviors, accident prevention), however, our findings were consistent with previous literature suggesting that an internal locus of control is predictive of engaging in preventative health behaviors.

With respect to risky behaviors, findings suggested that HLOC predicted tobacco use, in that higher internality was associated with lower tobacco use. This finding is similar to previous literature that has found that non-smoking college students reported higher internal HLOC than smokers (Martinelli, 2003). Results in our study did not suggest any significant findings between HLOC and other risky behaviors. Similarly, a study with German university students did not find that an internal HLOC was associated with drinking or illicit drug use (Helmer, Kramer, Mikolajczyk, 2012). The authors of that study stated that their finding was consistent with other literature suggesting that internal HLOC has stronger effects on health maintenance behavior than risk behaviors (Steptoe & Wardle, 2001). As such, the findings from our study tie in well with existing literature, in that internality was not predictive of risky behaviors.

In accordance with our third and fourth aims, in which we examined chronic condition status role as a moderator, findings suggested that chronic condition status served as a moderator in the associations between HLOC and screen time/physical activity and between HLOC and sex after drinking. Findings suggested that higher HLOC was associated with more screen time/physical inactivity in students with a chronic condition. This association is partially supported by the previous literature in that having a higher internal HLOC has not been consistently associated with better health outcomes, at least in pediatric and adult populations with chronic conditions such as cancer (Nazareth et al., 2015; Burish et al., 1984). It may be that by having a high degree of perceived control, students in the current study chose not to engage in more physical activity, possibly due to the nature of their chronic condition. For instance, it would make sense that some students would choose to avoid physical activity in order to prevent exacerbating symptoms, such as in asthma. In other conditions, such as obesity, avoiding physical activity may actually be detrimental to overall health.

Additionally, students with a chronic condition were more likely to engage in sex after drinking as their HLOC increased. These findings are supported by previous literature linking higher internal locus of control with higher drug use and increased likelihood of engaging in risky sexual behaviors in college students (Burnett et al., 2014). Paradoxically, the findings in our study and the study conducted by Burnett and colleagues (2014) suggest that an internal orientation also predicts risky behaviors as well as preventative behaviors. In the current study, this discrepancy could be explained due to having a chronic condition. Other findings have suggested that adolescents with chronic conditions tend to engage in riskier behaviors than their peers without chronic conditions (Suris & Parera, 2005). In our sample, college students with chronic conditions could be engaging in more drinking behavior, which could lead to riskier

sexual behaviors. Research has generally found that alcohol use positively predicts sexual hookups (Dvorak et al., 2016). Additionally, it is possible that by having higher HLOC, students may perceive that they can be in control of their sexual behaviors after drinking, though there is no existing literature to date that supports this theory.

Health Literacy

We also found that higher levels of health literacy predicted a greater number of wellness maintenance behaviors, general health behaviors, accident prevention behaviors, and more physical activity. These findings support our first aim in which we hypothesized that higher levels of health literacy would be associated with a greater number of healthy lifestyle behaviors. To date, studies of health literacy have primarily examined its association with medication adherence in adolescent samples (Murphy et al., 2010; Dharmapuri et al., 2015). Our current study, at least to our knowledge, is one of the first to establish an association between health literacy and health behaviors, conceptualized in this study as wellness maintenance behaviors, general health behaviors, and accident prevention behaviors. In terms of physical activity, this finding is supported by previous literature in a sample of Japanese adults which found that higher levels of health literacy were associated with more exercise (Suka et al., 2015). Health literacy seems to be a promising factor in intervention work with college students that warrants further research. For instance, as many college students are newly and solely responsible for managing their health, it would be advantageous to evaluate and increase health literacy in college students in order to specifically target healthy lifestyle behaviors. By increasing health literacy, college students may better understand any relevant health information that would allow them to make better informed decisions about their health (Peerson & Saunders, 2009). Additionally, having

increased health literacy would allow college students to feel more empowered to promote and maintain positive health outcomes (Nutbeam, 2008).

Our second aim, in which we hypothesized that higher levels of health literacy would be associated with fewer risky behaviors, was not supported. Results suggested that health literacy was not a significant predictor of any risky behaviors measured (alcohol use, substance use, tobacco use, lifetime number of sex partners, condom use, sex after drinking, or sex under influence of drugs). Although there is a dearth of research on health literacy and risky behaviors, other studies have found higher health literacy to be associated with fewer risky behaviors. For instance, in a sample of Japanese adults, higher levels of health literacy were associated with less smoking and drinking (Suka et al., 2015). A different study found that higher health literacy was associated with higher risky sexual behaviors in a sample of middle-aged and older adults (Graf & Patrick, 2013). Our findings from the current study suggest that health literacy may not be associated with these behaviors. Further replication and research is warranted to confirm whether associations exist between health literacy and risky behaviors in college samples, especially since there are few published studies that investigate health literacy in this population (Raquel, 2014; Bakker, Koffel, & Theis-Mahon, 2017).

Moderation analyses revealed that chronic condition status was a significant moderator in associations between health literacy and accident prevention behaviors and between health literacy and dietary behavior. Findings suggested that the association between health literacy and accident prevention behaviors was stronger for students with a chronic condition. In this sample, students with chronic conditions who had higher health literacy reported more accident prevention behaviors than students without a self-reported chronic condition. Additionally, students with chronic conditions with lower health literacy were more likely to report fewer

accident prevention behaviors in comparison to students without a chronic condition. Perhaps with higher health literacy, students with chronic conditions were more aware of potential health consequences and thus exhibited more accident prevention behaviors. These findings build upon existing literature, which previously was unclear as to whether having higher levels of health literacy contributed to using health information in health-promoting ways (Peerson & Saunders, 2009). If students with chronic conditions have higher health literacy, then they may be more likely to exhibit a greater number of accident prevention behaviors due to a better understanding of health knowledge. On the other hand, college students low in health literacy may not fully understand those potential health consequences, which might include the severity or impact of their chronic condition. This could explain why college students with chronic conditions are likely to exhibit fewer accident prevention behaviors than college students without a chronic condition.

Similar to the association between health literacy and accident prevention behaviors, chronic condition status was a significant moderator in the association between health literacy and dietary behavior. College students with a chronic condition were more likely than those without a chronic condition to exhibit a greater number of healthy eating behaviors at high levels of health literacy which is consistent with research suggesting that dietary behaviors may aggravate or alleviate symptoms of chronic conditions (World Health Organization, 2003). Therefore, students with chronic conditions would benefit from being more aware of the importance of dietary behaviors in comparison to their healthy peers. Based on these findings, health literacy may be an important construct for students with chronic conditions, especially with respect to accident prevention behaviors and dietary behaviors.

Health Self-Efficacy

Based on the results of the current study, our first and second aims were not supported within the context of health self-efficacy. Specifically, health self-efficacy did not significantly predict any healthy lifestyle behavior or risky behavior. These findings were surprising given self-efficacy's well-documented and consistent role in predicting health behaviors in adults (Strecher et al., 1986). Self-efficacy has been used to predict a host of health behaviors, ranging from physical activity in adults (Corwyn & Benda, 1999) to sexual behaviors in college students (Downing-Matibag & Geisinger, 2009). Findings from the current study suggest that health self-efficacy may not be as important in predicting these behaviors among college students in our sample, which is contrary to published reports (Westmaas, Gil-Rivas, & Silver, 2011; Clark & Dodge, 1999).

One possible explanation for this discrepancy is that the scale used in our study to measure self-efficacy was not an effective tool, especially considering the fact that the Chronic Disease Self-Efficacy Scale (Lorig et al., 1996) was modified for use in this study. The CDSES was originally intended to examine self-efficacy in the context of chronic disease. For the current study, the scale was modified given that our sample included students with and without chronic conditions. As such, any instance of the word "disease" was replaced with "health" in order for the items to be easily answered by any participant. After running a Cronbach's alpha test to assess internal reliability, the modified CDSES scale had an overall consistency of $\alpha = 0.98$. Although internal reliability was high, there could be issues with construct validity or other aspects of validity with the modified CDSES scale.

Interestingly, however, chronic condition status moderated associations between health self-efficacy and wellness maintenance, dietary behavior, and condom usage. In terms of wellness maintenance behaviors, post-hoc tests revealed that both the chronic condition group

and no chronic condition group had significant simple slopes that differed from zero. This suggests that regardless of the presence of a chronic condition, self-efficacy influences the number of wellness maintenance behaviors. Another way to interpret this finding is that there is an interaction effect (Vanderweele & Knol, 2014) in which health self-efficacy and chronic condition status have a combined effect on wellness maintenance behaviors. In studies with healthy populations, higher self-efficacy has also been associated with maintaining diet, physical activity, and safe-sex practices (Westmaas, Gil-Rivas, & Silver, 2011). Other studies have shown that higher self-efficacy has been associated with more self-management behaviors in certain conditions such as type I diabetes in adolescents and COPD in older adult populations (Nouwen, Urquhart-Law, Hussain, McGovern, & Napier, 2009; Hartman, ten Hacken, Boezen, & de Greef, 2013). Therefore, our findings are consistent with previous literature involving populations with and without chronic conditions; higher self-efficacy seems to be associated with higher wellness maintenance behaviors regardless of a college student's chronic condition status.

Additionally, chronic condition status significantly moderated the association between self-efficacy and dietary behavior. We did not find a change in dietary behavior across levels of self-efficacy for the no chronic condition group. For students with chronic conditions, high levels of self-efficacy were significantly associated with more healthy dietary behaviors. Furthermore, we found that for students with chronic conditions, low levels of self-efficacy were associated with fewer healthy dietary behaviors compared to their peers without chronic conditions. As previously stated, an individual's diet can have an impact on their chronic condition symptoms, such as in obesity, diabetes, cardiovascular disease, and cystic fibrosis (World Health Organization, 2003). In order to manage these symptoms, it is important that students with chronic conditions maintain a high belief in their individual ability to change and

maintain their diet according to medical guidelines. If self-efficacy is low, then individuals may perceive that they cannot change their own health (Conner & Norman, 2005). Being able to increase self-efficacy is especially important since our findings suggest that students with chronic conditions with low levels of self-efficacy have less healthy dietary behaviors than their peers without chronic conditions.

Lastly, chronic condition status was a significant moderator in the association between self-efficacy and condom use. Although post-hoc probing revealed the simple slope for the chronic condition group was not statistically significant, results showed a trend in that students with chronic conditions were less likely to use condoms as self-efficacy increased. In students without chronic conditions, we found that higher self-efficacy was associated with more condom use. Previous research has generally found that higher levels of self-efficacy were associated with higher contraceptive use and abstinence in adolescent samples (Wang el al., 2003; DiIorio et al., 2004). Adolescents with chronic conditions, however, have been found to be more likely than their healthy peers to engage in risky sexual behaviors (Valencia & Cromer, 2000; Suris & Parera, 2005). Our findings in the current study suggest that higher levels of self-efficacy may not be effective in promoting condom use, at least in this population of college students with a chronic condition. When considering self-efficacy, individuals with higher self-efficacy have a greater belief in their ability to achieve certain outcomes (Bandura, 1977). Perhaps students in this sample with high self-efficacy have an erroneous perception of their ability to manage personal health, despite the challenges of managing a chronic condition. One study has shown that college students tend to underestimate their sexual risk in relation to their peers (Chapin, 1999). As a result of this false perception, these students would paradoxically engage in riskier sexual behaviors and exhibit less condom use. Further research is warranted to elucidate the

mechanisms by which higher self-efficacy is associated with more risky sexual behaviors, especially in samples of college students with chronic conditions.

Health-Related Quality of Life

With respect to HRQOL, our results suggested that this construct only significantly predicted physical activity. In previous studies, HRQOL has been assessed as a primary or secondary outcome, or has been examined with physical inactivity (Dey et al., 2014). In other studies, physical activity itself was not associated with HRQOL in a sample of students aged 18 to 24 (Zahran et al., 2007). In contrast, findings from our study would suggest that having higher HRQOL positively predicts higher levels of physical activity. Since HRQOL consists of physical, psychological, and social functioning (Sprangers, 2002), individuals who report higher levels of HRQOL are likely to also report more physical activity. In terms of improving both HRQOL and physical activity, it may be worthwhile to encourage college students to utilize athletic equipment and facilities on campus. It may be easier for some college students to engage in higher physical activity if those opportunities are provided on campus, which in turn could improve their HRQOL.

In the associations between HRQOL and risky behaviors, our second aim was supported. Results suggested that higher HRQOL was associated with less substance use and tobacco use, and that higher HRQOL was associated with more condom use. These findings are supported by previous literature in that higher numbers of risky behaviors are generally associated with below average physical and mental QOL (Dey et al., 2014; Zahran et al., 2007). In those studies, however, some discrepancies exist in sexual risk behaviors; one study found that sexual intercourse without a condom was not associated with QOL in a sample of Swiss men (Dey et al., 2014). Another study found that individuals who engage in risky sex behaviors reported

significantly more physical and mentally unhealthy days in a sample of students aged 18-24 (Zahran et al., 2007). Findings from the current study expand this area of the literature in that higher HRQOL was associated with less risky sexual behavior, specifically with more condom use. It may be that sexual health is an important aspect of QOL for college students. A study by Flynn and colleagues (2016) found that sexual health behaviors and sexual satisfaction were associated with QOL in a sample of adults in the U.S. As such, one's HRQOL may be an indicator of sexual health, which includes condom use.

Moderation analyses revealed that chronic condition status was not a significant moderator in the association between HRQOL and healthy lifestyle behaviors or risky behaviors. This is inconsistent with previous literature suggesting that having a chronic condition is associated with lower QOL (Fortin et al., 2004; Megari, 2013). Therefore, it was hypothesized that HRQOL should differ in associations with both healthy lifestyle behaviors and risky behaviors based on chronic condition status. It is unclear why chronic condition status was not a significant moderating variable in associations between HRQOL and health behaviors in this study. A possible explanation could be that in students with chronic conditions, other personal factors could buffer any negative effects their chronic condition may have on their HRQOL. One potential factor is that of self-determination, which includes autonomous behaviors and beliefs that lead to control over one's life (Wehmeyer & Schwartz, 1997). Studies have shown that self-determination is a dimension of QOL (Verdugo et al., 2005). One study in particular found that self-determination was an important factor that impacted HRQOL for young adults with chronic conditions and disabilities (McDougall, Evans, & Baldwin, 2010). It is possible that other personal factors not investigated in this study could have affected the associations between HRQOL and health behaviors in students with chronic conditions.

Limitations

Several limitations of this study should be noted. Limitations include a relatively small sample size from a Mid-Atlantic university in an urban environment. Thus, these findings may not generalize beyond this sample of undergraduate students with and without chronic conditions, and should be replicated in a larger sample of diverse students from multiple areas. This study was also conducted at a university in an urban environment. Differences in reported healthy lifestyle behaviors and risky behaviors could differ depending on location, such as in a college town or geographic region in the U.S. Also in terms of demographics, the sample was mostly female (66.1%), which may affect generalizability. Another limitation is that the design of the study was cross-sectional, which does not allow for analysis of behavior change over time. Furthermore, this study included college students from all class standings, freshman to senior, and we did not examine differences between class standings. Our analyses controlled for age as a covariate, but there could be differences between academic class standings. For example, freshman students may not be as adjusted to college life and less familiar with college health resources compared to senior students, regardless of their age.

Sample sizes within each chronic condition were also not large enough to allow significant comparisons between groups. For instance, only 1.8% of students with chronic conditions reported having diabetes, and 5.4% reported having allergic rhinitis. Health behaviors may differ based on the nature of the condition, and generalizing such findings to all students with chronic conditions may be inaccurate. Previous studies have found differences between conditions in terms of self-efficacy and HLOC (Burish et al., 1984; Marks, Allegrante, & Nourig, 2005; Hartman, ten Hacken, Boezen, & de Greef, 2013). This study did not examine

differences between these chronic condition groups, which is a potential avenue for further research.

There were also issues with low reliability for several of the subscales used in this study. Namely, the Cronbach's α reliability coefficients were below the commonly accepted threshold of 0.7 (Kline, 2000) for all three subscales of the MHLC, the functional health literacy subscale of the AAHLS, and the accident prevention and general behavior subscales of the HBQ. With Cronbach's α coefficients below 0.7, these subscales have low internal consistency, suggesting that the items may not completely measure the same latent variable in each subscale. As such, any conclusions drawn from these subscales should be interpreted with caution.

Many of the research aims of the current study were not supported in examining risky behaviors, which included substance use behaviors and risky sexual behaviors. This could be due to a number of factors such as how these behaviors were captured. Every questionnaire used in this study relied on self-report, which asked how often these behaviors occurred within the past three months up to twelve months. It is possible that the numbers reported were inaccurate due to biases inherent in self-reporting, especially with more stigmatized behavior such as alcohol consumption (Devaux & Sassi, 2016) and sexual behavior (Coxon, 1999). In terms of statistical analyses in this study, it is important to note that a majority of individuals did not report engaging in risky behaviors. As such, the data were significantly positively skewed. A transformation was not employed, since it would no longer accurately reflect the nature of the behaviors reported, and normality was not a required statistical assumption for the statistical tests used (Baron & Kenny, 1986).

Implications and Future Directions

Our findings suggest that health literacy and HLOC are important factors to focus on in improving healthy lifestyle behaviors. On the other hand, HRQOL might be a relevant factor to focus on in reducing risky behaviors. Health literacy seems promising for further research given that many college students may be newly responsible for managing their own health. Improving health literacy could be an attainable goal for college health services, especially since they are important facilitators in helping students bridge the pediatric and adult health care world (Bravender, 2014). College health centers could provide educational materials such as pamphlets on how to find and interpret health information, or how to effectively talk to their doctor. Such materials would make it easier for students to understand and communicate health-related information.

Another way to increase healthy behaviors in college students would be by targeting their HLOC and HRQOL. It may be harder to address and change a student's HLOC, but it would still be advantageous to help students frame their health as something they can control. According to findings from this study, having a high internal HLOC would help with students' general health behaviors, preventing accidents, reducing screen time and physical inactivity, and with reducing tobacco use. By shifting students' perceptions to a more internal orientation, students would have a greater sense of agency and responsibility for their own health outcomes. Additionally, by enabling students to achieve better HRQOL, it might prevent students from engaging in risky substance use-related behaviors. College health centers could help students maintain their physical and mental QOL, which would make maladaptive coping behaviors such as drinking and smoking less appealing. One method could be by implementing a campus-wide social norms marketing campaign, which would address misperceptions of college student drinking (National Social Norms Institute, 2016). Also, college health centers could focus on

promoting positive coping strategies such as engaging in physical exercise to reduce stress. Studies have shown that physical activity has protective effects against stress, which could impact a person's QOL (Bland et al., 2014). In addressing these health-related factors, college health centers could benefit the health of a large number of their students, regardless of their chronic condition status.

When considering college students with chronic conditions, focusing on health literacy and self-efficacy could be useful in promoting health behaviors. In regards to designing health behavior interventions, it would be beneficial to tailor these designs depending on whether or not students have a chronic condition. In these interventions, students with chronic conditions could receive additional information or management strategies relevant to their condition. If an institution has access to student chronic condition information, it may be worth reaching out to these students before they arrive or to check on their health every semester. Results from this study suggest that students with chronic conditions exhibit more healthy lifestyle behaviors, such as healthy dietary behaviors, at higher levels of health literacy. Additionally, these students exhibit fewer of these healthy lifestyle behaviors at lower levels of health literacy compared to their healthy peers. It would make sense that students with chronic conditions tend to have higher health literacy than their peers due to the nature of managing their condition. These students most likely have more frequent health care usage and should be more health literate. Students with chronic conditions with low health literacy would greatly benefit from having additional resources from their college health services, given that discrepancies in health literacy in chronic condition groups have resulted in health inequalities (Sihota & Lennard, 2004).

Further research should focus on whether it is efficacious and effective to reach out to this subset of the college population, especially since this study only found significant

moderation effects with self-efficacy in students with a chronic condition. Perhaps targeting self-efficacy in students with chronic conditions would yield better outcomes than in a general college population. Even if college health centers do not have prior chronic condition information, having educational resources widely available for students with chronic conditions could have an impact on their health behaviors. These resources could also focus on building students' self-efficacy and convey the importance of managing one's health.

Additionally, shifting students' beliefs about their HLOC to a more internal orientation could prove advantageous. Future research could focus on factors that influence either an internal or external HLOC given the context of college student life. Possible interventions could focus on students' own agency when it comes to engaging in risky behaviors, or when focusing on dietary behaviors and physical activity. Future replications of this study are also needed, given that health self-efficacy was not a significant predictor of healthy lifestyle behaviors or risky behaviors. Studies should also further investigate risky behaviors, perhaps by using different methods than self-report questionnaires, which can be unreliable. Perhaps using an ecological momentary assessment (EMA) approach, which can include the use of apps and mobile devices, could provide more accurate risky behavior data. Although EMA is also self-report, this method allows for a more precise assessment of behaviors near the time of the experience and in the participant's natural environment (Robbins & Kubiak, 2014), which can greatly increase ecological validity (Smyth & Heron, 2012). Given that college students typically use mobile technology, EMA could prove to be an effective methodology for further research in these areas.

Furthermore, future studies could focus on college students with specific chronic conditions. It may be especially important to elucidate how certain health-related factors, such

as HLOC, vary across different chronic conditions. Previous research has found that having an internal orientation may not be advantageous for certain conditions, such as cancer (Burish et al., 1984). Future studies could investigate within which chronic conditions an external orientation would be beneficial. The current study only examined students with and without chronic conditions in terms of HLOC and screen time and physical inactivity. Although more research is needed in this area, HLOC may be related to physical inactivity in that it may be adaptive for certain chronic conditions where mobility is significantly impacted.

Lastly, it may be worthwhile to develop a scale that assesses the individual burden of a chronic condition. Such a scale would assess the impact of the chronic condition on a daily basis, which may vary depending on the nature of each individual chronic condition. For example, an individual with diabetes may experience significant daily burden due to fluctuations in blood sugar, which would require careful dietary considerations every few hours; whereas an individual with well controlled asthma may only experience difficulty breathing when exposed to cigarette smoke. A chronic condition burden scale could be helpful for determining how difficult it may be for certain individuals to engage and maintain health behaviors.

Conclusion

Overall, this study examined several health related factors (HLOC, health literacy, health self-efficacy, HRQOL) in their associations with health behaviors, which included healthy lifestyle behaviors and risky behaviors. Chronic condition status was found to be a moderator in associations between many of these health related factors and both healthy lifestyle and risky behaviors. Keeping the limitations of this study in mind, findings need to be replicated to establish generalizability beyond this sample. By following recommendations for future research

from this study, college health researchers can potentially improve the health behaviors for a number of college students, regardless of their chronic condition status.

References

Abouserie, R. (1994). Sources and levels of stress in relation to locus of control and self-esteem in university students. *Journal of Educational Psychology, 14*, 323-330.

Anye, E. T., Gallien, T. L., Bian, H., & Moulton, M. (2013). The Relationship between Spiritual Well-Being and Health-Related Quality of Life in College Students. *Journal of American College Health, 61*, 414-421. doi:10.1080/07448481.2013.824454

Baker, D. W., Wolf, M. S., Feinglass, J., Thompson, J. A., Gazmararian, J. A., & Huang, J. (2007). Health Literacy and Mortality among Elderly Persons. *Archives of Internal Medicine, 167*, 1503-1509.

Bakker, C. J., Koffel, J. B., & Theis-Mahon, N. R. (2017). Measuring the health literacy of the Upper Midwest. *Journal of the Medical Library Association, 105*, 34-43. doi:10.5195/jmla.2017.105

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.

Bandura, A. (1989). Social cognitive theory. *Annals of Child Development, 6*, 1-60.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

Baron, R.M., Kenny, D.A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Beckmeyer, J.J. (2016). Non-Intercourse and Intercourse Hookup Intentions, Drinking Expectancies, and College Students' Heavy Drinking. *Substance Abuse*. http://dx.doi.org/10.1080/08897077.2016.1214212

Benotsch, E. G., Koester, S., Luckman, D., Martin, A. M., & Cejka, A. (2011). Non-medical use of prescription drugs and sexual risk behavior in young adults. *Addictive Behaviors, 36,* 152-155.

Benotsch, E.G., Seeley, S., Mikytuck, J., Pinkerton, S.D., Nettles, C.D., Ragsdale, K. (2006). Substance use, medications for sexual facilitation, and sexual risk behavior among traveling men who have sex with men. *Sexually Transmitted Diseases, 33,* 706-711.

Benotsch, E.G., Zimmerman, R., Cathers, L.,…Snipes, D. (2013). Non-medical use of prescription drugs, polysubstance use, and mental health in transgender adults. *Drug and Alcohol Dependence, 132,* 391-394.

Berkman, N. D., Dewalt, D. A., Pignone, M. P., Sheridan, S. L., Lohr, K. N., Lux, L., ... & Bonito, A. J. (2004). Literacy and Health Outcomes: Summary. *AHRQ Evidence Report Summaries*.

Bitsko, M.J., Everhart, R.S., & Rubin, B.K. (2014). The Adolescent with Asthma. *Paediatric Respiratory Reviews, 15*.

Bland, H. W., Melton, B. F., Bigham, L. E., & Welle, P. D. (2014). Quantifying the impact of physical activity on stress tolerance in college students. *College Student Journal*, *48*, 559-568.

Blum, R. W. M., Garell, D., Hodgman, C. H., Jorissen, T. W., Okinow, N. A., Orr, D. P., & Slap, G. B. (1993). Transition from child-centered to adult health-care systems for adolescents with chronic conditions. *Journal of Adolescent Health*, *14*, 570–576.

Bohlman, L.N., Panzer, A.M., Hamlin, B., & Kindig, D.A. (2004). *Health Literacy: A Prescription to End Confusion*. Washington, D.C: National Academies Press.

Bonsaksen, T., Fagermoen, M.S., & Lerdal, A. (2014). Trajectories of self-efficacy in persons with chronic illness: An explorative longitudinal study. *Psychology & Health, 29*, 350-364.

Bravender, T. (2014). College Student Health in the 21st Century. *Pediatrics, 134*, 1026-1027.

Brenner, N.D., Kann, L., Shanklin, S., Kinchen, S.,…Flint, K.H. (2013). Methodology of the Youth Risk Behavior Surveillance System – 2013. *Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report, 62*, 1-25.

Brook, U., & Shiloh, S. (1993). Attitudes of Asthmatic and Nonasthmatic Adolescents Toward Cigarettes and Smoking. *Clinical Pediatrics, 32*, 642-646.

Burish, T. G., Carey, M. P., Wallston, K. A., Stein, M. J., Jamison, R. N., & Lyles, J. N. (1984). Health Locus of Control and Chronic Disease: An External Orientation May Be Advantageous. *Journal of Social and Clinical Psychology, 2*, 326–332. http://doi.org/10.1521/jscp.1984.2.4.326

Burnett, A.J., Sabato, T.M., Wagner, L., & Smith, A. (2014). The influence of attributional style on substance use and risky sexual behavior among college students. *College Student Journal, 48*, 325-336.

Bush, K., Kivlahan, D.R., McDonell, M.B., Fihn, S.D., & Bradley, K.A. (1998). The AUDIT Alcohol Consumption Questions (AUDIT-C): An Effective Brief Screening Test for Problem Drinking. *Archives of Internal Medicine 158*, 1789-1795.

Centers for Disease Control and Prevention (2000). Measuring healthy days: Population assessment of health-related quality of life. Retrieved from http://www.cdc.gov/hrqol/concept.htm

Centers for Disease Control and Prevention. (2014). 10 Leading Causes of Death by Age Group, United States – 2012. Retrieved from http://www.cdc.gov/injury/wisqars/leadingcauses.html

Centers for Disease Control and Prevention. (2016). 2017 National Youth Risk Behavior Survey. Retrieved from http://www.cdc.gov/healthyyouth/data/yrbs/pdf/2017/2017_yrbs_national_hs_questionnaire.pdf

Champion, V.L. (1994). Strategies to increase mammography utilization. *Medical Care, 32,* 118-129.

Chapin, J. (1999). Understanding College Students' Sex Risk Perception: A Health Communication Perspective. Paper presented at: Annual Meeting of the National Communication Association; 1999 November 4-7; Chicago, Illinois.

Chinn, D., & McCarthy, C. (2013). All Aspects of Health Literacy Scale (AAHLS): Developing a tool to measure functional, communicative and critical health literacy in primary healthcare settings. *Patient Education and Counseling, 90,* 247-253.

Clark, N. M., & Dodge, J. A. (1999). Exploring self-efficacy as a predictor of disease management. *Health Education & Behavior, 26,* 72–89.

Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. (1985). *Measuring the functional components of social support.* In I. G. Sarason & B. R. Sarason (Eds.), Social Support: Theory, Research and Application, 73-94.

Conner, M., & Norman, P. (2005). *Predicting health behaviour*. McGraw-Hill Education (UK).

Cooley, W.C., & Sagerman, P.J. (2011). Supporting the health care transition from adolescence to adulthood in the medical home. *Pediatrics, 128,* 182-200.

Corwyn, R.F., & Benda, B.B. (1999). Examination of an integrated theoretical model of exercise behavior. *American Journal of Health Behavior, 23,* 381-392.

Coxon, A.P.M. (1999). Parallel accounts? Discrepancies between self-report (diary) and recall (questionnaire) measures of the same sexual behavior. *AIDS Care, 11*, 221-234.

Davey, J., Holden, C.A., & Smith, B.J. (2015). The correlates of chronic disease-related health literacy and its components among men: a systematic review. *BMC Public Health, 15*.

Dennis, E. A., Potter, K. L., Estabrooks, P. A., & Davy, B. M. (2012). Weight Gain Prevention for College Freshmen: Comparing Two Social Cognitive Theory-Based Interventions with and without Explicit Self-Regulation Training. *Journal of Obesity*, 1-10. doi:10.1155/2012/803769

Devaux, M., & Sassi, F. (2016). Social disparities in hazardous alcohol use: Self-report bias may lead to incorrect estimates. *European Journal of Public Health, 26,* 129-134.

Dey, M., Gmel, G., Studer, J., Mohler-Kuo, M. (2014). Health-risk behaviors and quality of life among young men. *Quality of Life Research, 23,* 1009-1017.

Dharmapuri, S., Best, D., Kind, T., Silber, T. J., Simpson, P., & D'Angelo, L. (2015). Health literacy and medication adherence in adolescents. *Journal of Pediatrics*, *166,* 378-382.

DiIorio, C., Dudley, W.N., Soet, J.E., McCarty, F. (2004). Sexual possibility situations and sexual behaviors among young adolescents: The moderating role of protective factors. *Journal of Adolescent Health, 35*, 11-20.

Downing-Matibag, T.M., & Geisinger, B. (2009). Hooking Up and Sexual Risk Taking among College Students: A Health Belief Model Perspective. *Qualitative Health Research, 19*, 1196-1209.

Dvorak, R.D., Kuvaas, N. J., Kilwein, T. M., Wray, T. B., Stevenson, B. L., & Sargent, E. M. (2016). Are drinking motives associated with sexual "hookups" among college student drinkers? *Journal of American College Health, 64,* 133-138.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175-191.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.

FitzGerald, J. M., & Poureslami, I. (2014). Chronic Disease Management: A Proving Ground for Health Literacy. *Population Health Management, 17,* 321-323.

Flynn, K. E., Lin, L., Bruner, D. W., Cyranowski, J. M., Hahn, E. A., Jeffery, D. D., . . . Weinfurt, K. P. (2016). Sexual satisfaction and the importance of sexual health to quality of life throughout the life course of U.S. adults. *Journal of Sexual Medicine, 13*, 1642-1650.

Fortin, M., Lapointe, L., Hudon, C., Vanasse, A., Ntetu, A.L., & Maltais, D. (2004). Multimorbidity and quality of life in primary care: a systematic review. *Health and Quality of Life Outcomes, 2,* 51-63.

Gadzella, B. (1994). Student-life stress inventory: identification of and reactions to stressors. *Psychological Reports, 74,* 395-402.

Graf, A.S., & Patrick, J.H. (2015). Foundations of life-long sexual health literacy. *Health Education, 115,* 56-70.

Grevenstein, D., Bluemke, M., & Kroeninger-Jungaberle, H. (2016). Incremental validity of sense of coherence, neuroticism, extraversion, and general self-efficacy: longitudinal prediction of substance use frequency and mental health. *Health and Quality of Life Outcomes*, *14*, 9. http://doi.org/10.1186/s12955-016-0412-z

Harper, R. (2014). Development of a Health Literacy Assessment for Young Adult College Students: A Pilot Study. *Journal of American College Health*, *62*, 125-134. doi:10.1080/07448481.2013.865625

Hartman, J. E., ten Hacken, N. H. T., Boezen, H. M., & de Greef, M. H. G. (2013). Self-efficacy for physical activity and insight into its benefits are modifiable factors associated with physical activity in people with COPD: A mixed-methods study. *Journal of Physiotherapy*, *59*, 117–124. doi:10.1016/S1836-9553(13)70164-4

Heller, J.R., & Sarmiento, A.L. (2016). Health behaviors of culturally diverse inner-city community college students. *Journal of American College Health*. doi: 10.1080/87448481.2016.1223674

Helmer, S.M., Kramer, A., & Mikolajczyk, R.T. (2012). Health-related locus of control and health behavior among university students in North Rhine Westphalia, Germany. *BMC Research Notes*, *5*.

Henderson, C. (2001). College Freshmen with Disabilities: A Biennial Statistical Profile. American Council on Education. Available at: http://files.eric.ed.gov/fulltext/ED458728.pdf

Herts, K.L., Wallis, E., & Maslow, G. (2014). College Freshmen with Chronic Illness: A Comparison with Healthy First-Year Students. *Journal of College Student Development*, *55*, 475-480.

Hittner, J.B., & Kennington, L.E. (2008). Normative perceptions, substance use, age of substance use initiation, and gender as predictors of HIV-risky sexual behavior in a college student sample. *Journal of Applied Biobehavioral Research, 13*, 86-101.

Holmbeck, G.N. (2002). Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *Journal of Pediatric Psychology, 27*, 87-96.

Ickes, M. J., McMullen, J., Pflug, C., & Westgate, P. M. (2016). Impact of a University-Based Program on Obese College Students' Physical Activity Behaviors, Attitudes, and Self-Efficacy. *American Journal of Health Education, 47*, 47–55. http://doi.org/10.1080/19325037.2015.1111178

Iguchi, M. (2015). Reduced health-related quality of life among Japanese college students with visual impairment. *Biopsychosocial Medicine, 9*, 1-7. doi:10.1186/s13030-015-0045-1

Joseph, R. P., Pekmezi, D. W., Lewis, T., Dutton, G., Turner, L. W., & Durant, N. H. (2013). Physical Activity and Social Cognitive Theory Outcomes of an Internet-Enhanced Physical Activity Intervention for African American Female College Students. *Journal of Health Disparities Research & Practice, 6*, 1-18.

Kanekar, A., Sharma, M., & Bennett, R. (2015). Using Social Cognitive Theory to Predict Safer Sex Behaviors in College Students. *American Journal of Health Studies, 30*, 90-101.

Kara, M., & Asti, T. (2004). Effect of education on self-efficacy of Turkish patients with chronic obstructive pulmonary disease. *Patient Education and Counselling, 55*, 114–120.

Kline, P. (2000). *The Handbook of Psychological Testing*. London: Routledge.

Lemly, D.C., Lawlor, K., Scherer, E.A., Kelemen, S., & Weitzman, E.R. (2014). College Health Service Capacity to Support Youth with Chronic Medical Conditions. *Pediatrics, 154*, 885-891.

Li, Y., & Guo, G. (2016). Peer Influence on Aggressive Behavior, Smoking, and Sexual Behavior: A Study of Randomly-assigned College Roommates. *Journal of Health and Social Behavior, 57,* 297-318.

Lorig, K., Stewart, A., Ritter, P., González, V., Laurent, D., & Lynch, J. (1996). *Outcome Measures for Health Education and other Health Care Interventions*. Thousand Oaks CA: Sage Publications, 24-25, 41-45.

Marks, R., Allegrante, J.P., & Lorig, K. (2005). A review and synthesis of research evidence for self-efficacy-enhancing interventions for reducing chronic disability: Implications for health education practice (part II). *Health Promotion Practice, 6,* 148-156.

Marr, J., & Wilcox, S. (2015). Self-efficacy and Social Support Mediate the Relationship between Internal Health Locus of Control and Health Behaviors in College Students. *American Journal of Health Education, 46,* 122-131.

Martinelli, A. M. (2003). An explanatory model of variables influencing health promotion behaviors in smoking and nonsmoking college students. *Public Health Nursing, 16,* 263-269.

Masters K., & Wallston K. (2005). Canonical correlation reveals important relations between health locus of control, coping, affect and values. *Journal of Health Psychology, 10,* 719-731.

McCray, A. (2004). Promoting Health Literacy. *Journal of the American Medical Informatics Association, 12,* 152-163.

McDougall, J., Evans, J., & Baldwin, P. (2010). The importance of self-determination to perceived quality of life for youth and young adults with chronic conditions and disabilities. *Remedial and Special Education, 31,* 252-260.

Megari, K. (2013). Quality of Life in Chronic Disease Patients. *Health Psychology Research*, *1*. http://doi.org/10.4082/hpr.2013.e27

Monahan, C. J., Bracken-Minor, K. L., McCausland, C. M., McDevitt-Murphy, M. E., & Murphy, J. G. (2012). Health-Related Quality of Life among Heavy-drinking College Students. *American Journal of Health Behavior*, *36*, 289-299. doi:10.5993/AJHB.36.3.1

Murphy, D.A., Lam, P., Naar-King, S., Harris, R., Parsons, J.T, Muenz, L.R. (2010). The Adolescent Medicine Trials Network for HIV/AIDS Interventions. Health literacy and antiretroviral adherence among HIV-infected adolescents. *Patient Education and Counseling 79*, 25-29.

National Institute on Alcohol Abuse and Alcoholism. (2015). College *Drinking* [Fact sheet]. National Institutes of Health. Retrieved from http://pubs.niaaa.nih.gov/publications/CollegeFactSheet/CollegeFactSheet.pdf

National Social Norms Center. (2016). *Social Norms Approach*. Michigan State University. Retrieved from http://socialnorms.org/social-norms-approach/

Nazareth, M., Richards, J., Javalkar, K., Haberman, C., Zhong, Y., Rak, E., … Ferris, M. (2016). Relating Health Locus of Control to Health Care Use, Adherence, and Transition Readiness among Youths with Chronic Conditions, North Carolina, 2015. *Preventing Chronic Disease*, *13*, 1–7.

Nesoff, E., Dunkle, K., & Lang, D. (2015). The Impact of Condom Use Negotiation Self-Efficacy and Partnership Patterns on Consistent Condom Use among College-Educated Women. *Health Education and Behavior*, *43*, 61–67. http://doi.org/http://dx.doi.org/10.1177/1090198115596168

Newsom, J.T., Huguet, N., McCarthy, M.J., Ramage-Morin, P., …Oderkirk, J. (2012). Health Behavior Change Following Chronic Illness in Middle and Later Life. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 67,* 279-288.

Nouwen, A., Urquhart Law, G., Hussain, S., McGovern, S., & Napier, H. (2009). Comparison of the role of self-efficacy and illness representations in relation to dietary self-care and diabetes distress in adolescents with type 1 diabetes. *Psychology & Health, 24,* 1071-1084.

Nutbeam, D. (2008). The evolving concept of health literacy. *Social Science & Medicine, 67,* 2072-2078.

Nylander, C., Seidel, C., & Tindberg, Y. (2014). The triply troubled teenager - Chronic conditions associated with fewer protective factors and clustered risk behaviours. *Acta Paediatrica, International Journal of Paediatrics, 103,* 194–200. http://doi.org/10.1111/apa.12461

Osborn, J., Naquin, M., Gillan, W., & Bowers, A. (2016). The Impact of Weight Perception on the Health Behaviors of College Students. *American Journal of Health Education, 47,* 287-298.

Parker, R.M., Baker, D.W., Williams, M.V., & Nurss, J.R. (1995). The test of functional health literacy in adults: a new instrument for measuring patients' literacy skills. *Journal of General Internal Medicine, 10,* 537-541.

Patterson, R.E., Neuhouser, M.L., Hedderson, M.M., Schwartz, C.M., Standish, L.J., & Bowen, D.J. (2003). Changes in diet, physical activity, and supplement use among adults diagnosed with cancer. *Journal of the American Dietetic Association, 103,* 232-328.

Pedišić, Ž., Rakovac, M., Titze, S., Jurakić, D., & Oja, P. (2014). Domain-specific physical activity and health-related quality of life in university students. *European Journal of Sport Science, 14,* 492-499.

Peerson, A. & Saunders, M. (2009). Health literacy revisited: what do we mean and why does it matter? *Health Promotion International, 24,* 285-296.

Robbins, M.L. & Kubiak, T. (2014). Ecological Momentary Assessment in Behavioral Medicine: Research and Practice. In D.I. Mostofsky (Ed.), *The Handbook of Behavioral Medicine, First Edition* (pp. 429-446). Wiley-Blackwell: Oxford.

Rolison, M.R., & Scherman, A. (2003). College Student Risk-Taking from Three Perspectives. *Adolescence, 38I,* 689-704.

Rosenstock, I.M. (1974). The Health Belief Model and Preventive Health Behavior. *Health Education Monographs, 2,* 354-386.

Ross, T. P., Ross, L. T., Short, S. D., & Cataldo, S. (2015). The Multidimensional Health Locus of Control Scale: Psychometric Properties and Form Equivalence. *Psychological Reports, 116,* 889–913. http://doi.org/10.2466/09.02.PR0.116k29w3

Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General & Applied, 80,* 1-28.

Scal, P., Ireland, M. (2005). Addressing transition to adult health care for adolescents with special health care needs. *Pediatrics, 115,* 1607–1612.

Scholz, U., Nagy, G., Göhner, W., Luszczynska, A., & Kliegel, M. (2009). Changes in self-regulatory cognitions as predictors of changes in smoking and nutrition behaviour. *Psychology & Health, 24,* 545–561.

Sihota, S., Lennard, L. (2004). *Health literacy: being able to make the most of health*. National

Consumer Council, London.

Simons-Morton, B., Haynie, D., O'Brien, F., Lipsky, L., Bible, J., & Liu, D. (2016). Variability in Measures of Health and Health Behavior among Emergent Adults One Year after High School According to College Status. *Journal of American College Health.* http://dx.doi.org/10.1080/07448481.2016.1238384

Smyth, J.M. & Heron, K.E. (2012). Health Psychology. In M.R. Mehl & T.S. Connor (Eds.), *Handbook of Research Methods for Studying Daily Life* (pp.569-584). Guilford Press: New York.

Sprangers, M.A. (2002). Quality-of-life assessment in oncology. Achievements and challenges. *Acta Oncologica, 41,* 229-237.

Staquet, M.J., Hays, R.D., & Fayers, P.M. (1998). *Quality of life assessment in clinical trials*. Oxford University Press: New York.

Steptoe, A., & Wardle, J. (2001). Locus of control and health behavior revisited: a multivariate analysis of young adults from 18 countries. *British Journal of Psychology, 92,* 659-672.

Strecher, V. J., DeVellis, B. M., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education & Behavior*, *13*, 73-92.

Strote, J., Lee, J.E., & Wechsler, H. (2002). Increasing MDMA use among college students: Results of a national survey. *Journal of Adolescent Health, 30,* 64-72.

Suka, M., Odajima, T., Okamoto, M…Sugimori, H. (2015). Relationship between health literacy, health information access, health behavior, and health status in Japanese people. *Patient Education and Counseling, 98,* 660-668.

Suris, J., Michaud, P., Akre, C., Sawyer, S.M. (2008). Health risk behaviors in adolescents with chronic conditions. *Pediatrics, 122,* 1113-1118.

Suris, J., & Parera, N. (2005). Sex, drugs and chronic illness: health behaviours among chronically ill youth. *European Journal of Public Health,* 484-488.

Tercyak, K. P. (2003). Psychosocial risk factors for tobacco use among adolescents with asthma. *Journal of Pediatric Psychology, 28,* 495–504.

US Census Bureau. Current population survey, Table 5: type of college and year enrolled for college students 15 years old and over, by sex, age, educational attainment and college enrollment: October 2012. Available at: www.census.gov/hhes/school/data/cps/2012/tables.html.

US Department of Health and Human Services. (2008). *2008 Physical Activity Guidelines for Americans*. Retrieved from: http://health.gov/paguidelines/guidelines/.

Valencia, L.S., & Cromer, B.A. (2000). Sexual activity and other high-risk behaviors in adolescents with chronic illness: a review. *Journal of Pediatric & Adolescent Gynecology, 13*, 53-64.

Vanderweele, T.J., Knol, M.J. (2014). A Tutorial on Interaction. *Epidemiological Methods, 3*, 33-72.

Varni, J. W., Seid, M., & Kurtin, P. S. (2001). PedsQL™ 4.0: Reliability and validity of the Pediatric Quality of Life Inventory™ Version 4.0 Generic Core Scales in healthy and patient populations. *Medical Care, 39,* 800-812.

Varni, J. W., & Limbers, C.A. (2009). The Pediatric Quality of Life Inventory: Measuring Pediatric Health-Related Quality of Life from the Perspective of Children and Their Parents. *Pediatric Clinics of North America, 56,* 843-863.

Verdugo, M., Schalock, R., Keith, K., & Stancliffe, R. (2005). Quality of life and its measurement: Important principles and guidelines. *Journal of Intellectual Disability Research, 49,* 707-717.

Vickers Jr., R.R., Conway, T.L., & Hervig, L.K. (1990). Demonstration of replicable dimensions of health behaviors. *Preventative Medicine, 19,* 377-401.

Virginia Department of Health. (2016). Commonwealth *of Virginia School Entrance Health Form*. Retrieved from http://www.vdh.virginia.gov/content/uploads/sites/11/2016/04/schoolform.pdf

Wallston, B. S., Wallston, K. A., Kaplin, G. D., & Maides, S. A. (1976). Development and validation of the Health Locus of Control (HLC) Scale. *Journal of Consulting and Clinical Psychology, 40,* 580-585.

Wallston K., Wallston B., & DeVellis R. (1978). Development of the multidimensional health locus of control (MHLC) scales. *Health Education Monographs, 6,* 160-170.

Wang R., Wang H., Hsu M. (2003). Factors associated with adolescent pregnancy: A sample of Taiwanese female adolescents. *Public Health Nursing, 20,* 33-41.

Welch, V.L., Van Geest, J.B., & Caskey, R. (2011). Time, costs, and clinical utilization of screening for health literacy: a case study using the newest vital sign (NVS) instrument. *The Journal of the American Board of Family Medicine, 24,* 281-289.

Westmaas, J.L., Gil-Rivas, V., & Silver, R.C. (2011). Designing and Conducting Interventions to Enhance Physical and Mental Health Outcomes. In H.S. Friedman (Ed.), *The Oxford Handbook of Health Psychology* (pp. 73-94). Oxford: Oxford University Press.

Wehmeyer, M., & Schwartz, M. (1997). Self-determination and positive adult outcomes: A follow-up study of youth with mental retardation or learning disabilities. *Exceptional Children, 63*, 245-255.

World Health Organization. (2003). Joint WHO/FAO Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases. *WHO Technical Report series*. Geneva, Switzerland.

Zahran, H.S., Zach, M.M., Vernon-Smiley, M.E., Hertz, M.F. (2007). Health-Related Quality of Life and Behaviors Risky to Health among Adults Aged 18-24 Years in Secondary or Higher Education – United States, 2003-2005. *Journal of Adolescent Health, 41*, 389-397.

Zimmerman, R.S., & Olson, K. (1994). AIDS-related risk behavior and behavior change in a sexually active, heterosexual sample: A test of three models of prevention. *AIDS Education and Prevention, 6*, 189-205.