

## ABSTRACT

Title of Dissertation:           CREATING PERSUASIVE HEALTH MESSAGES:  
CONSIDERATION OF FUTURE CONSEQUENCES  
AND INTENTION TO PURSUE VACCINATION  
AGAINST HUMAN PAPILLOMAVIRUS

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The present study examined the responses of traditional aged college women to health messages about human papillomavirus (HPV) and the new preventative HPV vaccine, Gardasil. These health messages were temporally framed and it was hypothesized that response (i.e. intention to get vaccinated, information-seeking, and thoughts following the message) would be connected with a woman's level of consideration of future consequences (CFC) and the type of temporal frame to which she was exposed. The possible role of attitude, social norms, and perceived behavioral control, as defined by the Theory of Planned Behavior and Reasoned Action, as mediating factors between CFC and intention to get vaccinated was also examined. The temporal frame of a message was not found to moderate the effect of CFC on the dependent variables. While attitude, social norms, and perceived behavioral control did not mediate between CFC and intention to get vaccinated, these variables did

significantly contribute to intention, providing support for the Theory of Planned Behavior and Reasoned Action as a useful model for predicting college women's response to health messages about the HPV vaccine. Additional analyses concerning demographic information, risk factors, knowledge about HPV and the vaccine, and responses to qualitative questions were also conducted.

CREATING PERSUASIVE HEALTH MESSAGES:  
CONSIDERATION OF FUTURE CONSEQUENCES AND  
INTENTION TO PURSUE VACCINATION AGAINST THE  
HUMAN PAPILLOMAVIRUS

by

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## Chapter 1

### Introduction

What factors influence whether or not people take preventive measures against disease? Counseling psychologists, with their focus on helping individuals to attain optimal functioning and their emphasis on preventive health, can play an important role in encouraging healthy behaviors that may enhance both the physical and psychological wellness of their clients. To this end, increasing awareness of how individual difference variables may affect reactions to messages about health will help psychologists to better understand and work with people who are at risk for disease.

A large body of research has focused on understanding what makes messages about health persuasive, with much recent literature examining how individual differences may affect responsiveness to preventive health messages. For example, the roles of such individual factors as coping style (Latimer, Katulak, Mowad, & Salovey, 2005) and health locus of control (Williams-Piehota, Schneider, Pizarro, Mowad, & Salovey, 2004) have been studied in order to better understand how tailoring messages to reflect differences in these variables might affect intentions to engage in health behaviors. The present study will examine whether a personal factor, consideration of future consequences (Strathman, Gleicher, Boninger, & Edwards, 1994), may affect an individual's reaction to a message about getting vaccinated against a common but potentially deadly sexually transmitted disease, human papillomavirus.

People who look ahead to the future consequences of their present behaviors may be more likely to think and act in ways that are protective of their future health and well-being. For instance, research has found that college students who consider the future

consequences of their behaviors are more likely to have regular sleep schedules, higher grade point averages, and fewer sexual partners than their counterparts who are more focused upon the present moment (Joireman, 1999; Peters, Joireman, & Ridgeway, 2005; Rothspan & Read, 1996). More future-oriented people have also been found to be more likely to engage in preventive health behaviors such as seeking out HIV-testing (Dorr, Krueckeberg, Stratham, & Wood, 1999) and intending to be screened for colorectal cancer (Orbell, Perugini, & Rakow, 2004).

People who focus more upon the present, on the other hand, are theorized to prefer to engage in behaviors in which the rewards of the behavior are more immediately apparent. Such people are less likely to be motivated through a difficult work-out, for example, by the thought of decreasing their chances of heart disease years from now than by the instantly gratifying aspects of the work-out itself. Thus, the idea of tailoring a health message to reflect a person's consideration of future consequences, or CFC, would seem to be a useful way of persuading individuals to take protective measures with their health.

A useful framework for understanding the processes through which people form intentions to engage in health behaviors is the Theory of Reasoned Action and Planned Behavior (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). This theory, which is frequently utilized in health psychology research (Armitage & Conner, 2001), states that intentions to act are influenced by a person's attitude toward a health behavior, the subjective norms set by important others in the person's life with regard to that behavior, and the amount of perceived behavioral control they report having over pursuing the behavior. The variables associated with the Theory of Reasoned Action and

Planned Behavior, or TPB, have been found to mediate the relationship between consideration of future consequences and the intention to take preventive action with one's health (Orbell et al, 2004). For example, a person who encounters a health message that has been modified to match her level of CFC may be more likely to form a positive attitude toward the health behavior described in the message, leading to a stronger intention to pursue that behavior. Unfortunately, the Orbell et al (2004) study was one of few that has utilized TPB as a framework for explaining how a present or future orientation might affect intentions to engage in health behaviors.

The aforementioned study (Orbell et al, 2004), which illustrated the mediator role of the Theory of Reasoned Action and Planned Behavior's variables, also examined the utility of temporally framing a health message and exploring whether or not the CFC level of the participants was related to how they responded to the message. This research provided evidence for a match between CFC level and the way in which a message is temporally framed being related to middle-aged participants' intentions to get screened for colorectal cancer. Such findings are important in increasing understanding of what factors induce individuals to think and act in proactive ways with regard to preventing the advance of a life-threatening illness. The present study partially replicated and extended the findings of this research using a different sample, female college students, and a different health topic, vaccination against the human papillomavirus, or HPV. As few studies have examined variables related to intentions to receive vaccinations, especially against sexually transmitted diseases, the present study provides a useful contribution to the literature.

The human papillomavirus is prevalent among young adults, with 18-28 year olds exhibiting the highest rates of HPV diagnosis (Koutsy, 2002). While usually harmless, HPV can also cause bothersome to dangerous health conditions, with certain strains being associated with genital warts and others with precancerous cell growth which could lead to cervical cancer (National Cancer Institute, 2006). Furthermore, preventing the sexual transmission of HPV poses unique challenges, as condoms are not consistently protective due to the virus being spread through skin-to-skin contact, the presence of an infection that could lead to future cervical dysplasia or cancer often exhibits no symptoms, and no test currently exists to detect HPV's presence in men.

Thus far, preventive efforts against the spread of HPV have focused on increasing knowledge levels about the virus, including risk factors such as having a high number of sexual partners, and encouraging young women to receive regular cervical screenings, or Pap smear tests, which are effective in recognizing the deleterious effects of HPV infection. However, research has shown that not all sexually active young women get screened regularly (Fletcher & Bryden, 2005). Furthermore, treatments to remove precancerous cervical lesions can be painful and may need to be repeated several times if the virus remains in a woman's body (American Society for Colposcopy and Cervical Pathology, 2006). Finally, if undetected, or not treated in a timely manner, some strains of HPV can lead to cervical cancer, a disease which killed approximately 4,000 American women in 2004 (National Cancer Society, 2006) and 230,000 women worldwide annually (Pan American Health Organization, 2005). Thus, the possibility of a new preventive measure against HPV transmission is highly desirable.

Recently, a new HPV vaccine, Gardasil, has been developed to protect against four strains of the human papillomavirus. Two of these strains have been found to be associated with cervical cancer, while the other two cause uncomfortable and unsightly genital warts which can recur and sometimes need to be removed surgically. Clinical trials have proven Gardasil to be effective for up to five years against two strains of HPV which cause 70% of cervical cancers, with few side effects, and the vaccine was associated with 90% fewer cases of persistent HPV infection in the subjects who received it (Villa, Costa, Petta, et al., 2005). Prior studies have shown that a vaccine against HPV would be welcomed by women who are at risk for acquisition (Kahn, Rosenthal, Hamann, & Bernstein, 2003; Zimet, Mays, Winston, et al., 2000), yet no known study has focused on how individual differences among these women might affect their response to a tailored health message about the HPV vaccine.

The present study examined whether the level of consideration of future consequences reported by female college students, paired with the temporal framing of benefits and risks within a health message about the HPV vaccine, had an effect upon whether or not these women formed the intention to get vaccinated against HPV. In addition, using the Theory of Reasoned Action and Planned Behavior as a guide, the mediating role of attitudes, subjective norms, and perceived behavioral control on intentions to get vaccinated was assessed. Because the vaccine is new and knowledge about the virus low compared to what is known about other STDs (Yacobi, Tennant, Ferrante, Pal, & Roetzheim, 1999), the effect of temporal framing and CFC on the information seeking behavior of young women, with regard to HPV and its vaccine, was also examined.

## Chapter Two

### Literature Review

#### *Introduction*

The field of counseling psychology has long championed the role of preventive interventions in protecting the future health and well-being of individuals. A key place in which this commitment is apparent is in the area of disease prevention. Counseling psychologists may be called upon to collaborate with the individuals or organizations with whom they work in order to help them to pursue healthier behaviors and avoid or detect harmful illnesses (Hoffman & Driscoll, 2000). Thus, increasing the field's knowledge of factors that motivate, or hinder, healthy intentions and behaviors will be a beneficial addition to the literature. The present study examined the effect of designing a preventive health message to reflect an individual difference variable, consideration of future consequences, on college women's intentions to pursue vaccination for the human papillomavirus (HPV) as well as information about the virus and its vaccine. This topic was explored using the framework of the Theory of Reasoned Action and Planned Behavior (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), which holds that health intentions and behaviors are affected by an individual's attitudes toward the behavior, the subjective norms of valued others, and perceived behavioral control over enacting a behavior.

HPV vaccination was chosen as the health behavior to examine due to the great prevalence of the human papillomavirus in young adults. This virus can be transmitted through sexual activity and can have serious health consequences for women including genital warts and, with certain strains of HPV, the appearance of precancerous cells that can lead to cervical cancer. Furthermore, transmission is not always prevented by

condom use due to the virus being passed through skin to skin contact. Additionally, being diagnosed with HPV can cause psychological, as well as physical, difficulties due to the social stigma associated with having an STD and related effects on self image and repercussions for intimate relationships (Guy, 1993; Hoffman & Baker, 2003; Nack, 2000). A new vaccine, Gardasil, provides important protection against several harmful strains of HPV which cause about 70% of cases of cervical cancer (Villa et al, 2005) and was made available to the public in June of 2006. Therefore, determining what factors affect a college-aged woman's intention to get vaccinated, or to seek out information about protection against HPV, seems to be an important addition to the prevention literature.

This literature review will first describe the prevalence of HPV among college students, as well as information about its transmission and barriers to its detection and treatment. This will be followed by information about the HPV vaccine, Gardasil. Next, the review will examine some factors that may influence receptiveness to preventive health messages. Focus will be placed on how the attitudes of college students toward cervical health, their reported subjective norms around the subject, and the amount of control they perceive having over getting vaccinated, as elucidated by the Theory of Reasoned Action and Planned Behavior (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), might affect their intentions to pursue HPV vaccination. Finally, as the research surrounding preventive health has veered toward a greater understanding of how individual difference variables might contribute to health behaviors, this review will examine how one of them, the consideration of future consequences, may affect receptiveness to health messages and health behavior in general.

### *HPV Vaccination and Female College Students*

This review will begin with a description of the sexually transmitted disease HPV, its prevalence among college students, and its connection to cervical cancer. This will be followed by research on the leading method for identifying and treating HPV-related cervical abnormalities, cervical screening, and barriers associated with seeking out this preventive measure. Research on the attitudes and overall reactions of women to the new HPV vaccine, Gardasil, will then be reviewed along with information about the vaccine itself.

### *Human Papillomavirus and Cervical Health*

Human papillomavirus, or HPV, is a common virus that is estimated to be present in approximately 20 million Americans (Center for Disease Control and Prevention, 2005). The virus can be transmitted through genital skin-to-skin contact (as opposed to fluid transmission in other sexually transmitted diseases, such as HIV) and it is believed that 75% of reproductive age, sexually active women and men are infected with the virus at some point in their lives (Cates, 1999). Young adults, in fact, seem most vulnerable to transmission of this virus, with 18-28 year old adults exhibiting the highest rates of HPV diagnosis (Koutsy, 2002). Of the 30 strains, or types, of HPV that can be sexually transmitted, about 10 are considered “high-risk” and have been connected with abnormal cell changes that may lead to various cancers, most commonly cervical cancer. HPV is the leading cause of cervical cancer (National Cancer Institute, 2006) and it has been estimated that one out of 1,000 women diagnosed with the virus will eventually experience cell changes associated with invasive cervical cancer (ACOG, 2000).



Most HPV infections are not serious and seem to either go away or become undetectable over time. For example, a recent study of women diagnosed with HPV found that in 93% of women the virus cleared itself from the body, without treatment, over a period of five years (Elfgren, Kalantari, Moberger, Hagmar & Dillner, 2000). Without cervical screening, commonly known as a Pap smear test, however, it is impossible to know whether or not HPV is still present in one's body. There are often no symptoms that indicate the presence of HPV and the virus can be contracted and remain completely dormant inside its carrier before infecting a new partner. Further complicating matters of detection, there are currently no reliable testing methods for detecting the presence of HPV in men, making many carriers unaware that they are infected. Unlike other STDs, condom usage is not consistently effective in preventing transmission of HPV, as only areas covered by the condom are likely to be protected from genital contact. Thus the only way to totally avoid contracting HPV is to refrain from all genital contact or to engage in a monogamous relationship with someone who has had no prior sexual partners.

Women are much more likely to experience repercussions from HPV than are men, although instances of HPV resulting in penile or anal cancer have, rarely, been reported and HPV has recently been found to be related to oral cancers (Gillison, Koch, Capone, et al, 2000). Although HPV is not the only possible cause of cervical cancer—smoking, diet, and the presence of immune disease have also been linked to the disease—HPV has been found to be present in 93% of cervical cancer tumors, making it a major causal factor in the disease (NCI, 2006). According to the National Cancer Society's (2006) statistics for the year 2004, 10,500 American women were diagnosed with

cervical cancer and nearly 4,000 died of the disease. Although the virus is equally widespread across racial groups (CDC, 2000), African-American, Latina, and Native American women have been found to have higher death rates due to cervical cancer than Caucasian women, probably due to lack of routine screening (NCI, 1999; ACS, 2000). Sadly, many of these deaths could have been prevented with regular screening or other preventive measures.

As stated previously, the high risk strains of HPV are often symptomless; genital warts are not necessarily present to signal a problem, as they are caused by different strains of HPV. Thus, cervical screening is the only way in which a woman might be alerted to a possibly precancerous situation. Annual Pap smear tests, which examine microscopic cell changes in the cervix, are used during cervical screenings to test for unusual cell changes caused by HPV. Here, high risk strains of the virus may cause cervical dysplasia, or abnormal tissue growth on the cervix, which could eventually develop into cancer if left unmonitored.

For many women, cervical dysplasia does not lead to cancer and may require no treatment beside regular Pap smear tests to monitor changes in cervical cells. For more severe cases of dysplasia, further tests, such as a colposcopy (during which a lighted microscope is used to examine the vagina and the surface of the uterine cervix) and a biopsy (in which large clusters of cells are removed and studied for signs of cancer) may be indicated (American Social Health Organization, 2005). If precancerous cells are discovered, they are commonly removed by a variety of surgical procedures, including cryotherapy (freeze cells with liquid nitrogen), LEEP (Loop Electrosurgical Exision), Conization (cone biopsy), and laser treatments (American Social Health Organization,

2005). The treatments for HPV-related cervical lesions are highly successful if the problem is caught early, with the above cited procedures having a success rate ranging from 85 to 95% (American Society for Colposcopy and Cervical Pathology, 2006).

Beyond the physical repercussions, a diagnosis of HPV can have significant psychological consequences. A survey on patient reactions to having HPV found that women experience a range of negative emotions, including anger, depression, shame, guilt, and isolation and that these emotions are most salient at the time of diagnosis (Guy, 1993). Furthermore, women may experience psychosexual repercussions, including a sense of the sexual self as damaged (Nack, 2000), a decrease in sexual desire, and fears of partner infidelity (Linnehan & Grace, 2000).

Another study on reactions to HPV testing revealed several factors that were correlated with negative reactions to the results of one's diagnosis. A study by Maissi, Marteau, Hankins, et al. (2004) examined levels of anxiety, distress, and concern about test results in four groups of women: those with borderline or mildly dyskaryotic Pap smear results (indicating the possible presence of HPV) who were found to be HPV positive, those with the same Pap smear results who were found to be HPV negative, those with abnormal Pap smear results who had not yet been tested for HPV, and women with normal Pap smear results. Women who were HPV positive showed the highest amounts of distress and anxiety, while women with a normal Pap smear exhibited the lowest. Women who had not yet been tested for HPV and those found to be HPV negative did not differ significantly with regard to anxiety and distress. Other factors found to be related to high anxiety were age (the younger, the more anxious), perceived risk of developing cervical cancer, and reporting not knowing the meaning of the smear

results; the latter two factors were also related to distress. Thus, receiving the news that one has HPV seems likely to evoke anxiety and distress in college-aged women, especially those who perceive themselves at high risk for cancer or don't understand what the diagnosis means for them.

*Cervical Screening Compliance and Knowledge of Cervical Health: Barriers to Detection*

As stated earlier, the development of HPV into cervical cancer could be greatly reduced by regular cervical screenings as well as by increased knowledge about the risk factors associated with cervical cancer, which include poor screening attendance, smoking, having multiple sexual partners, starting sexual activity at a young age, and failure to use barrier contraception (Fletcher & Bryden, 2005). Unfortunately, research has suggested that not all at-risk women receive regular screenings or possess high levels of knowledge about the human papillomavirus, making the option of vaccination against transmission of HPV all the more important. The following section will review factors associated with low compliance with regard to cervical screenings, as well as barriers to knowledge about the Pap smear, HPV, and cervical cancer.

A sizable body of research, utilizing a range of age groups, has identified factors associated with cervical screening noncompliance in women. Socioeconomic disparities and related differences in financial stability, education level, and access to health care have been found to be related to compliance in cervical health practices (Branoff, Santi, Campbell, Roetzheim, & Oler, 1997; Jubelirer, Blanton, Blanton, et al, 1996; Lee, Parsons, & Gentleman, 1998; Fitch, Greenberg, Cava, Spaner, & Taylor, 1998; Larsen & Olesen, 1998), with lower education, smaller salary, and less access to health care being

related to less compliance. Some women have also reported feeling discomfort with regard to the physically unpleasant aspects of the procedure, and therefore choosing not to pursue screenings (Branoff et al, 1997; Fitch et al, 1998; Gerhardt, Pong, Kollar, Hillard, & Rosenthal, 2000; Jubelirer et al, 1996; Larsen & Olsen, 1998). Finally, a lack of knowledge, or misinformation, about the relationship between screenings and cervical cancer has been consistently linked to fewer screenings (Branoff et al, 1997; Fitch et al, 1998; Gerhardt et al, 2000; Jubelirer et al, 1996; Larsen & Olsen, 1998; Munk & Kjaer, 1998; Nugent & Tanilyn-Leaman, 1992; Yacobi et al., 1999).

Several studies have attempted to understand factors related to this latter barrier- a lack of knowledge regarding HPV- and its prevalence in college students. Yacobi et al. (1999) surveyed 289 male and female students at a public university in Florida on their knowledge of HPV. The researchers found that only 37% of students claimed to know what HPV was, and that, of seven listed STDs, HPV was the disease about which subjects reported having received the least amount of education. Furthermore, when given items pertaining to perceived susceptibility and seriousness of the disease, respondents exhibited low scores, with a median score of three out of thirteen. Variables found to predict low levels of knowledge about HPV included being male, having multiple sexual partners, and reporting low condom usage. Such findings are alarming, given the common nature of this STD among college students and the importance of preventing transmission of a disease that may exhibit few symptoms until it has progressed to a less treatable stage.

A study by Fletcher and Bryden (2005) also indicated low levels of knowledge about HPV and cervical health in college-aged women. Of the women they surveyed,

46.7% had never had a Pap smear, although only 7% of these students had never been sexually active. A lack of knowledge about the necessity of cervical screenings seemed to be a major reason for not getting a Pap smear in this study. Twenty-seven percent of women who had never been screened stated that they believed that screening was not necessary, while 5.2% claimed that they did not know where they could undergo this procedure. Lack of comfort with the procedure also prohibited compliance, with 19.5% feeling too much discomfort and 13% simply stating that they did not want to undergo screening. As in the Yacobi et al (1999) study, overall knowledge of the disease was low, with both those who had and had not undergone a Pap smear scoring less than optimally. Those women who did seek out regular cervical screenings were more likely to engage in other preventative practices, such as conducting regular breast self-exams.

Both of these studies suggest that college students lack important knowledge about HPV risk factors as well as the cervical screening practices that could serve to protect against cancer or its progression. Furthermore, flaws in the studies may have resulted in underestimation of how much college students know about HPV. For example, both studies relied on self report measures, which may have led to overreporting or underreporting of health or sexual practices. The fact that 100% of the subjects in the Fletcher and Bryden (2005) study claimed that they had never had an STD points to possible underreporting or bias in the sample, considering rates of STD in equivalent portions of the population. Also, questionnaires testing knowledge were multiple choice, leaving open the possibility that participants guessed on some of their responses. Thus, knowledge about HPV may be even more desperately needed than these studies suggest.

This research on noncompliance with cervical screening emphasizes the importance of providing additional methods of protection against HPV, such as vaccination. According to these studies, young women may avoid being screened for cervical abnormalities due to embarrassment or discomfort associated with the procedure, financial issues, or an absence of health care. Furthermore, a lack of knowledge about HPV, its risk factors, and associated preventive measures may also interfere with a woman's tendency to be screened regularly. Although, even with the advent of the HPV vaccination, cervical screening will remain a vital preventive measure, the additional option of a vaccination which may protect a woman against infection for at least five years seems like a promising step toward decreasing the presence of cervical cancer in our health care system. The following section will describe this vaccine in greater detail.

#### *Gardasil: An HPV Vaccine*

Up until recently, preventive efforts against HPV and cervical cancer focused on encouraging women to protect themselves by using condoms during sexual intercourse and getting regular cervical screenings. However, as previously noted, condoms are not consistently effective in preventing HPV due to the virus being passed through skin contact. Furthermore, although screenings can detect the virus, diagnosis of cell abnormalities associated with HPV can, as indicated by earlier mentioned research, result in psychological distress as well as a series of unpleasant surgical procedures aimed at removing the cervical lesions that could lead to cancer. Therefore, the invention of an HPV vaccine by the Merck and Sanofi Aventis-owned vaccine producer Sanofi Pasteur has been viewed by the medical community as an exciting new tool in the fight against cervical cancer.

The vaccine, called Gardasil, was first tested to be effective against a cancer-causing strain of HPV, HPV-16, in a randomized clinical trial of 1533 young women ages 16-23 (Crum, 2002). Subjects in this trial were not pregnant, had no abnormal Pap smear tests, and no more than five lifetime sexual partners. The vaccine was administered to half of the study's participants through intramuscular injection on three occasions over a span of six months and the women were monitored for four years. The other participants were given a placebo injection and monitored for the same amount of time. While 41 cases of persistent HPV-16 infection occurred in the placebo group, no women in the vaccine group were found to have cervical lesions associated with HPV-16. Because the vaccine did not protect against other strains of HPV, however, 22 women in the vaccine group were diagnosed with cervical abnormalities that were unassociated with HPV-16.

A second clinical trial utilized a version of the vaccine aimed at preventing infection by four strains of HPV: HPV-16 and HPV-18, which together account for 70% of cases of cervical cancer, and HPV-6 and HPV-11, which cause 90% of HPV antibodies, including those associated with genital warts (Villa et al, 2005). This randomized trial of 552 female subjects, with ages ranging from 16-23, was conducted similarly to the previous study, with three injections occurring over a six month period. In the placebo condition, 36 subjects were found to have HPV, with three women contracting genital warts and three having pre-cancerous cervical lesions. In contrast, only four women in the experimental condition were found to have HPV and none of these developed any of the diseases found in the placebo condition. The researchers ascertained that the vaccine was responsible for 90% fewer cases of persistent HPV infection, had few side effects, and would be effective for up to five years (Villa et al,



2005). Plans to follow up on these findings with a larger clinical trial are in progress (Villa et al, 2005).

Early research on women's reactions to the advent of an HPV vaccine was mostly positive. Several studies focused on factors related to women's attitudes toward getting vaccinated against HPV. For example, Zimet et al (2000) had two groups of women, one of adolescents in an urban health clinic and the other of adult women in an STD clinic, rate nine hypothetical HPV vaccines using a variety of characteristics. Both groups reported that efficacy of the vaccine, recommendation of the drug by a physician, and cost would have the greatest effect on whether or not they chose to become vaccinated. Another study looking at the attitudes of young adults and adolescents toward HPV vaccination and taking part in a clinical trial found that 88% of participants supported young women getting vaccinated for HPV before becoming sexually active and that 68% of the participants themselves would be at least somewhat likely to pay for HPV vaccination, even if it was not covered by their insurance. Several additional factors may also determine whether or not HPV vaccination is sought out. A study by Kahn, Rosenthal, Hamann, and Bernstein (2003) examined knowledge of HPV, attitudes toward HPV vaccination, and risk behaviors in a sample of 52 young adult women (ages 18-30; M=25). Overall, participants held positive attitudes toward the HPV vaccine and stated high intentions to receive the vaccination themselves as well as to vaccinate their daughters. Intention to seek out vaccination was found to be related to knowledge about HPV, personal beliefs about vaccination (such as believing that it would truly prevent cancer), the belief that others would approve of the vaccination, physician recommendation, and having a higher number of sexual partners.

Gardasil was approved by the United States Food and Drug Administration on June 8, 2006 and became available to the public shortly after (U.S. Food and Drug Administration, 2006). On June 26, 2006, the Advisory Committee on Immunization Practices approved the use of Gardasil for girls as young as nine years old and recommended that the vaccine be placed on the immunization schedules for girls aged 11-12 (Schaffer, 2006). Marketing for the drug has largely been focused on preteen girls between the ages of 10-13 in an effort to protect girls who are not yet sexually active from becoming infected. However, Gardasil has been approved for women up the age of 26 and, in sexually active women, may defend against strains of HPV that have not yet been transmitted (CDC, 2006). It does not, however, treat existent HPV infections. The HPV vaccine is administered through three injections that are received over a six month period and each injection costs \$120 (CDC, 2006). Vaccines for Children, a federally funded program, is offering the vaccine for free to uninsured or Medicaid-eligible girls under the age of 19; however, few programs provide similar funding for older women interested in becoming vaccinated (CDC, 2006). Currently, Gardasil has not been approved for usage by boys in the United States, as further testing is needed to prove efficacy in this population (CDC, 2006).

The initial enthusiasm over the advent of Gardasil has been tainted by controversy since its introduction to the public (Houppert, 2007). Conservative groups favoring an abstinence-only approach to lessening the spread of STDs have expressed fears that the drug will increase promiscuity in young women. Anti-vaccine groups and concerned consumers have noted the reporting of 371 serious side effects, including 3 deaths, following vaccination with Gardasil on the database of the FDA's Vaccine Adverse

Event Reporting System (VAERS) (VAERS, 2007). These effects are still under investigation as no cause and effect have been established for events recorded on the VAERS database; prior studies with 21,000 women found that the only negative responses to Gardasil were pain at the site of injection, fever, and nausea (FDA News, 2006; Merck, 2006). This is not the first time that adverse side effects have been reported in response to a Merck product. Merck's public image was tarnished in 2005 when its arthritis drug, Vioxx, was found to be responsible for over 28,000 deaths and the company was criticized for approving a drug without informing consumers of possible side effects (Berenson, 2005). The resulting lawsuits may have resulted in decreased trust in the company's ethics as well as in the quality of its products.

However, the greatest controversy over Gardasil has focused on Merck's efforts to make the vaccine mandatory for preteen girls. Several state legislatures have taken this matter into consideration and, in February of 2007, conservative Texas governor Rick Perry mandated the vaccine for girls entering the 6<sup>th</sup> grade (Office of Governor Rick Perry, 2007), causing great public outcry and the eventual overruling of his mandate by the Texas legislature. In response to the overall public reception of the vaccine, Merck announced that it would stop lobbying for mandatory vaccination of preteen girls in late February 2007 (Associated Press, 2007).

Less public commentary has focused on how college-aged women have responded to Gardasil and it is unknown how political and public responses surrounding the drug may have affected this population's decision to receive it. Therefore, it seems especially important to assess the factors that are contributing to young women's intentions to get vaccinated. Because knowledge about HPV and the efficacy of an HPV

vaccine, as well as endorsement by health professionals, could be vital in persuading young women to become vaccinated against HPV, developing health messages to which college students are responsive will be an important task for promoting the new HPV vaccine to women in this age group. Such messages may need to take into account the influence of variables such as risk factors and knowledge about HPV. Also of importance could be attitudes and personal beliefs toward getting vaccinated against HPV. The present study focused on a yet-unexamined individual difference variable, consideration of future consequences, which will be described in greater detail later in this review. Furthermore, with college students possessing little knowledge of HPV and its relation to cervical cancer, it seems important to identify ways to encourage this population to seek out information about this STD in order to better understand connected risks and the benefits of vaccination. The following section will describe a well known theory which has been used to predict a range of health behaviors and which provided the framework for the current study's aim of predicting intention to engage in HPV vaccination and seek out information about HPV: the Theory of Reasoned Action and Planned Behavior.

*Predicting Health Behaviors: The Theory of Reasoned Action and Planned Behavior*

The Theory of Reasoned Action and Planned Behavior (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) has been one of the most widely utilized theories to predict health behaviors across a variety of diseases. In its first incarnation, the Theory of Reasoned Action (Fishbein & Ajzen, 1975) conceptualized one's willingness to engage in a behavior as being influenced by one's intention to do so. In other words, intention to engage in a certain behavior was hypothesized to lead to actual engagement in that behavior. Intentions were hypothesized to be predicted by two other constructs.

First, what is the person's attitude toward the behavior? Second, what subjective norms are associated with the behavior or how do important others regard this behavior? Thus, for example, whether or not a person eats her vegetables would be predicted by her intention to eat vegetables; this intention in turn would be predicted by her overall attitude toward vegetables and her perception of what other important people in her life think about eating vegetables.

Critiques of the theory's tendency to only represent volitional behaviors led to the development of a key extension of the original theory: the Theory of Planned Behavior (Ajzen, 1988; Ajzen, 1991). In this model, the variable of perceived behavioral control (PBC) was added as an additional predictor of both intentions and behaviors. PBC describes the amount of control the individual perceives him or herself as having over enactment of a behavior and has been differentiated from similar concepts, such as self-efficacy, in that it includes not only the amount of confidence the individuals have in their ability to act but actual external barriers perceived by individuals (Armitage & Conner, 2001). Perceived behavioral control was hypothesized to both directly and indirectly, through intentions, predict behavior and this hypothesis has been supported in subsequent research (Armitage & Conner, 2001; Johnston, Johnston, Pollard, Kinmouth, & Mant, 2004). PBC itself has been found to be affected by past experiences, such as in Armitage's (2005) study where positive past performance with an exercise program strengthened the amount of behavioral control perceived by participants.

The Theory of Reasoned Action and Planned Behavior (TPB) has been found to be useful in multiple studies focused on predicting health behaviors. In the latest and most comprehensive meta-analysis conducted on this theory, 185 independent studies

published through 1997 were analyzed in order to examine the relative importance of each component of the theory (Armitage & Conner, 2001). TPB variables were found to predict 39% of the variance in intentions ( $R^2=0.39$ ) and 27% of the variance in behaviors ( $R^2=0.27$ ), with a moderate correlation existing between intention and behavior ( $r=0.47$ ). This meta-analysis also identified problems with the TPB literature, including an over reliance on self report measures of behavior (which were more strongly predicted by TPB than were objective measures of behavior), and problems with measurement of the various components; for example, subjective norms were believed to be the weakest predictors of intention due to a lack of multi-item scales (Armitage & Conner, 2001).

Additional studies have suggested that the relative importance of the TPB's components may vary based on characteristics of the particular population being studied. For example, Rhodes and Courneya (2003) measured the impact of each component upon engaging in exercise behaviors in a sample of college students and a sample of cancer survivors. Attitude toward exercise was split into two components: affective (whether or not the person likes exercise) and instrumental (whether exercise is viewed as beneficial or harmful). Two aspects of the subjective norms construct, injunctive (whether or not the person's social network would expect them to exercise) and descriptive (whether or not the person's social contacts exercise themselves), were also assessed. Finally, two elements of perceived behavioral control, self-efficacy (the confidence the person feels regarding how easy it might be for him or her to exercise) and controllability (amount of general control perceived), were also assessed.

Overall, the general measure of subjective norms, which incorporated both types of norms, was equally important in predicting exercise behavior in both samples. Self-

efficacy, as a component of PBC, predicted more variance than either overall PBC or the element of controllability in both samples. However, the importance of attitudes varied in each sample, with the general measure being most predictive of exercise in the undergraduate sample and affective attitude being most predictive among cancer survivors. Thus, while general subjective norms and self-efficacy seem to be the most helpful constructs to study when assessing exercising behavior using the Theory of Planned Behavior, enjoying exercise in the present moment may be most important to cancer survivors while future benefits of exercise may be equally persuasive to college students. Such findings are supported by another theory which has been cited in the health literature, Socioemotional Selectivity Theory (Carstensen, 1995), which predicts that individuals faced with a potential ending, such as a life-threatening illness, tend to seek out goals that maintain present, positive emotions due to their sense of foreshortened time. Thus, college students who perceive an expansive future might be more motivated by future goals than more present-minded cancer survivors.

Psychological and social variables have been found to impact the usefulness of subjective norms in predicting behavioral intentions in some studies. For example, Latimer and Ginis' (2005) quasi-experimental study found that fear of negative evaluation by others increased the importance of subjective norms in predicting intention to engage in an exercise program. Although this study did not contain a measure of actual exercise behavior, and may have been influenced by participants' fears of their appearance being criticized as opposed to purely their health behaviors, it suggests that personal factors could strengthen the relationship between subjective norms and intentions. Furthermore, a study on pregnant women considering whether or not to

engage in screening for Down's Syndrome found that some norms were more important than others (Michie, Dormandy, French, and Marteau, 2004). Mothers in this study were more likely to hold as important the norms set by partners and friends than those set by health professionals. Although the focus on Michie et al's (2004) study may have made these subjective norms more salient than they would be in the present study (for example, a partner's opinions may be more important when deciding whether or not to terminate a pregnancy as opposed to deciding whether or not to get a vaccination for one's own protection) it suggests that the attitudes of relevant social relationships to the individual may be relevant to consider in particular health situations.

Although multiple studies have used TPB to examine response to health messages about preventive health behaviors for a number of diseases or illnesses, few studies have utilized this theory as a framework in predicting intention to seek vaccination against HPV or other sexually transmitted diseases. This is noteworthy due to the high number of young women infected by various strains of the virus and the evidence provided by Fletcher and Bryden's earlier mentioned (2005) study indicating that a high percentage of female college students do not receive regular, protective cervical screenings. Of those studies that have used TPB to examine intentions to become vaccinated, results have been inconsistent.

For example, one recent study utilized the Theory of Reasoned Action and Planned Behavior to examine intention to become vaccinated against a sexually transmitted disease, Hepatitis B. The study (de Wit, Vet, Schutten, & van Steenbergen, 2005) examined Hepatitis B vaccination among a high risk population, men who have sex with men (MSM), and examined the usefulness of variables from the TPB, as well as



from the Health Belief Model (Becker, 1974), in predicting intentions to become vaccinated and actual vaccination behavior. A sample of 432 MSM at a health clinic was surveyed pertaining to interest in receiving a free Hepatitis B vaccination and actually choosing to get vaccinated at the clinic. The vaccinations would be administered over three visits to the clinic, were described as being effective for up to 15 years, and protected against a disease that can be associated with liver damage and possible death.

The men in the study viewed Hepatitis B as a severe illness, its vaccination effective, and perceived costs and barriers to being vaccinated as low. Perceived susceptibility among the men in the study for contracting Hepatitis B was also low. Overall, the factors related to the Health Belief Model were strong predictors of intention to be vaccinated and actual vaccination behavior: perceived susceptibility to the disease and perception of the virus as more severe predicted vaccination behavior, while perceived barriers and costs, such as having community members know that they were gay and seeking protection against STDs, predicted not getting vaccinated. The Theory of Planned Behavior variables, on the other hand, were not found to be strong predictors of vaccination behavior.

It is possible, however, that the study's design may have impacted the effectiveness of variables like perceived behavioral control and intention in predicting vaccination behavior. The men in the study were surveyed while awaiting an appointment at a clinic where they were later immediately offered free Hepatitis B vaccination as part of the visit. Therefore, actual barriers to getting vaccinated right away were very low, making perceived control over the situation less salient due to the degree of volitional control the subjects could exert over getting vaccinated. Similarly, due to the presence of

a free, immediate vaccination minutes after taking the questionnaire, the authors postulated that even subjects with weak intentions to become vaccinated might have ended up doing so, wherein they might not have pursued the vaccine in a different situation. Thus, it is unclear whether or not the Theory of Reasoned Action and Planned Behavior might be more useful in a situation where vaccination behavior must be planned and more actively sought.

One study, mentioned earlier in this review (Kahn et al, 2003), utilized the Theory of Reasoned Action and Planned Behavior to examine intentions to become vaccinated against human papillomavirus. The study integrated variables from TPB, the Health Belief Model, and Social-Cognitive Theory to measure intentions to get vaccinated against HPV through a yet-unknown vaccine (as little information had, at the time, been released about the vaccine). A sample of 52 young women ranging in age from 18 to 30 were given basic information about HPV by a nurse involved in the research and asked to answer questions about a hypothetical HPV vaccine and their intentions to get themselves and any future or present daughters vaccinated. With regard to the TPB, attitudes were assessed using global personal beliefs (beliefs about how good or bad HPV vaccination would be) and individual personal beliefs (for example, how likely they believed it was that the vaccine would prevent HPV transmission and cervical cancer). Subjective norms were measured both globally (would people in their lives, overall, approve of HPV vaccination) and individually (would individuals, including their parents and members of their religious communities, approve of vaccination). Intentions were measured by asking whether or not the participants intended to get vaccinated themselves and to have their daughters vaccinated. Perceived behavioral control was not included in the study.

Attitudes and subjective norms regarding HPV vaccination were found to be significantly related to intention to get one's self and one's daughter vaccinated against HPV. Specifically, global personal beliefs and global normative beliefs were correlated with intention. Three out of five individual normative beliefs, the approval of parents, steady partners, and health professionals, were related to intention to become vaccinated. Although individual personal beliefs were not associated with intention to be vaccinated, the authors hypothesized that this finding may have been jointly related to the small sample size, and thus low statistical power, and lack of variance among responses to personal belief questions.

This study suggests that the Theory of Reasoned Action and Planned Behavior may be useful in predicting intention to become vaccinated against HPV. However, many factors have yet to be examined. For instance, the construct of perceived behavioral control warrants additional study, since it was not included in the Kahn et al (2003) study and may not have been fully applicable in the study on Hepatitis B vaccination (de Wit et al, 2005). Furthermore, the findings of the Kahn et al. (2003) study may have been limited by its small sample size and lack of available knowledge about the actual HPV vaccine. Thus, further examination of the predictive utility of the Theory of Reasoned Action and Planned Behavior with regard to HPV vaccination intention in young women would be an important addition to the existing health literature. The following section will present another variable that could contribute significant understanding to the field's knowledge of factors that may affect response to health messages about vaccination: consideration of future consequences.

### *Consideration of Future Consequences and Health*

What role might perception of time play in whether or not a person engages in a health-related behavior? The individual's perception of time has been considered in predicting his or her motivation to engage in a range of behaviors across several research disciplines. Mischel's (1974) work on the concept of delay of gratification, for example, examined why some people seek gratification in the present while others are willing to delay gratification until a later time. People who perceived a reward in the future as being greater than a present reward were found to be more likely to choose to delay gratification (Metcalf & Mischel, 1999). However, other research has suggested that some people seem to be more responsive, overall, to either future or present rewards. Research on risk taking behaviors, for example, has found that people who engage in risky behaviors tend to be more focused upon the present rewards of a situation, and less toward the possible future rewards or repercussions, than people who don't engage in these behaviors. These present-oriented individuals, sometimes described as being high in present hedonism, have been found to be more likely to engage in unprotected sex (Rothspan & Read, 1996), use alcohol and drugs (Strathman et al, 1994; Alvos, Gregson, & Ross, 1993), and take risks while driving (Zimbardo, Keough, & Boyd, 1997).

Theorists have long tried to describe the construct of time perspective and better understand its functions. Lewin (1948;1951) depicted time perspective as an unconscious process which leads a person to organize his or her experiences into temporal categories. Future time perspective, from this viewpoint, is defined as the overall importance that one attributes to the future and is conceptualized as contributing to how one organizes and derives meaning from one's experiences. But how does this time perspective

develop? Does time perspective vary with the situation or is it a static aspect of one's personality?

Several theorists have focused on the developmental aspects of time perspective. In her Socioemotional Selectivity Theory, Carstensen (1995) linked time perspective to age, with younger people being theorized to possess a more expansive view of time and older people a narrower view of time. This theory posits that older people, in response to the perceived threat of shortened time, tend to orient more to the present and engage in behaviors aimed at maintaining positive emotions, such as regulating their emotions. According to Lockenhoff and Carstensen (2004), this tendency to become more present-minded with age can have adverse affects for one's health care, as people may tend, as they age, to focus more on the present rather than thinking ahead to address potential health problems.

Other theorists have focused on the more stable, individual aspects of time perspective. Zimbardo and Boyd's (1999) conception of time perspective, which was based on Lewin's, describes the construct as a cognitive bias that develops over time as a person habitually overemphasizes past, present, or future temporal frames. While Zimbardo and Boyd's conception of time perspective focuses little on what factors might contribute to the development of a specific temporal bias, it offers insight into the types of dispositional styles that are commonly found.

Their research has suggested that people differ across five types of time perspectives. People high in past negative bias may frame new experiences in light of negative perceptions about their past, while individuals high in past positive time perspective see the past in the opposite way. As earlier mentioned, people high in a

present hedonistic perspective tend to take more risks and don't engage in as many proactive health behaviors, but respond to pleasant elements of the present. Finally, individuals high in present fatalistic time perspectives don't believe that their present actions will have much impact on the future, while those high in future time perspectives are most concerned about attaining positive future consequences. These styles are believed to differ with regard to how people in each category cope with stress as well as how they address health problems (Boyd & Zimbardo, 2005). While a future-oriented time perspective has been correlated with many positive outcomes, a balance between appreciation of the moment and of planning for the future is theorized to be connected with highest life satisfaction (Boyd & Zimbardo, 2005).

The present study utilized Strathman et al's (1994) conceptualization of the consideration of future consequences (or CFC) to assess its effect on health behaviors and intentions. Similar to, and highly correlated with, Zimbardo and Boyd's (1999) future time perspective, CFC has a narrower scope and attempts to assess "the extent to which individuals think about the relatively immediate versus distant consequences of their potential actions (Strathman & Joireman, 2005)." This conceptualization of time orientation was chosen due to its extensive usage with a college-aged population and its proven usefulness in predicting a range of health behaviors, especially preventive behaviors (Dorr et al., 1999; Joireman, 1999; Peters, Joireman, & Ridgway, 2005; Rothspan & Read, 1996; Strathman et al, 1994).

People high in CFC are believed to focus on future outcome, with their behaviors being most influenced by the consideration of how present actions may affect the future. Conversely, people who are low in CFC are believed to focus on the present moment,

with their behaviors being most strongly influenced by immediate gains or losses. Thus, one's CFC may have ramifications for various behaviors, being dependent on whether those behaviors have immediate or long term positive or negative consequences.

The construct of CFC has been found to be present in people who gravitate toward future-oriented goals and interests. People who espouse behaviors that deemphasize immediate gratification while emphasizing the importance of planning for the good of the future tend to exhibit higher CFC. For example, Strathman et al (1994) compared the CFC levels of college students involved in social activism clubs, such as the College Democrats and Black Students for Progressive Change, to those of non-activist students, reasoning that the activists would be more likely to focus on how their current actions could instigate future change. As predicted, the activist sample scored higher on CFC than the four samples of non-activist college students. Proenvironmental intentions and behaviors have been predicted by CFC (Joireman, Lasane, Bennett, Richards, & Solaimani, 2001) as well as predilection for commuting using public transportation as opposed to car in those who believed that excessive car usage could damage air quality (Joireman, Van Lange, & Van Vugt, 2004). Furthermore, college students high in CFC have been found to have higher GPAs, more regular sleep schedules, and fewer sexual partners than those who are more focused on the present (Peters et al, 2005; Joireman, 1999; Rothspan & Read, 1996). Overall, these studies seem to suggest that college students with high CFC are more likely to think ahead to possible future consequences when making decisions.

Consideration of future consequences has been found to be a particularly important factor in predicting attitudes toward health and health-related behaviors. In a

study of university students (N=60), Strathman et al (1994) found that CFC predicted a significant amount of variance in health beliefs and behaviors, such as cigarette use and overall concern about health, over and above the effect of other personality traits such as conscientiousness, hope, optimism, and Zimbardo's (1990) measure of time perspective. In the same study, however, CFC failed to strongly predict alcohol use, an effect that the experimenters blamed on students' failure to fully acknowledge the link between present drinking behaviors and future health and well being. In other words, students may make normative evaluations of drinking behavior and may not see excessive drinking as related to future health. Thus, in situations where people are not fully aware of the impact of their actions, CFC might not predict health behavior.

People who consider future consequences are more likely to know about and to engage in preventive health behaviors. Lukwago, Kreuter, Holt, Steger-May, Bucholtz, and Skinner (2003) examined the role of a related construct, orientation to present or future time, to predict knowledge of breast cancer and mammography in a sample of urban African-American women. Those women who were more focused upon the present time were less likely to possess knowledge about mammography and treatment for breast cancer and more likely to perceive barriers that prevented them from seeking a mammography. Another study (Dorr et al, 1999) examined differences in CFC among three samples of college students (one waiting to be tested for HIV, one in a clinic for an unrelated medical visit, and one from a psychology class). Those participants seeking testing for HIV were significantly higher in CFC than those who had never sought out such testing. Furthermore, college students high in CFC were, overall, less likely to engage in risky sexual behaviors than those who were low in CFC. While this study was



limited by its predominant use of one-item measures, it provides evidence for the tendency for CFC level to be related to both health and risk behaviors.

Because one's consideration of living in the present versus thinking about future outcomes seems to affect current health behaviors, it makes sense that the way in which health information is framed temporally would influence one's choice to engage in preventative behaviors such as vaccination against disease. The present study partially replicated and extended the research framework of Orbell, Perugini, and Rakow (2004) which examined the relationship between CFC and response to health information regarding getting screened for colorectal cancer. Orbell et al (2004) predicted that a sample of middle-aged subjects (N=220) would be most responsive (i.e. intend to engage in and exhibit positive attitudes toward screenings) when positive information about screenings was matched to their corresponding consideration of future consequences. For example, it was predicted that people with high CFC would be more likely to engage in screenings when positive information about the screening was presented as occurring over the long term and negative information was presented as occurring in the short term; the opposite presentation was hypothesized to encourage responsiveness to colorectal screening in people with low CFC.

Overall, Orbell et al. (2004) found that participants high in CFC viewed screenings as beneficial (as ascertained by an open-ended qualitative question, the contents of which were coded by two independent raters) and reported more positive attitudes and subjective norms, perceptions of behavioral control, and intentions to engage in screenings. These findings were interpreted in the context of the Theory of Reasoned Action and Planned Behavior, which was described earlier. As predicted,

subjects high in CFC were more persuaded when positive elements of screening were connected with the future and negative elements with the present, while subjects low in CFC showed the exact opposite pattern. For example, a message mentioning the immediate relief of anxiety accompanying a screening and the long term hassle of attending regular screenings was more persuasive to participants with low CFC than the message stressing the immediate discomfort of the procedure and the long term relief of anxiety that would result from being screened at the present time.

The relationship between intention to engage in colorectal screening and the interaction between CFC and temporal frame was furthermore found to be mediated by two variables, attitude and perceived behavioral control, from the Theory of Reasoned Action and Planned Behavior. For example, the matching of temporal frame to CFC appears to predict the amount of perceived behavioral control a person perceives her or himself as having over getting screened, which in turn predicts her or his intention to seek out colorectal screening. Interestingly, the interaction between CFC and temporal frame did not predict one construct taken from TPB: subjective norms, or what the subject believed others would think about screenings. This finding seemed credible, however, considering that the temporal framing of a statement would not necessarily change the opinion of an important other as much as the opinion of the subject his or herself.

Limitations of the study include its lack of a behavioral measure, such as an actual account of screening attendance. However, past meta-analyses of TPB studies have found that intentions adequately predict behavior- for example Sheeran's (2002) meta-analysis of ten past meta-analyses of TPB found an average correlation of .53 between intentions and behaviors- thus it is likely that intention to be screened is related to actual screening

behavior. The study also did not measure the role of demographic variables, such as ethnicity and economic status, which might be relevant to differences in CFC and screening behaviors. Further assessment of differences in CFC based on such variables may be important. For example, Brown and Segal (1996) conducted a study comparing African American and White American subjects on temporal orientation with regard to perceptions about hypertension. The authors' findings suggested that African American subjects were more likely to hold a present temporal orientation, which was connected with fewer feelings of personal susceptibility to the consequences of hypertension.

Since the conception of the present study, another study focused on matching CFC with temporally framed health messages to predict a health behavior was published. In a replication of their prior study, Orbell and Hagger (2006) found similar results with a sample of 210 middle aged men and women who were contacted in their homes and asked for their views on a free screening program for Type II diabetes. Participants with high levels of CFC were again found to have more positive attitudes and subjective norms toward screening, perceive greater behavioral control over getting screened, and have greater intentions to follow through on this health behavior. They were also found to respond better to health messages that mirrored their individual temporal orientation than otherwise. This study also included a new construct, fearfulness of diabetes, and found that this was also significantly related to CFC. These findings presented even stronger evidence of the utility of both CFC and the Theory of Planned Behavior in predicting health behaviors.

The present study hoped to extend the findings of Orbell et al (2004) by studying the effects of temporal message framing on a different population- college-aged women-

and in regard to a different medical situation: seeking out vaccination against HPV. Since Orbell et al (2004) found that older age was related to lower CFC, it was expected that this younger sample would be more likely, overall, to be oriented toward the future, although demographic and personal factors, such as ethnicity and risk factors, respectively, may moderate this effect. Furthermore, since CFC has been related to intentions to engage in risky or preventive behaviors, it was expected that this variable would be useful in predicting whether or not young women would be persuaded to seek out preventive measures or additional information about HPV transmission and its prevention. The following chapter will describe the present study in greater detail.

## Chapter Three

### Statement of the Problem

Research on preventive health has sought to understand how important health messages might be designed to induce healthy intentions and behaviors. The present study examined how the psychological construct of consideration of future consequences (CFC) is related to whether or not college-aged women intend to get vaccinated against the human papillomavirus (HPV) and to seek out additional information about HPV and the HPV vaccine. The Theory of Planned Behavior (Fishbein & Ajzen, 1975; Ajzen, 1988) was used as a framework for understanding how attitudes toward vaccination, the subjective norms of others, and perceived behavioral control over seeking out HPV vaccination may mediate the aforementioned intentions to become vaccinated and better educated with regard to HPV. The human papillomavirus was selected as the health risk to examine as it is present in around 75% of young men and women at some point in their lives (Cates, 1999) and is the primary cause of cervical cancer.

Despite the fact that more college-aged young adults have HPV than any other STD, students have been found to possess less knowledge about this virus (Fletcher & Bryden, 2005). Due to the danger of cervical cancer associated with high risk strains of HPV, the invention of a vaccine that could protect young women against disease transmission for up to five years is an important development in preventive care. Also, because college students know little about HPV, including ways of protecting themselves, it is important for women to educate themselves about this virus and its vaccine by seeking out relevant information. Education about the virus may reduce the likelihood of a young woman getting or transmitting HPV by encouraging practices such

as vaccination, attending regular cervical screenings, and condom use. Thus, research aimed at understanding what factors affect college-aged women's tendency to be persuaded by health messages about HPV and the HPV vaccine to engage in preventive behaviors such as seeking out vaccination and accumulating knowledge about the STD seems a helpful addition to prevention literature.

The Theory of Planned Behavior and Reasoned Action (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen) offers a useful framework for studying intention to engage in preventive behaviors. TPB has been utilized in many studies focused on health behaviors such as exercise (Armitage, 2005; Rhodes & Courneya, 2003), cervical screenings (Bish, Sutton, & Golombok, 2000; Sheeran & Orbell, 2000), and vaccination against sexually transmitted diseases (Kahn et al, 2003; de Wit et al, 2005). Furthermore, a meta-analysis of 185 health-related studies (Armitage & Conner, 2001) found TPB variables to be useful in explaining 39% of the variance in intentions to engage in health behaviors and 27% of the variance in actual health behaviors. Therefore, further investigation into the relationships between attitudes, subjective norms, perceived behavioral control, and intentions, as theorized by TPB, will likely provide good insight into how these factors interact to affect response to messages about HPV vaccination.

Consideration of future consequences has been established as a useful predictor of risk and preventive behaviors in people in general, including college students, in a number of studies investigating a range of health concerns (Orbell et al, 2004; Dorr et al, 1999; Strathman et al, 1994). Being more oriented toward either the future or the present has also proven to be a predictor of taking action in studies looking at health behaviors, including engaging in health or disease screening behaviors such as seeking a

mammography (Lukwago et al, 2003) or getting tested for HIV (Dorr et al, 1999). Furthermore, a previous study on colorectal cancer screening (Orbell et al., 2004), which utilized a theoretical and methodological framework similar to that of the present study, provided evidence to support the hypothesis that health messages are more persuasive when tailored to match an individual's CFC. For example, participants with a high level of consideration for future consequences were found to be more likely to intend to pursue colorectal screening when benefits of screening were described as being in the future and costs were described as occurring in the present. Thus, CFC appears to be a useful topic of study for health professionals including psychologists who are interested in understanding how individual difference factors may affect intention to take preventive measures with one's health.

In addition to the abovementioned areas of interest, the present study collected descriptive data about the women in the sample. This information was analyzed in order to understand how certain demographic factors might contribute to preventive behaviors concerning cervical health. Information gathered included subjects' ages, ethnicities, health insurance status, reported knowledge of HPV and cervical cancer, prior experience with these conditions, and reported sexual history.

### Hypotheses

**Hypothesis 1: Women high in Consideration of Future Consequences (CFC) will be more likely to intend to get vaccinated against HPV than women low in CFC.**

Specifically, women who focus on how the future may be affected by their current actions, rather than focusing predominantly upon the present time, were believed to be

more likely to exhibit positive intentions toward seeking HPV vaccination than women who reported less focus on the future consequences of their behavior.

Several studies, many of them focusing on a college student population, have suggested that consideration of future consequences is linked to health beliefs and behaviors. Strathman et al (1994) found that CFC was positively correlated with overall concern about one's health and risk behaviors such as cigarette use. Peters et al (2005) also found a positive relationship between CFC and healthy behaviors such as keeping a regular sleep schedule. Consideration of future consequences has also been tied to screening behaviors such as seeking out HIV testing (Dorr et al, 1999) and the intention to engage in colorectal screening (Orbell et al, 2004). Although, no study had yet examined the relationship between CFC and the intention to seek vaccination against a sexually transmitted disease, it seemed likely that women who are highly aware of how their present actions could reflect upon their future health would be more likely to take immediate precautions against acquiring a virus that could cause serious health problems, like cancer, later in life. Thus, women high in CFC were believed to be more motivated to seek out HPV vaccine injections than women who were low CFC.

**Hypothesis 2: Women high in CFC will be more likely to seek out information about HPV and its vaccine than women low in CFC.** Specifically, women who focus on how the future may be affected by their current actions, rather than focusing predominantly upon the present time, were thought to be more likely to exhibit positive intentions toward seeking information about the human papillomavirus and its vaccine than women who report less focus on the future consequences of their behavior.



The action of seeking out health information has been described as being integral in the accumulation of knowledge that may lead to either present or future preventive health behaviors (Rimal, Flora, & Schooler, 1999). For example, in a study focused on cardiovascular disease Rimal et al (1999) found that information seeking behaviors could be increased as a result of health campaign materials. Furthermore, information seeking behaviors were related to knowledge about cardiovascular disease and risk factors and also predicted health beliefs and behaviors (such as self-efficacy, diet, exercise, and smoking behaviors) even three years after the health campaign had ended. Due to the broad usefulness and longstanding impact of seeking health information, studying individual differences related to information seeking behavior seemed important.

No prior studies focused on the relationship between time orientation variables and the behavior of information seeking could be identified. However, it seemed likely that individuals with high levels of CFC would be more likely to be motivated to seek out health information than individuals with low levels of CFC. Being oriented toward future time, as opposed to the present, has been related to a range of preventive health behaviors including greater condom usage (Burns & Dillon, 2005), greater likelihood of delaying sexual activity and actively inquiring about partners' sexual histories (Rothspan & Read, 1996), cigarette use (Strathman et al, 1994), and receiving, or intending to receive, disease screening (Dorr et al, 1999; Orbell et al, 2004). Individuals who are concerned about their future health, and thus interested in avoiding risks or taking proactive measures in order to ensure future benefits, were hypothesized to also be more likely to seek out information that would help them to attain these goals.

**Hypothesis 3: Women high in CFC will be more likely than women low in CFC to write positive thoughts in response to a message about HPV vaccination.**

Specifically, women who report a focus on how the future may be affected by their current actions, rather than focusing predominantly upon the present time, were thought to be more likely to write positive thoughts in response to the message about HPV vaccination than women who report less focus on the future consequences of their behavior.

Prior studies focused on understanding the ways in which consideration of future consequences is related to behavior have theorized that an individual's information processing and subsequent cognitive and affective response toward a message can be affected by that individual's level of CFC. For example, Strathman et al's (1994) study exposed subjects to messages about the advantages and disadvantages of offshore oil drilling and then asked subjects to write down their thoughts about the readings. Individuals high in CFC were more likely to write down negative thoughts in response to the passage than individuals low in CFC. These results support what is known about the construct, considering that individuals high in CFC were found, in the same study, to be pro-environment, being conscious of how their current actions could affect the future well-being of the environment. Thus, CFC seemed to be related to the thoughts experienced in response to messages that contain future and present elements.

Information-processing, as measured by thought-listings, has also been tied to CFC in studies using health messages. Orbell et al (2004) exposed subjects to several health messages about the risks and benefits of colorectal screening and asked them to write down the thoughts that entered their heads upon reading these messages.

Individuals high in CFC were more likely to write down positive thoughts about screening; again, this finding fits well with theory, which holds that individuals high in CFC would be more likely to think ahead to how current health practices could affect their future wellness (Strathman et al, 1994). The researchers then recategorized the thought listings into two groups of thoughts: one that focused on the risks of detecting illness and another that focused on the benefits of preventive health practices. There were also differences among these two thought categories, with individuals high in CFC being more likely to generate thoughts about prevention than risks associated with detection. Therefore, it seemed likely that CFC would have similar effects upon subjects reading health messages concerning HPV vaccination.

**Hypothesis 4: The relationship between CFC level and health protective attitudes and intentions will be moderated by temporal frame.** Each woman was exposed to either a message focused upon positive short term effects and negative long term effects of HPV vaccination or a message focused upon negative short term effects and positive long term effects of HPV vaccination. The way in which the message was framed was believed to predict the effect of consideration of future consequences on the dependent variable. The specific hypotheses that were tested were:

**4a. The relationship between CFC level and a woman's intentions to seek out HPV vaccination will be moderated by temporal frame.** Specifically, women who were high in CFC and who were exposed to the message in which the long term benefits of HPV vaccination were emphasized were hypothesized to be more likely to report intentions to seek HPV vaccination than women who were also high in CFC and were exposed to the message in which the short term benefits of HPV vaccination were the

focus. Also, women who were low in CFC and who were exposed to the message in which short term benefits of HPV vaccination were emphasized were predicted to be more likely to report intentions to seek vaccination than women who were also low in CFC and were exposed to the message in which the long term benefits of HPV vaccination were the focus.

**4b. The relationship between CFC level and whether or not a woman seeks out additional information about HPV and its vaccine will be moderated by temporal frame.** Specifically, women who were high in CFC and who were exposed to the message in which the long term benefits of HPV vaccination were emphasized were believed to be more likely to seek additional information about HPV and its vaccine than women who were high in CFC and were exposed to the message in which the short term benefits of HPV vaccination were the focus. Also, women who were low in CFC and who were exposed to the message in which short term benefits of HPV vaccination were emphasized were thought to be more likely to seek additional information about HPV and its vaccine than women who were categorized as low in CFC and were exposed to the message in which the long term benefits of HPV vaccination were the focus.

**4c. The relationship between CFC level and the number of positive thoughts about HPV vaccination that are written in response to the health message will be moderated by temporal frame.** Specifically, women who were categorized as high CFC and who were exposed to the message in which the long term benefits of HPV vaccination were emphasized were thought to be more likely to write positive statements in response to the message than women who were high in CFC and were exposed to the message in which the short term benefits of HPV vaccination were the focus. Also,

women who were low in CFC and who were exposed to the message in which short term benefits of HPV vaccination were emphasized were thought to be more likely to write positive statements about the message than women who were low in CFC and were exposed to the message in which the long term benefits of HPV vaccination were the focus.

The studies discussed previously (i.e. Strathman et al, 1994; Orbell et al, 2004) provided ample evidence for an interaction between consideration of future consequences and temporal framing of information affecting a range of reactions. For example, Strathman et al (1994) found that CFC and the framing of information to highlight either the immediate or future advantages of oil drilling interacted significantly to predict positive or negative attitude toward drilling. Although this study (Strathman et al, 1994) did not find a significant interaction with regard to positive thoughts about drilling, the Orbell et al (2004) study did find that the interaction between CFC and temporal framing of a message about the immediate versus future benefits associated with colorectal screening had a significant impact on the type of thought (positive or negative) noted after reading a health message. Orbell et al (2004) found a similarly significant interaction between CFC and temporal frame for intention to seek out colorectal screening. Although no research has been conducted on the interactive effect of CFC and temporal framing on information seeking behaviors, it seemed likely that this preventive behavior would also be more likely to take place when temporal frame was tailored to the individual's level of CFC.

**Hypothesis 5: The effects of consideration of future consequences and temporal frame on intention to seek out HPV vaccination will be mediated by Theory of**

**Planned Behavior and Reasoned Action variables.** Each woman was exposed to either a message focused upon positive short term effects and negative long term effects of HPV vaccination or a message focused upon negative short term effects and positive long term effects of HPV vaccination. The interaction between CFC level and temporal frame was hypothesized to influence intention to seek out HPV vaccination by proximal effects on the following variables from the Theory of Planned Behavior and Reasoned Action:

**5a. The effect of CFC level and temporal frame on intention to seek out HPV vaccination will be mediated by attitude toward HPV vaccination.** In the Theory of Planned Behavior and Reasoned Action (Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) attitude toward a particular health behavior has been theorized to predict engagement in that behavior. A number of studies have suggested the importance of attitude as a predictor of intention to take preventive measures with one's health. For example, two studies (Bish et al, 2000; Sheeran & Orbell, 2000) found attitude toward cervical screenings to be a significant predictor of screening intention and behavior, although only one of these (Sheeran & Orbell, 2000) found that attitude predicted actual screening attendance. Furthermore, Kahn et al (2003) found that overall attitude toward a hypothetical HPV vaccine predicted one's intention to become vaccinated once the drug became available.

There is also evidence that attitude may mediate the relationship between the effect of CFC and temporal frame on intention to engage in preventive behaviors. In Orbell et al's (2004) study, CFC level and the framing of a health message about colorectal screening (whether or not risks and benefits were mentioned as occurring in the long term or short term) affected intention to engage in screening through one's

attitude toward colorectal screening. In other words, a person who possesses a certain level of CFC and is exposed to a health message about colorectal screening that is tailored to that level of CFC will be more likely to hold a better attitude toward screening, which in turn will cause him or her to form the intention to get screened. Thus, it seemed likely that the interaction between CFC and temporal frame would affect subjects' attitudes toward the HPV vaccine, which in turn would affect their intentions to become vaccinated.

**5b. The effect of CFC level and temporal frame on intention to seek out HPV vaccination will be mediated by perceived behavioral control over getting vaccinated against HPV.** Perceived behavioral control (PBC) has been found to be an important predictor of intention to engage in health behaviors over a variety of studies (Armitage & Connor, 2001). The construct of PBC can be viewed as representing the amount of control a person feels over performing a behavior (controllability) and how much confidence the person feels that he or she can engage in the behavior (self efficacy) (Rhodes & Courneya, 2003). Although, in their study of exercise behaviors in college students, Rhodes and Courneya (2003) found that confidence in one's ability to exercise was a better predictor of actual behavior than perceived controllability, it is possible that other health behaviors might benefit equally from both aspects of the construct. For example, in seeking vaccinations, actual barriers, such as having a low income and no health insurance, might lower one's sense of controllability over getting vaccinated while individual features, such as fear of medical procedures, might affect one's perceived confidence toward scheduling three appointments to receive injections.

One study was identified as assessing the effect of PBC on intentions and behaviors associated with vaccination against a sexually transmitted disease. De Wit et al (2005) found that PBC was not related to intentions to get vaccinated against Hepatitis B in a sample of men who have sex with men, nor was it correlated with actual vaccination behavior. However, a high amount of volitional control over getting vaccinated, due to the study's design and timing of assessment, may have resulted in a misrepresentation of this construct's link with taking measures to protect against STDs in other situations. Furthermore, differences in the sample of the deWit et al (2005) study, which focused on men who have sex with men, and the sample of the current study, young college-aged women, warrants additional examination of the utility of this construct. The present study, therefore, hoped to further clarify how the perception of control over receiving a vaccination against HPV could affect the intentions of young women to seek this protective measure.

Orbell et al (2004) examined the role of perceived behavioral control as a mediator between the effect of matching temporal frame of a health message to CFC level and intention to engage in colorectal screening. In a regression analysis in which the dependent variable was intention to engage in colorectal screening, PBC added a significant amount of variance over and above the effect of the interaction between CFC level and the temporal framing of the health message. Thus, in the present study's assessment of intention to seek out HPV vaccination, it seemed likely that the match between one's consideration of future consequences and a particular time frame could affect one's perceived amount of control over getting vaccinated, which would in turn affect one's intention to be vaccinated.



**5c. The effects of consideration of future consequences and temporal frame on intention to seek out HPV vaccination will be mediated by reported subjective norms regarding HPV vaccination.** Overall, studies have shown inconsistent results with regard to the predictive utility of subjective norms with regard to health behavior. A meta-analysis by Armitage and Conner (2001) found that the construct of subjective norms had less predictive value than the other components of the Theory of Planned Behavior and Reasoned Action, a finding the authors attributed to a dearth of relevant items used when measuring subjective norms. The aforementioned Orbell et al (2004) study on colorectal screening did not find a relationship between the interaction between CFC and temporal framing and subjective norms about screening, nor did subjective norms serve as a mediator between the CFC/temporal frame interaction and intention to get screened. This study used three measures of global and injunctive norms (based on what others would think the subject him or herself should do) only and did not use individualized (for example, what the subject's parents or friends would think) or descriptive (what others would do themselves) examples of subjective norms.

The study by Kahn et al (2003) regarding young women's attitudes toward a hypothetical HPV vaccination found subjective norms, or normative beliefs as they were called, to predict intentions to get vaccinated. Here, both a global measure of normative beliefs and personalized normative beliefs regarding the approval of parents, steady partners, or friends were found to be correlated with intention to be vaccinated against HPV. Thus, it seemed possible that subjective norms could be a salient aspect of how young women form the intention to seek preventive health measures and thus worth including in our analyses.

### Additional Questions

Several other questions were examined over the course of the study, including:

1. Is ethnicity related to CFC level?
2. Is having health insurance related to intention to seek out vaccination for HPV?
3. Is past cervical screening behavior related to intention to get vaccinated for HPV?
4. Is knowledge about HPV related to intention to seek out HPV vaccination?
5. Is knowledge about HPV vaccine related to intention to seek out HPV vaccination?
6. Is the relationship between CFC level and intention to get vaccinated for HPV moderated by risk factors (presence/absence of sexual activity and frequency of condom usage)?

### Qualitative Questions

Finally, three open-ended questions were included in order to gather further information about participants' perceptions of the health messages provided to them:

1. What are the primary reasons why you **WOULD** get vaccinated against human papillomavirus (HPV) within the next two years? (Note: Consider your response to the health message you read in your response)
2. What are the primary reasons why you **WOULD NOT** get vaccinated against the human papillomavirus (HPV) within the next two years? (Note: Consider your response to the health message you read in your response)
3. What are the primary reasons why you may be **UNSURE ABOUT** getting vaccinated against the human papillomavirus (HPV) within the next two years? (Note: Consider your response to the health message you read in your response)

## Chapter Four

### Method

#### Design

A quasi-experimental design was utilized to investigate reactions to a health message about the HPV vaccine including:

1. Potential differences between participants who report higher consideration of future consequences as opposed to those who report lower consideration of future consequences (CFC) on intentions to seek HPV vaccination, writing positive or negative thoughts in response to a health message about HPV and its vaccine, and seeking information about HPV and its vaccine,
2. Moderating effects of temporal framing and consideration of future consequences on intention to get vaccinated against HPV, writing positive and negative thoughts in response to a health message about HPV and its vaccine, and seeking information about HPV and its vaccine,
3. Mediating effects of the Theory of Planned Behavior and Reasoned Action's variables, attitude, subjective norms, and perceived behavioral control, on the interaction of CFC level with the temporal framing of a health message and the intention to get vaccinated against HPV.

#### Participants

The sample consisted of 251 traditional aged (ranging from 18- 24 years) female, undergraduate college students. This age range was chosen because it captures the traditional age range of college students; it is also two years beneath the age limit to receive the HPV vaccine, giving the oldest participants a period of two years within

which they could decide to get vaccinated. The majority of the women who participated were Caucasian (75.7%; see Table 1) with a mean age of 19.7 (SD=1.29). The amount of time participants had been in college varied from first years to 6<sup>th</sup> year seniors with a slightly greater number of first year students (31.9%; see Table 2).

*Table 1: Ethnicity/Race (N=251)*

	Number of Participants	Percentage
African American	11	4.4
Asian-American/Pacific Islander	16	6.4
Latina/Hispanic	8	3.2
White/European Descent	190	75.7
Middle-Eastern and/or Arab	8	3.2
Asian Indian/Pakistani	1	0.4
Native American/Alaskan	1	0.4
Biracial/Multiracial	10	4
No answer	6	2.4

*Table 2: Year of Study (N=251)*

	Number of Participants	Percentage
First Year	80	31.9
Sophomore	59	23.5
Junior	46	18.3
Senior	33	13.1
5 <sup>th</sup> Year Senior	4	1.6
6 <sup>th</sup> Year Senior	29	11.6

The number of women recruited for the study (N= 251) exceeded the minimum number of participants needed, 240, which was calculated by consulting the G-Power

table created by Faul and Erdfelder (1992). Sample size was approximated assuming the presence of eight predictors and seeking a medium effect size of 0.25, a desired power of 0.80, and an alpha of 0.05.

Participants were recruited from two Eastern and two Eastern Atlantic universities and were offered either class credit, community service points (for some students involved in sororities), or the possibility of winning a gift certificate to Starbucks in return for their participation. These particular universities were chosen for recruitment due to being state universities representing several different settings across the East coast, thereby including students from diverse backgrounds (i.e. included universities situated in large cities as well as those in relatively more rural areas).

ANOVAs were run looking for differences among schools on the dependent variables, including CFC, the Theory of Planned Behavior variables (attitude, social norms, and perceived behavioral control), risk factors (i.e. condom use, age of first intercourse, number of partners), and demographic data (age) but no differences were found. T-tests were then run between the two schools from which the majority of participants were recruited: the University of Maryland (N=103) and the University of Maine (N=121). Of these participants, the Maryland students were significantly older (M=20.11; SD=1.36 for Maryland and M=19.39; SD=1.14 for Maine) ( $t=4.26; p<0.01$ ) and had higher levels of CFC ( $t=2.35; p<0.05$ ), although this latter finding should be interpreted with caution given its significance level and the number of analyses conducted between these groups. As age was not significantly related to any of the variables of interest in this study, this difference was not believed to affect any analyses.

University of Maine students knew significantly more about HPV ( $t=-3.11$ ;  $p<0.01$ ) and were more likely to think about cancer ( $t=-3.21$ ;  $p<0.01$ ).

This latter finding was further examined by running t-tests between students who reported being in sororities ( $N=46$ ) and those who did not ( $N=203$ ), since the majority of participants in sororities ( $N=37$ ) were from the University of Maine. Women in sororities did not differ from other participants on any of the dependent variables, risk factors, or demographic data. However, the sorority women knew significantly more about HPV ( $t=3.09$ ;  $p<0.01$ ) and the HPV vaccine ( $t=3.46$ ;  $p<0.01$ ) than those who were not in sororities; they also thought more about cancer ( $t=2.35$ ;  $p<0.05$ ). This may be due to information about the STD being brought into these sororities as a part of their educational programming efforts.

Of the 373 students who signed up online to take the survey, a total of 334 women between the ages of 18-24 completed it, for a completion rate of 89%. Thirty-eight of these women were excluded from further analysis because they had already received the HPV vaccine, 25 because they had already been diagnosed with HPV, and 20 because they reported being currently scheduled to get vaccinated against HPV. This left a total sample size of 251 participants. These participants consisted of 122 students from sororities and psychology classes at the University of Maine, 106 students from psychology classes at the University of Maryland, 13 students from an introductory psychology class at the University of Massachusetts, Dartmouth, and 10 students from a sorority at the University of Virginia.

In calculating a response rate, some approximations were made of the number of women students between the ages of 18-24 who were exposed to the study. For example,

at the University of Maryland, although 714 women took part in the psychology subject pool, it is unknown how many of these were within the intended age range; furthermore, these subjects were able to choose between multiple research studies for participation credits and could earn a limited number of credits. Similarly the researchers were unable to access any record of male versus female participation in the University of Maine's subject pool and thus the number of age-appropriate women was estimated by using the actual number of students who had access to the subject pool and asking professors to approximate the percentage of women in their classes. Taking these factors into consideration, a response rate of between 20-50% could be calculated.

### Measures

#### *Consideration of Future Consequences Scale*

The Consideration of Future Consequences Scale (see Appendix A; Strathman et al, 1994) is a 12 item scale measuring the extent to which the future consequences of one's current behaviors are considered. Items ranged from 1-5 with 1 meaning "extremely uncharacteristic" and 5 meaning "extremely characteristic." Raw scale scores ranged from a total of 12 to 60, with 7 items being reverse scored. The present study's range of scores were from 26-60 and were normally distributed. Examples of items on the scale included "I only act to satisfy immediate concerns, figuring the future will take care of itself" and "My convenience is a big factor in the decisions I make and the actions I take."

Upon its conception, Strathman et al (1994) ran a number of analyses to examine the CFC scale's psychometric properties. Using four samples of college students, the authors found that the scale possessed good internal consistency (Cronbach's alpha

ranged from .80 to .86), and adequate test-retest reliability over a 2 week and 5 week interval (.79 and .72, respectively). Principal factors analysis, accompanied by two goodness of fit indices, suggested a one factor solution as the best fit. Cronbach's alpha was .81 for the present study.

After its conception, validity of the scale was established in several ways. First, convergent validity was established by examining correlations of CFC with the related constructs of deferment of gratification, internal locus of control, and the future oriented items on the Stanford Time Perspective Inventory (Zimbardo, 1990). CFC was positively correlated with each, although weakly with locus of control, suggesting that CFC plays a small role here. Second, the responses of three undefined college samples were compared to those of a group predicted to be high in CFC: a sample of students involved in social activism activities. The social activist group, as expected, scored significantly higher on CFC than the other groups.

As a third test of validity, the psychological consequences of CFC were predicted and tested in college student population. The first was based on prior findings regarding counterfactual simulations of reality. Kahneman and Miller (1986) theorized that the consideration of "should-have-beens" or counterfactual alternatives in response to a negative outcome would result in negative affect if those counterfactual alternatives caused the outcome to be viewed as neutral or less negative. Boninger, Strathman, and Gleicher (1993) theorized that people high in CFC would not experience negative affect in this situation because they would be more likely to be comforted by the prospect of learning something from the experience that might be helpful in the future. Thus, in their study, CFC was induced by asking subjects to focus on the current outcome or the future



possibilities associated with a negative outcome (i.e. losing a race), with exposure to counterfactual alternatives also being manipulated. As predicted, subjects with high CFC were less likely to have negative reactions to counterfactual alternatives than subjects low in CFC.

Finally, incremental validity of CFC was assessed by testing the amount of variance predicted by CFC over and above the effects of other similar variables. CFC was found to predict health behaviors, such as smoking, and environmental behaviors, such as driving a fuel-efficient car, over and above the variables of conscientiousness, hope, optimism, and time perspective. Thus, the CFC scale seems to represent CFC as a differentiated construct with its own unique influence on a variety of behaviors. These analyses, and the fact that the CFC scale has been used in dozens of studies, many of which used college students as participants, suggest the applicability of the scale to the present study.

#### *Health Information Messages*

Participants were randomly given one of four messages containing information about HPV and its vaccine through a randomization feature of the survey's website. The first paragraph of each message was the same and contained information about HPV; the second paragraph of each message varied and contained both positive and negative aspects of the HPV vaccination process. In one condition, positive aspects (benefits) were presented as being immediate in nature and negative aspects (costs) were presented as future-oriented. In the other condition, the opposite was true. To protect against ordering effects, the order in which the positive and negative aspects were presented was switched, resulting in four possible combinations (see Appendix B) of differently ordered positive

and negative, present-oriented and future-oriented statements. The health information messages were modeled after those used in the study by Orbell et al (2004) and were modified to reflect information about HPV and its vaccine.

These health information messages were first piloted using women slightly above the age range of the proposed sample (ages 25-30), in order to assess the effectiveness of the manipulation. Women with some expertise in psychology or health related fields (e.g. psychology graduate students or women involved in psychological or health-related research) were contacted via email and asked to give feedback on two of the study's health messages. Twelve women participated in the manipulation check, with 5 women evaluating the first two messages and 7 evaluating the second two messages. Each participant was exposed to one message in which the benefits of the vaccine were present-oriented and the costs were future-oriented and one in which the benefits were future-oriented and the costs were present-oriented. They were then asked to respond to the following questions about each message, each of which was rated on a Likert scale ranging from 1-7:

“How credible is this health message?”

“How clear is the information presented in this health message?”

“How compelling were the present-oriented aspects of seeking the HPV vaccine as conveyed in this message?”

“How compelling were the future-oriented aspects of seeking the HPV vaccine as conveyed in this message?”

“How balanced did the positive and negative reasons for receiving the HPV vaccine appear?”

“Please share any additional comments about your above reactions to the health message.”

Overall, the messages were rated as credible (with averages ranging from 5.6 to 5.9) and clear (averages of 5.7 to 6.2). Although messages were overall rated above average with regard to balance of the present and future-oriented aspects of each (averages of 5.4 to 6.0), participants rated the present-oriented aspects of the messages slightly less compelling (with averages ranging from 4.6 to 5.4) than the future-oriented aspects (averages of 5.1 to 5.6). This may have been due, in part, to the slightly older age of the women, as well as their advanced educational status. In line with what is known about Consideration of Future Consequences, it seems likely that older women focused on advanced degrees would be somewhat more compelled by future-oriented arguments than their younger, less goal-oriented counterparts. Feedback from participants was utilized in rewriting the health messages, including increasing the urgency of the message’s tone and adding relevant information.

### *Thought Listings*

After reading a health message, participants were asked to “Please take a few minutes to write down any thoughts that came to your mind while you were reading this passage (see Appendix C).” This information was coded by two raters, one a researcher and the other a graduate student in psychology unacquainted with the study’s hypotheses. For each response, the total number of positive and negative thoughts listed in the response was calculated. Of the 251 possible responses, 25 were missing, as the women did not provide any response to this question, and 9 were omitted by the raters due to lack of clarity or not fitting any of the coding categories. Interrater reliability was calculated

using kappa and was 0.96. The raters then discussed the items where they disagreed and made a decision to omit the response as described above or reached consensus on the category.

*Theory of Planned Behavior: Measures of Attitude, Subjective Norms, Perceived Behavioral Control, and Intentions to Get HPV Vaccination*

The following items were modified for relevance to HPV based on the TPB items in the Orbell et al. (2004) study (see Appendices D,E,F,&G). Also consulted in the creation of the items was the website of Icek Azjen (2006), a leading TPB theorist, who provides specific guidelines in this website for creating questions to assess attitudes, subjective norms, perceived behavioral control, and intentions to engage in a particular behavior. Because TPB items have not yet been modified with regard to getting vaccinated against HPV, no previous data about the reliability of such scales existed. However, the Orbell et al (2004) study's similar measures found that the attitude, subjective norms, perceived behavioral control, and intention scales were reliable (having alphas of .74, .80, .72, and .88, respectively). Furthermore, a study using TPB items to examine intentions to get vaccinated against Hepatitis B reported scale reliabilities of .84 (attitude), .73 (subjective norms), .77 (PBC), and .79 (Intentions).

*1. Attitude*

Attitude toward HPV vaccination was assessed by four items (see Appendix D). Each item began "Getting vaccinated against the HPV virus within the next two years would be" and was followed by two adjectives, on a bipolar adjective scale ranging from 1-7. The adjectives listed were chosen using Azjen's (2006) guide to creating Theory of Planned Behavior items as a model and included one global attitude assessment item

(extremely good-extremely bad), two items aimed at assessing perceived utility of the vaccine (extremely beneficial-extremely harmful and extremely valuable- extremely worthless), and one item assessing affective attitude toward the vaccination (an extremely pleasant experience- not at all an unpleasant experience). Items were summed together with total scores ranging from 4 to 28. Low scores indicated positive attitudes and high scores indicated negative attitudes. Cronbach's alpha for this scale was .86.

## 2. *Subjective norms*

Subjective norms with regard to HPV vaccination was assessed using five items (see Appendix E). Because past research has found both injunctive and descriptive norms to be useful predictors of health behaviors in college students (Rhodes & Courneya, 2003) both were utilized. The four injunctive norms were written using the subjective norm items from Azjen's (2006) guide to creating Theory of Planned Behavior items as a model and include a global item, "If they knew about the HPV vaccine, most people whose opinions I value would approve/disapprove of me getting vaccinated against human papillomavirus (HPV) within the next two years," and three individualized items, "If they knew about the HPV vaccine, my friends would approve/disapprove of me getting vaccinated against the human papillomavirus (HPV) within the next two years," "If they knew about the HPV vaccine, my parents would approve/disapprove of me getting vaccinated against the human papillomavirus (HPV) within the next two years" and "If they knew about the HPV vaccine, my doctor would approve/disapprove of me getting vaccinated against the human papillomavirus (HPV) within the next two years." Answers were rated on a Likert scale ranging from 1-7 where 1 means "Strongly Approve" and 7 means "Strongly Disapprove." The descriptive item included was "If

they knew about the HPV vaccine, most women who are important to me would get themselves vaccinated against the human papillomavirus (HPV) within the next two years if they were at risk” and was also rated on a Likert scale ranging from 1-7 where 1 means “Strongly Agree” and 7 means “Strongly Disagree.” Items were summed for a total score ranging from 5 to 35. Low scores indicated that the participants felt that important others feel positively toward HPV vaccination while high scores indicated that important others were believed to have a negative perspective of HPV vaccination.

Data with regard to the validity and reliability of this exact scale does not exist, as scales of TPB constructs, as modeled by Azjen (2006), are individualized to fit each specific health concern. However, as mentioned earlier, scales following Azjen’s guidelines have been previously found to have good reliability and to validly represent TPB constructs. The Cronbach’s alpha for this scale in the present study was .87.

### *3. Perceived Behavioral Control*

Perceived behavioral control over getting screened was assessed using four items, modified from Orbell et al (2004) (see Appendix F). These items were chosen because, in line with Azjen’s (2006) definition of PBC, they were representative of both situational barriers to vaccination perceived by the participant as well as how the participant’s health self-efficacy may affect the amount of control she perceives over getting vaccinated. The items included: “For me, to attend an appointment to get vaccinated against HPV within the next two years would be” along with a Likert scale ranging from 1-7 where 1 means “Very Easy” and 7 means “Very Difficult,” “For me, to get vaccinated against HPV within the next two years would be:” with a Likert scale ranging from 1-7 where 1 means “Totally under my control” and 7 means “Totally outside of my control,” “I am confident

that I can get vaccinated against HPV within the next two years” with a Likert scale ranging from 1-7 where 1 means “Very Confident” and 7 means “Not Very Confident,” and “There are significant barriers that could get in my way of receiving the HPV vaccine within the next two years” with a Likert scale ranging from 1-7 where 1 means “Not at All True” and 7 means “Very True.” Items were summed together with total scores ranging from 4 to 28. Low scores indicated high levels of perceived behavioral control and high scores indicated low levels of perceived behavioral control.

Data with regard to the validity and reliability of this exact scale does not exist, as scales of TPB constructs, as modeled by Azjen (2006), are individualized to fit each specific health concern. However, as mentioned earlier, scales following Azjen’s guidelines have been previously found to have good reliability and to validly represent TPB constructs. The coefficient alpha for this scale in the present study was .84.

#### *4. Intention*

Intention to get vaccinated against HPV within the next year was assessed using four items, taken from the Orbell et al (2004) study and modified for the subject of HPV using the guidelines set forth by Azjen (2006) (see Appendix G). The first item was “I want to get vaccinated against the human papillomavirus (HPV) within the next two years,” followed by “I expect that I will get vaccinated against the human papillomavirus (HPV) within the next two years,” “I do not intend to get vaccinated against the human papillomavirus (HPV) within the next two years,” and “I plan to make an appointment for an HPV vaccination within the next two years.” Items were summed together for a total score ranging from 4 to 28. Low scores indicated greater intentions to be vaccinated while high scores indicated lower intentions to be vaccinated.

Data with regard to the validity and reliability of this exact scale does not exist, as scales of TPB constructs, as modeled by Azjen (2006), are individualized to fit each specific health concern. However, as mentioned earlier, scales following Azjen's guidelines have been previously found to have good reliability and to validly represent TPB constructs. The coefficient alpha for this scale was calculated as .94 for the present study.

#### *Salience of Gynecological Health*

In order to assess how relevant matters of health, including sexual health, were to the participants, each of the following three questions were rated on a Likert scale ranging from 1(None at all) to 7(Quite a lot) (see Appendix H). The items were modified to be relevant for HPV for this study from the questions used in the Orbell et al. (2004) study. Each was examined in order to assess the relevance of gynecological health to the young women in the sample. The items were as follows:

“How often do you think about your gynecological health?”

“How often do you think about getting a sexually transmitted disease (STD)?”

“How often do you think about getting cervical cancer?”

Each of these items showed a broad range of replies (1-7). Participants reported thinking most often about their gynecological health (M=4.04; SD=1.50), followed by thinking about STDs (M=3.35; SD=1.71), followed by cervical cancer (M=2.96; SD=1.60).

#### *Perceived Knowledge of HPV and its Vaccine*

Participants were also asked two questions pertaining to their assessment of the knowledge they believed that they possessed concerning HPV and the HPV vaccine (see



Appendix I). Answers were rated on a Likert scale ranging from 1 (Very Low) to 7 (Very High). These items were created by the researcher to provide a brief assessment of participants' familiarity with these topics, with one-item measures having been proven to provide good global measures of a variety of constructs, including job satisfaction and pain related beliefs and coping strategies (Patrician, 2004; Jensen, Keefe, Lefebvre, Romano, & Turner, 2003). The items were as follows:

“How would you rate your knowledge of the human papillomavirus (HPV)?”

“How would you rate your knowledge of the new vaccine that protects against infection by the human papillomavirus?”

There was a broad range of replies (1-7) for each question although the distributions of each were negatively skewed ( $M=3.30$ ;  $SD=1.57$  for knowledge of HPV and  $M=3.02$ ;  $SD=1.62$  for knowledge of the HPV vaccine).

#### *Reasons For or Against HPV Vaccination: Open-Ended Questions*

In order to gain a clearer understanding of the reasons why a woman may or may not intend to get vaccinated against HPV, three open-ended questions designed for this study were next added. Participants' responses to these questions were coded by three raters. These raters consisted of the researchers, a graduate student and a professor in Counseling Psychology, and a graduate student in psychology who was not acquainted with the study's hypotheses. When consensus was not reached on a response, a fourth graduate student in psychology provided an additional code on this response. Kappas were calculated to test for interrater agreement and the kappas for all the questions fell between .80 and .90.

The first question asked participants to list reasons why they would get vaccinated within the next two years. Responses were coded into five categories. The first category included responses in which the overall benefits of preventing against HPV were viewed as outweighing the costs. These responses included thoughts that expressed understanding that the HPV virus is widespread and not testable in men and therefore interest in preventive behaviors that would be protective of their and/or their partners' health and well-being. Examples of responses in the first category include: "Because I want to prevent cancer and warts" and "Looking at recent figures concerning the number of women who contract the disease in their lifetime and the possible risks associated with HPV, I would consider getting the vaccine to protect myself."

The second category contained responses of a more emotional valence and expressed interest in HPV vaccination because it would reduce worries about being diagnosed with HPV, cancer, or warts. Included in this category were those responses in which participants mentioned being influenced by the bad or frightening experiences of women they knew who had these conditions. Examples of responses in the second category included: "That it would give me peace of mind, one less thing to worry about" and "If I can prevent myself {from} the hassle of any type of disease or illness, I do it. And cancer is a huge worry on my mind. I have enough health risks due to my family's medical history, I don't need to worry about the things I can prevent."

The third category consisted of the responses of participants who reported perceiving themselves at risk for HPV. Examples of responses in the third category included: "It is so common and I am very sexually active" and "The virus is so prevalent

that if I continue to be sexually active I could be at risk for it and would rather have the vaccine just in case to be as safe as possible.”

The fourth category contained responses of participants who reported feeling some pressure to get vaccinated while they were within the age range currently approved by the FDA. Examples of responses in the fourth category included: “From now until I turn 26 is the only time in my life when I’d be able to be vaccinated so it seems like a smart thing to do” and “I’m almost 23-years-old and I know the vaccine only goes to 25-26 year olds.”

Finally, the fifth category included the responses of participants who stated that they did not intend to get vaccinated. Reasons for not intending to get vaccinated ranged from lack of interest to not viewing vaccination as salient due to not being sexually active at present. Examples of responses in the fifth category included: “I probably wouldn’t” and “I do not plan and will not need to get vaccinated.”

The second open-ended question asked participants to list reasons why they would not get vaccinated within the next two years. Five categories, much like those in the prior question, were generated. The first included responses in which participants reported feeling that the benefits of the vaccine might not outweigh the costs. Barriers to receiving the vaccine that were mentioned included the price, especially if it was not covered by insurance, personal factors such as level of motivation or forgetfulness, and the inconvenience of finding a time or location for the appointments. Examples of responses in the first category included: “Because it’s hard to take time out of your days to go and make appointments to get a vaccine for a disease that I may not have or never

get, kinda like a waste” and “If my insurance didn't cover the cost of the vaccine, I would have a hard time coming up with the \$180 required to pay for the vaccine.”

The second category included responses focused on aspects of getting vaccinated that might raise anxiety or discomfort. These responses included fear of the stigma associated with getting vaccinated or of parents finding out about a participant’s sexual activity, fears of needles and shots, distrust of vaccines, and uncertainty about side effects or long term effects of a new vaccine. Examples of responses to the second category included: “I HATE SHOTS” and “My parents have a negative view of most vaccines because of the potential risks, and I have some of their views, so I would have to talk to them and do more research.”

The third category focused on responses in which the participant reported not perceiving herself at risk for HPV and thus not interested in vaccination. Examples of responses from this category included: “I am very careful with my sexual partners and use condoms, etc” and “I am not sexually active and don't intend to be until marriage.”

The fourth category was comprised of responses in which participants expressed a lack of interest or need to get vaccinated and seemed decided about not getting vaccinated. Examples included: “I have no interest in doing so” and “I am not concerned about getting the virus and the injections and pain do not seem worth it for me.”

Finally, the fifth category contained responses in which participants did not offer a reason why they would not get vaccinated, asserting that they did intend to receive the shots. Examples of these responses are: “There are no reasons I would not get vaccinated” and “I cannot think of any reason for me not to get the vaccine. My insurance provider will help cover it and if they don’t, I can get the money to pay for it.”

The third, and final, open-ended question asked participants to list reasons why they might be unsure about getting vaccinated over the next two years. These responses were also coded into five categories. These categories were identical to those in the previous question, with two exceptions. First, there was no category focused on a lack of need or interest in the vaccine. Second, in its place, a new category was included in which the participants' responses described being unsure about vaccination because they felt they needed more information, either by reviewing future research about the HPV vaccine or by first finding out whether or not they were infected with the HPV virus. Examples of responses in this category included: "It is expensive and I am afraid I may have already contracted HPV" and "Again mainly because, it's hard to know all about the vaccination, and it would involve much more research."

#### *Information-Seeking Behavioral Measure*

The last measure on the survey gave participants the opportunity to seek out additional information about HPV and the HPV vaccine (Appendix J). Participants were given the option of clicking a link which allowed them to finish the study as well as connect them to further information about HPV and its vaccine. Participants were informed that they could view this material right away or bookmark the webpage for later. Those participants who chose to seek out further information were led to a webpage containing links to several websites containing HPV and vaccine information (see Appendix K). Only 6% (N=15) of the participants in the sample sought out additional information. The choices of participants were recorded and both those who sought additional information and those who did not were ultimately led to a webpage where they were asked to record the number they were given (if they were participating for class

credit), along with the name of their school and how they had been introduced to the study (i.e. sorority) (see Appendix L).

### *Demographics Questionnaire*

Demographic information was collected using a questionnaire that was designed for the present study (see Appendix M). Participants were asked their age, gender, ethnicity, and current year in college. Each participant was also asked to provide health information about insurance coverage, frequency of gynecological check-ups over the last two years, personal history with HPV, sexually transmitted disease, abnormal Pap smear, or cervical cancer, and whether anyone close to them was diagnosed with these medical problems. Because HPV is a sexually transmitted disease, participants were also asked about their romantic relationship status, engagement in penis/vagina and/or anal intercourse, age of first sexual activities, number of sexual partners, type of birth control used, and the frequency of condom use when in committed relationships and with new partners.

### Procedures

The study was administered via the internet. Students in psychology classes were able to access the study's website via their psychology department's website and were also given class credit through this website. Other participants were emailed the study's website address by their sorority presidents. Participants were asked to leave an identifying number that was used for class credit verification as well as the name of the school they attended; they were also asked to specify if they had heard about the study through a sorority. All participants took the questionnaire in their own living place and

were urged to take the study in one sitting and with as few distractions as possible (see Appendix N).

The study was advertised as being about “Women’s Attitudes Toward Sexual Health” and the initial page of the survey described its focus on sexually transmitted disease, explained the rights of the participant, and provided an opportunity for the participant to give her informed consent for participation. The measures were then presented in the following order: Salience of Gynecological Health, Knowledge of HPV/Vaccine, Consideration of Future Consequences Scale, Health message, Thought Listings, Theory of Planned Behavior Attitude, Social Norms, Perceived Behavioral Control, and Intention to Get Vaccination, Open-Ended Questions, Demographics, and Information-Seeking Question.

## Chapter Five

### Results of Data Analyses

#### *Descriptive Statistics*

Means and standard deviations for the five scales used are listed in Table 3, as are the reliabilities of each scale; bivariate correlations of all scales are noted in Table 4. A total of 334 women between the ages of 18-24 completed the survey, however 38 of these were excluded from further analysis because they had already received the HPV vaccine, 25 because they had already been diagnosed with HPV, and 20 because they reported being currently scheduled to get vaccinated against HPV. This left a total sample size of 251 participants.

*Table 3: Means, Standard Deviations, and Cronbach's Alphas of Scales*

	Mean	Standard Deviation	Cronbach's Alpha
Consideration of Future Consequences	42.03	6.87	.81
Attitude toward HPV Vaccination	21.95	4.94	.86
Social Norms Toward HPV Vaccination	28.54	5.37	.87
Perceived Behavioral Control	21.52	5.48	.84
Intention to be Vaccinated	22.65	6.68	.94

Participants were asked to provide descriptive information about themselves. The majority of the women who participated were Caucasian (75.7%) with a mean age of 19.7 (SD=1.29). The amount of time participants had been in college varied from first years to



Table 4: Bivariate Correlations of Scales

	Consideration of Future Consequences	Attitude Toward HPV Vaccination	Social Norms Toward HPV Vaccination	Perceived Behavioral Control	Intention to Be Vaccinated
Consideration of Future Consequences	-	-.06	.05	.08	-.01
Attitude Toward HPV Vaccination	-	-	.62**	.43**	.81**
Social Norms Toward HPV Vaccination	-	-	-	.45**	.63**
Perceived Behavioral Control	-	-	-	-	.48**
Intention to Be Vaccinated	-	-	-	-	-

\*\* = Correlation significant at the 0.01 level.

6<sup>th</sup> year seniors with a slightly greater number of first year students (31.9%). Comparable numbers of women in and out of relationships were reported with 55% of the sample being single or casually dating and 45% reporting being in a long term, committed relationship.

Most of the women reported being currently sexually active (65.7%) and a higher number reported having had penis/vagina intercourse in the past (76.5%), although the majority reported never having had anal intercourse (80.1%). Age of first intercourse ranged from 12-22 years old with a mean age of 16.7 (SD=1.54); age of first anal intercourse ranged from 14-23 years old with a mean age of 17.9 (SD=1.77). Of those participants who had had penis/vagina intercourse, the number of sexual partners ranged

from 1-32 with a mean of 4.75 (SD=4.86); for anal sex partners numbers ranged from 1-6, with a mean of 1.44 (SD=0.87). A list of statistical analyses examining the relationships between risk factors such as number of partners and the dependent variables of this study can be found in Table 5.

The majority of participants reported always using a condom when engaged in sexual activity with a new partner (70.1%; see Table 6). However, far fewer reported consistently using a condom when with a partner to whom she had been committed for more than 6 months. Only 24.1% of participants reported always using condoms for protection when in committed relationships (see Table 6). Various methods of birth control were cited, with most participants relying upon birth control pills or the patch alone (31.1%, see Table 7). Twenty-two percent of the women surveyed used a combination of methods aimed at protecting not only against pregnancy but sexually transmitted disease. Of the “other methods” mentioned, participants reported using the pull-out method, a calendar to be aware of ovulation times, and the morning after pill.

Questions pertaining to the health care of participants revealed that the great majority of women reported having health insurance (94%), be it their own or under their parents’ plans. When asked if they would be willing to pay for the HPV vaccine if it were not covered by insurance (and thus costing about \$350), most participants said that they would not (60.2%). Participants expressed moderate to low levels of knowledge about HPV (on a scale of 1-7, M=3.30; SD=1.57) and the vaccine (on a scale of 1-7, M=3.02; SD=1.62). Approximately 37% of participants reported possessing “very low” amount of knowledge about HPV (i.e. scored a 1 or 2 out of 7) while around 44% reported similar levels of knowledge about the HPV vaccine. Only 6% of participants requested more

Table 5: Correlations between CFC, Theory of Planned Behaviors variables, and Risk Factors

	CFC	Attitude	Social Norms	PBC	Intention	Age First Inter.	# Partners Inter.	Age First Anal	# Partners Anal	Condom New	Condom Committed
CFC	-	-0.06	0.05	0.08	-0.01	0.08	-0.09	0.32*	-0.17	0.16*	0.03
Attitude	-	-	0.62**	0.43**	0.81**	-0.08	0.13	0.06	-0.04	0.06	0.06
Social Norms	-	-	-	0.45**	0.63**	-0.04	0.12	-0.20	-0.20	-0.00	0.00
PBC	-	-	-	-	0.43**	-0.09	0.02	-0.27	-0.27	0.05	-0.01
Intention	-	-	-	-	-	-0.03	0.10	-0.09	-0.14	0.06	0.05
Age First Inter.	-	-	-	-	-	-	-0.41**	0.61**	-0.12	-0.02	0.23**
# Partners Inter.	-	-	-	-	-	-	-	-0.11	0.24	-0.60	-0.20**
Age First Anal	-	-	-	-	-	-	-	-	-0.28*	0.19	0.23
# Partners Anal	-	-	-	-	-	-	-	-	-	-0.40**	-0.22
Condom New	-	-	-	-	-	-	-	-	-	-	0.39**
Condom Committed	-	-	-	-	-	-	-	-	-	-	-

CFC=Consideration of Future Consequences, PBC=Perceived Behavioral Control, Inter.=Intercourse; \*\*p<0.01.

*Table 6: Frequency of Condom Use*

	With New Partner (N=194)		With Committed Partner (+6 months) (N=191)	
	Number of Participants	Percentage	Number of Participants	Percentage
Never	7	3.6	48	25.1
Sometimes	13	6.7	55	28.8
Usually	15	19.6	42	22
Always	136	70.1	46	24.1

*Table 7: Types of Birth Control Used (N=251)*

	Number	Percentage
Condoms Only	41	16.3
Multiple Methods (Condoms & pills, etc)	56	22.3
Birth Control Pill Or Patch Only	78	31.1
Depo Provera	5	2
Nuva Ring	7	2.8
Other Method	3	1.2
None	2	0.8
No Answer	5	2
Not Sexually Active	54	21.5

information about HPV or the vaccine at the end of the study.

With regard to number of gynecological appointments attended over the past two years during which a Pap smear test was performed, participants reported an average of 1.43 visits (SD=1.67) with the number of visits ranging from 0-20. Nearly 30% of the participants reported that they had not attended a gynecological appointment in the last

two years; of these, 32.4% were reportedly sexually active. Eighteen of the women in the sample had been told that their Pap smear tests came back abnormal and seven women reported having been diagnosed with an STD. STDs mentioned included genital herpes and chlamydia. When asked about the gynecological health of others in their lives, a small number of participants reported knowing someone who had been diagnosed with HPV (15.1%) or cervical cancer (7.2%). It seems likely that the reported numbers of STD diagnoses in this study, both pertaining to the participants and to others in their lives, are underestimated due to the personal and potentially shameful effect of sharing such information

### ***Primary Analyses***

Before testing this study's hypotheses, frequencies, correlations, and scatterplots were run with all major variables in order to examine the variability within each scale and rule out the presence of multicollinearity. All scales showed a wide range of scores. The Consideration of Future Consequences Scale was normally distributed, with total scores varying from 26 to 60. The Theory of Planned Behavior scales (attitude, social norms, perceived behavioral control, and intentions) were somewhat negatively skewed, indicating a tendency toward lower attitudes, social norms, PBC, and intentions regarding vaccination. These scales also exhibited a range of scores (4 to 28 for Attitudes, 5 to 35 for Social Norms, 5 to 25 for Perceived Behavioral Control, and 4 to 28 for Intentions). None of the scatterplots exhibited evidence of outliers or curvilinearity.

***Hypothesis 1: Women high in Consideration of Future Consequences (CFC) will be more likely to intend to get vaccinated against HPV than women low in CFC.***

A correlation was run with the sum of the CFC scale's items and the sum of the four Intentions items. The two variables were not correlated ( $r=-0.01$ ,  $p>0.05$ ).

***Hypothesis 2: Women high in CFC will be more likely to seek out information about HPV and its vaccine than women low in CFC.***

An independent sample t test was run using the sum of the CFC scale's items and whether or not participants chose to seek additional information at the close of the survey. The grouping variable exhibited unequal groups, with 15 participants seeking information and 236 not seeking information. Levene's test for equality of variances was not significant, thus equality of variances was assumed. The t test found no significant difference between the means of the two groups ( $t=0.18$ ,  $p>0.05$ ).

***Hypothesis 3: Women high in CFC will be more likely than women low in CFC to write positive thoughts in response to the message about HPV vaccination.***

An independent samples t test was used to test for differences in number of positive thoughts between women with low CFC and high CFC. The dependent variable, Thought Listings, was calculated by subtracting the total amount of negative thoughts listed by each participant from the total number of positive thoughts listed by each participant. There was no significant difference found ( $t=-0.62$ ,  $p>0.05$ ).

A correlation was then run between the summed score of the CFC scale and Thought Listings. No relationship was found between the two variables ( $r=0.01$ ,  $p>0.05$ ).

***Hypothesis 4a. The relationship between CFC level and a woman’s intentions to seek out HPV vaccination will be moderated by temporal frame.***

An ANOVA was used to examine this relationship (see Table 8). The summed score of intention to seek vaccination was used as a dependent variable. CFC, the temporal frame of the messages (e.g. whether the positive or negative aspects of the vaccine were framed in the present or future) and the orderings of the messages’ wording were entered as independent variables. The orderings were included in the original analysis to examine any possible order bias and the lack of a main effect ( $F=0.16; p>0.05$ ) here suggests that the ordering of the messages did not significantly affect intentions. Therefore, the orderings were not included in the final equation. Temporal frame was not significant for a main effect ( $F=0.41; p>0.05$ ), nor was CFC ( $F=0.41; p>0.05$ ) or the interaction between CFC and temporal frame ( $F=1.67; p>0.05$ ).

*Table 8: 2 (CFC: High/Low) x 2 (Temporal Frame Message 1 &2) Analysis of Variance on Intention to Get Vaccinated*

<i>Variable</i>	<i>F Value/ df</i>	<i>p</i>
CFC	F( 1, 251) =0.41	n/s
Temporal Frame	F= (1, 251)= 0.41	n/s
CFC x Temporal Frame	F=(1, 251)= 1.67	n/s

Note: CFC= Consideration of Future Consequences;  $R^2=0.01$

***Hypothesis 4b. The relationship between CFC level and whether or not a woman seeks out additional information about HPV and its vaccine will be moderated by temporal frame.*** First, an ANOVA was run (see Table 9), with CFC as the dependent variable and

intent to be vaccinated and whether or not the participant sought additional information being independent factors. CFC was used as the dependent variable in this equation because information-seeking was not a continuous variable. The orderings were included in the analysis to examine any possible order bias and the lack of a main effect ( $F=0.65$ ;  $p>0.05$ ) here suggests that the ordering of the messages did not significantly affect CFC. Therefore, the orderings were not included in the final ANOVA. In the final ANOVA, there was no interactive effect between temporal frame and wanting information on CFC ( $F=2.59$ ;  $p>0.05$ ). However, temporal frame did have a significant effect on CFC ( $F=5.99$ ;  $p<0.05$ ), although this was not a strong effect (partial eta squared= 0.02). This

*Table 9: 2(Information Seeking: Yes and No) x2 (Temporal Frame: Long Term Positive and Short Term Positive) Analysis of Variance on Consideration of Future Consequences*

<i>Variable</i>	<i>F/df</i>	<i>p</i>
Information Seeking	F(1, 251)=0.03	n/s
Temporal Frame (TF)	F(1, 251)=5.99	$p<0.05^*$
Information Seeking x TF	F(1, 251)=2.60	n/s

Note:  $*p<0.05$ ,  $R^2=0.03$

finding seems to be due to a chance occurrence, as CFC was assessed prior to the messages being randomly shown to participants; upon examination, it became clear that more women in the final sample had been exposed to the temporal frame in which the positives were described as being in the short term and negatives in the long term. Thus, many of the women who were screened out of the study, either for having already been vaccinated or diagnosed with HPV, had been exposed to the alternative message, resulting in an uneven distribution of temporal frames.



***Hypothesis 4c. The relationship between CFC level and the number of positive and negative thoughts about HPV vaccination that are written in response to the health message will be moderated by temporal frame.***

An ANOVA was utilized to explore this relationship (see Table 10). CFC, the overall tone of the response (whether the response was, when all thoughts were added together, more positive or negative) and the temporal frame (long term consequences positive and short term consequences positive) of the messages were entered as independent variables. The total number of negative thoughts listed by each participant was subtracted from the total number of positive thoughts listed by each participant and the resulting variable, Thought Listings, was used as a dependent variable. These Thought Listings ranged from -4 to 4. Ordering was included in the first ANOVA as an independent variable but, as it was not found to have a significant effect in the first test ( $F=0.34; p>0.05$ ), ordering was not included in the final ANOVA. In this final test, the positive or negative overall tone of the response had a significant effect on the number of thoughts ( $F=392.89; p<0.01; \text{partial eta squared}=0.69$ ), while the temporal frame itself did not exert a significant main effect ( $F=0.54; p>0.05$ ). Temporal frame was not found to moderate the relationship between CFC and number of positive thoughts written ( $F=0.06; p>0.05$ ). The interaction between CFC and whether the tone was positive or negative was significant ( $F=6.46, p<0.05; \text{partial eta squared}=0.04$ ).

***Hypothesis 5a. The effect of CFC level and temporal frame on intention to seek out HPV vaccination will be mediated by attitude toward HPV vaccination.***

Linear regression analysis was utilized to examine the relationship between these variables (see Table 11). First, temporal frame was recoded as a dummy variable where

*Table 10: 2 CFC (High/Low) x 2 (Temporal Frame: Long Term Positive and Short Term Positive) x 2 (Positive and Negative Responses) Analysis of Variance on Thought Listings*

<i>Variable</i>	<i>F/df</i>	<i>p</i>
CFC	1.20 (1)	n/s
Temporal Frame (TF)	0.54 (1)	n/s
Positive/Negative Response	392.89(1)	p<0.01**
TF x Pos/Neg	0.48(1)	n/s
TF x CFC	0.06(1)	n/s
CFC x Pos/Neg	6.46(1)	p<0.05*
TF x CFC x Pos/Neg	0.04(1)	n/s

\*p<0.05; \*\*p<0.01, R<sup>2</sup>=0.71; CFC= Consideration of Future Consequences; Pos/Neg= Positive/Negative Responses

the messages in which the present was framed in terms of positives and the future in terms of negatives was coded as 0 and the messages in which the future was framed in terms of positives and the present in terms of negatives was coded 1. This dummy variable of temporal frame and the summed score of CFC were regressed upon the summed score of intention to seek HPV vaccination on the first step, followed by the interaction term of temporal frame and CFC, followed by the summed score of attitudes toward HPV vaccination. Attitude toward HPV vaccination explained 65% of the variance in intention to get vaccinated and had a large effect size ( $f^2=0.75$ ), while CFC and temporal frame did not explain significant amounts of variance. Thus, while attitudes toward vaccination are related to intention to seek vaccination, attitude does not mediate the relationship between CFC and temporal frame and the dependent variable.

Table 11: Regression Analyses for Hypothesis 5a

Variable	B	SE	$\beta$	t	Sig.
<i>Step 1</i>					
CFC	-0.01	0.06	-0.01	-0.22	n/s
TF	0.47	0.87	0.04	0.54	n/s
<i>Step 2</i>					
CFC x TF	0.17	0.13	0.56	1.36	n/s
<i>Step 3</i>					
Attitude	1.09	0.05	0.81	21.30	p<0.01**

CFC=Consideration of Future Consequences, TF=Temporal Frame; \*\*p<0.01; Step 1 R<sup>2</sup>=0.00, Step 2 R<sup>2</sup>=0.01, Step 3 R<sup>2</sup>=0.65.

***Hypothesis 5b. The effect of CFC level and temporal frame on intention to seek out***

***HPV vaccination will be mediated by perceived behavioral control over getting***

***vaccinated against HPV.*** Linear regression analysis was utilized to examine the relationship between these variables (see Table 12). First, temporal frame was recoded as a dummy variable where the messages in which the present was framed in terms of positives and the future in terms of negatives was coded as 0 and the messages in which the future was framed in terms of positives and the present in terms of negatives was coded 1. This version of temporal frame and the summed score of CFC were regressed upon the summed score of intention to seek HPV vaccination first, followed by the interaction term of CFC and temporal frame, followed by the summed score of perceived behavioral control. Perceived behavioral control explained 25% of the variance in intention to get vaccinated, and its effect size ( $f^2=0.06$ ) was very small. CFC and temporal frame did not explain significant amounts of variance.

Table 12: Regression Analyses for Hypothesis 5b

Variable	B	SE	$\beta$	t	Sig.
<i>Step 1</i>					
CFC	-0.01	0.06	-0.01	-0.22	n/s
TF	0.49	0.86	0.04	0.57	n/s
<i>Step 2</i>					
CFC x TF	0.17	0.13	0.56	1.36	n/s
<i>Step 3</i>					
PBC	0.60	0.07	0.49	8.87	p<0.01**

CFC=Consideration of Future Consequences, TF=Temporal Frame, PBC=Perceived Behavioral Control; \*\*p<0.01; Step 1 R<sup>2</sup>=0.00, Step 2 R<sup>2</sup>=0.01, Step 3 R<sup>2</sup>=0.25.

***Hypothesis 5c. The effects of consideration of future consequences and temporal frame on intention to seek out HPV vaccination will be mediated by reported social norms***

***regarding HPV vaccination.*** Linear regression analysis was utilized to examine the relationship between these variables (see Table 13). First, temporal frame was recoded as a dummy variable where the messages in which the present was framed in terms of positives and the future in terms of negatives was coded as 0 and the messages in which the future was framed in terms of positives and the present in terms of negatives was coded 1. This version of temporal frame and the summed score of CFC were regressed upon the summed score of intention to seek HPV vaccination first, followed by the interactions term of CFC and temporal frame, followed by the summed score of perceived social norms regarding HPV vaccination. Social norms explained 41% of the variance in intention to get vaccinated and had a small effect size ( $f^2=0.19$ ), while CFC and temporal frame did not explain significant amounts of variance. Thus, while perceived social norms appear to be related to intention to get vaccinated, this variable

does not mediate the relationship between CFC, temporal frame, and the dependent variable.

*Table 13: Regression Analyses for Hypothesis 5c*

<i>Variable</i>	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>Sig.</i>
<i>Step 1</i>					
CFC	-0.01	0.06	-0.01	-0.22	n/s
TF	0.47	0.87	0.04	0.54	n/s
<i>Step 2</i>					
CFC x TF	0.17	0.13	0.56	1.36	n/s
<i>Step 3</i>					
Social Norms	0.79	0.06	0.63	12.89	p<0.01**

CFC=Consideration of Future Consequences, TF=Temporal Frame; \*\*p<0.01; Step 1 R<sup>2</sup>=0.00, Step 2 R<sup>2</sup>=0.01, Step 3 R<sup>2</sup>=0.41.

### ***Additional Questions***

***6. Is ethnicity related to CFC level?*** Due to unequal sample sizes, two groups were established: white (N=197) and non-white (N=54). A t-test was run to look for differences between the groups with the sum score of consideration of future consequences being the dependent variable. This test was not significant (t=-0.60; p>0.05).

***7. Is having health insurance related to intention to seek out vaccination for HPV?***

An independent samples t-test was used to test for differences on the dependent variable, the sum of the Intentions items, among participants who have health insurance and those who do not. Although these groups were unequal (N=236 for those with insurance and N=15 for those who did not) Levene's test for equality of variances was not significant. This test was significant at the .01 level (t=3.57) with a

medium effect size ( $r_{Y\lambda}=0.39$ ), with those who had insurance being more likely to intend to get vaccinated than those who did not.

**8. *Is number of past gynecological appointments related to intention to get vaccinated for HPV?*** The participants' reported number of gynecological visits in the past two years was correlated with intention to get vaccinated. The correlation was not significant at the .01 level, although it was significant at the .05 level ( $r=0.15$ ,  $p=0.02$ ; small effect size).

**9. *Is knowledge about HPV related to intention to seek out HPV vaccination?*** The participants' reported knowledge of HPV was correlated with their intention to get vaccinated. This correlation was not significant ( $r=0.10$ ,  $p>0.05$ ).

**10. *Is knowledge about HPV vaccine related to intention to seek out HPV vaccination?*** The participants' reported knowledge of the HPV vaccine was correlated with intention to get vaccinated. This correlation was significant ( $r=0.19$ ,  $p=0.00$ ; small effect size).

**11. *Is the relationship between CFC level and intention to get vaccinated for HPV moderated by risk factors (presence/absence of sexual activity and frequency of condom usage)?*** Three analyses of variance were utilized to explore these questions. First, an ANOVA was used to test for differences between the dichotomous variable CFC (high or low) and current sexual activity (yes or no) on the continuous variable of intention to get vaccinated. While current sexual activity had a significant effect on intention to get vaccinated ( $F=5.20$ ;  $p<0.05$ ), there was no interactive effect between CFC and current sexual activity on intentions ( $F=0.28$ ;  $p>0.05$ ).

Next, an ANOVA was used to test for differences between high/low CFC and condom use with a committed (6 months or longer) partner on intention to get vaccinated against HPV. Here, there was a main effect for condom use on intention to get vaccinated ( $F=3.48$ ;  $p<0.05$ ) but no interactive effect between CFC and condom use ( $F=0.25$ ;  $p>0.05$ ).

Finally, an ANOVA was used to test for differences between high/low CFC and condom use with a new partner (always, usually, sometimes, never) on intention to get vaccinated against HPV. While there were no main effects for CFC or condom use, there was an interactive effect between CFC and condom use with a new partner on intention to become vaccinated ( $F=4.99$ ;  $p<0.00$ ). This interaction has an effect size of 0.08, which was calculated using its partial eta squared.

To further clarify this interaction effect, the responses of participants who said that they sometimes or usually used condoms with a new partner were combined into one category. Then, another ANOVA was run using these three categories (never, sometimes/usually, and always) and the two levels of CFC (high/low). There was a significant interactive effect of condom use and CFC on intention to get vaccinated ( $F=6.60$ ;  $p<0.00$ ). Those participants who were categorized as High CFC were more likely to intend to get vaccinated than those low in CFC, when condom usage with a new partner was reported to “always” take place. However, the opposite was true when condom use was reported to take place “never” or “sometimes/usually.”

This test was repeated, this time with participants’ CFC level being determined by using only those participants in the upper and lower quartiles. The interaction effect was again significant ( $F=3.22$ ;  $p<0.05$ ) although not at the same level of significance

as the prior test. This, however, could be attributed to the lower number of participants included in this analysis (N=110), which may have reduced its power.

### ***Qualitative Analyses***

Participants' responses to the three qualitative questions were each coded into five categories, as described earlier in the Methodology chapter. Each response was coded into only one of the five categories. The frequencies of each can be found in Table 14 below. Overall, participants most frequently mentioned the benefits of taking preventive measures with their health (Category 1) as being why they would get vaccinated (68.5%) and, conversely, thinking that the pros of vaccination would not outweigh the cons (Category 1) as being why they would not get vaccinated (40.8%). Participants mentioned anxiety associated with vaccination (i.e. fears of side effects or needles; Category 2) as being the leading reason why they were unsure about getting vaccinated (41.2%).

Three additional questions were included using data that had been coded from the qualitative data. As these questions seemed relevant to the study's purposes, they are included here:

***1. Are there differences among reasons for wanting to get vaccinated with regard to CFC, Intention to Get Vaccinated, Attitudes Toward Vaccination, Social Norms, or Perceived Behavioral Control?*** The responses of participants were coded into one of five categories or groups (see Table 14). A series of ANOVAs were run to assess differences pairwise multiple comparisons test, the Scheffe method, was run in order to better understand differences among these groups for each dependent variable. T-tests were



*Table 14: Frequencies of Qualitative Categories*

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Primary reasons why you WOULD get vaccinated in the next two years (N=232)

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Category	Number	Percentage
1. Benefits of Prevention	159	68.5
2. Benefits of Reducing Worry	30	13.4
3. Perceive Self at Risk	24	10.3
4. Within Age Range	6	2.6
5. No Wish to be Vaccinated	12	5.2

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Primary reasons why you WOULD NOT get vaccinated in the next two years (N=233)

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1. Benefits Don't Outweigh Costs	95	40.8
2. Increased Anxiety	65	27.9
3. Don't Perceive Self at Risk	37	15.9
4. No Wish to be Vaccinated	11	4.7
5. No Reason Not To	25	10.7

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Primary reasons why you may be UNSURE ABOUT getting vaccinated in the next two years (N=266)

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1. Benefits Don't Outweigh Costs	34	15
2. Increased Anxiety	93	41.2
3. Don't Perceive Self at Risk	29	12.8
4. Not Unsure	36	15.9
5. Need More Information	34	15

---

then conducted with those categories that were significantly different from each other.

For Intention, women in Category 5 (See No Reason Not To) were more likely among the groups in relation to the dependent variables mentioned. Significant differences were found for Intention, Attitude, and Social Norms (see Table 15). A post

*Table 15: Analyses of Variance for Open-Ended Questions*

Variable	F/df	p	partial eta <sup>2</sup>
<u>1. Reasons you WOULD get vaccinated within the next two years:</u>			
CFC	0.41/4	n/s	n/s
Intention	9.25/4	p<0.01**	0.14
Attitude	9.22/4	p<0.01**	0.14
Social Norms	4.33/4	p<0.01**	0.07
PBC	0.19/4	n/s	n/s
<u>2. Reasons you would NOT get vaccinated within the next two years:</u>			
CFC	2.34/4	n/s	n/s
Intention	23.32/4	p<0.01**	0.29
Attitude	24.85/4	p<0.01**	0.31
Social Norms	8.06/4	p<0.01**	0.12
PBC	3.58/4	p<0.01**	0.06
<u>3. Reasons you might be UNSURE about getting vaccinated within the next two years:</u>			
CFC	1.96/4	n/s	n/s
Intention	4.89/4	p<0.01**	0.08
Attitude	8.61/4	p<0.01**	0.14
Social Norms	1.89/4	n/s	n/s
PBC	2.22/4	n/s	n/s

Note: CFC = Consideration of Future Consequences, PBC= Perceived Behavioral Control

hoc, pairwise multiple comparisons test, the Scheffe method, was run in order to better understand differences among these groups for each dependent variable. T-tests were then conducted with those categories that were significantly different from each other.

Participants in Category 5 (No Wish for Vaccination) significantly differed from Category 1 (Benefits of Prevention) ( $t= 4.99, p<0.01; r_{Y\lambda} = 0.53$ ), Category 2 (Benefits of Reducing Worry) ( $t=4.53, p<0.01; r_{Y\lambda} = 0.57$ ), Category 3 (Perceive Self at Risk) ( $t=5.02, p<0.01; r_{Y\lambda} = 0.64$ ), and Category 4 (Within Age Range) ( $t=3.49, p<0.01; r_{Y\lambda}=0.70$ ) on Attitude and differed from Category 1 ( $t=5.21, p<0.01; r_{Y\lambda} = 0.60$ ), Category 2 ( $t=4.78,$

$p < 0.01$ ;  $r_{Y\lambda} = 0.62$ ), Category 3 ( $t = 6.10$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.72$ ), and Category 4 ( $t = 3.83$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.70$ ) on Intention. For Social Norms, women in Category 3 (Perceive Self at Risk) were more likely to report positive social norms than those in Category 5 ( $t = 3.30$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.51$ ).

**2. Are there differences among reasons for not wanting to get vaccinated with regard to CFC, Intention to Get Vaccinated, Attitudes Toward Vaccination, Social Norms, or Perceived Behavioral Control?** The responses of participants were coded into one of five categories or groups (see Table 14). A series of ANOVAs were run to assess differences among the groups in relation to the dependent variables mentioned. Significant effects were found for Intention, Attitudes, Social Norms, and PBC (see Table 15). A post hoc, than women in Category 2 (Increased Anxiety) ( $t = 4.01$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.47$ ), Category 3 (Don't Perceive Self at Risk) ( $t = 9.58$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.76$ ), and Category 4 (No Wish to Get Vaccinated) ( $t = 5.02$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.71$ ) to intend to get vaccinated. Women in Categories 3 ( $t = 7.54$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.58$ ) and 4 ( $t = 4.81$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.55$ ) were significantly less likely than women in Category 1 to intend to get vaccinated. Finally, women in Category 2 were more likely than those in 3 ( $t = 5.04$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.46$ ) and 4 ( $t = 3.29$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.44$ ) to want to get vaccinated.

For Attitude, again women in Category 5 (No Reason Not to) were more likely than those in Category 2 (Increased Anxiety) ( $t = -7.36$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.59$ ), Category 3 (Don't Perceive Self at Risk) ( $t = -8.55$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.72$ ), and Category 4 (No Wish to Get Vaccinated) ( $t = -6.08$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.77$ ) to have a positive attitude toward vaccination. Women in Category 1 (Benefits Don't Outweigh Costs), meanwhile, were significantly more likely than women in Categories 2 ( $t = 4.31$ ,  $p < 0.01$ ;  $r_{Y\lambda} = 0.32$ ), 3

( $t=6.47$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.56$ ), and 4 ( $t=3.87$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.54$ ) to hold a positive attitude. Women in Category 2 were significantly more likely than those in Category 3 to have a positive attitude toward vaccination ( $t=3.86$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.36$ ).

For Social Norms, women in Category 3 (Don't Perceive Self at Risk) did not report as positive social norms as those in Categories 1 (Benefits Don't Outweigh Costs) ( $t=4.04$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.34$ ) and 5 (No Reason Not to) ( $t=-3.76$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.45$ ); similarly, women in Category 4 (No Wish to Get Vaccinated) did not report as positive social norms as those women in Categories 1 ( $t=2.51$ ,  $p<0.05$ ;  $r_{Y\lambda} = 0.03$ ) and 5 ( $t=-3.56$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.51$ ).

Finally, for Perceived Behavioral Control, women in Category 2 (Increased Anxiety) were less likely than those in Category 5 (Intend to Get Vaccinated) to perceive themselves as having high behavioral control over getting vaccinated ( $t=-3.73$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.38$ ).

***3. Are there differences among reasons for being unsure about getting vaccinated with regard to CFC, Intention to Get Vaccinated, Attitudes Toward Vaccination, Social Norms, or Perceived Behavioral Control?*** The responses of participants were coded into one of five categories or groups (see Table 14). A series of ANOVAs were run to assess differences among the groups in relation to the dependent variables mentioned. Significant differences were found for Intention and Attitudes (see Table 15). A post hoc, pairwise multiple comparisons test, the Scheffe method, was run in order to better understand differences among these groups for each dependent variable. T-tests were then conducted with those categories that were significantly different from each other.

For Intention, women in Category 3 (Don't Perceive Self at Risk) were

significantly less likely to intend to seek out vaccination against HPV than women in Categories 1 (Benefits Don't Outweigh Risks) ( $t=3.74$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.42$ ) and 4 (Intend to Get Vaccinated) ( $t=-3.97$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.44$ ). For Attitude, women in Category 3 (Don't Perceive Self at Risk) were significantly less likely to hold a positive attitude about the vaccine than women in Categories 1 (Benefits Don't Outweigh Risks) ( $t=4.35$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.49$ ), 2 (Increased Anxiety) ( $t=3.26$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.32$ ), and 4 (Intend to Get Vaccinated) ( $t=5.00$ ,  $p<0.01$ ;  $r_{Y\lambda} = 0.54$ ).

## Chapter Six: Discussion

The present study was designed to build upon prior research which has suggested that time perspective and constructs derived from the theory of planned behavior such as attitudes, social norms, and perceived behavioral control are related to whether or not an individual engages in a health behavior. In specific, this study looked at whether these variables played an important role in young, college-aged women's decisions about becoming vaccinated against the human papillomavirus. The following discussion section will examine the study's findings in greater depth and, when appropriate, contrast what was found with the results of related research. Limitations of the present study will then be discussed, followed by implications of this study's findings for research and practice.

### Hypothesis 1

Contrary to expectation, Consideration of Future Consequences was not correlated with intention to get vaccinated against HPV in this study. Thus, despite the findings of past studies which suggested a link between time perspective and the health-related attitudes and behaviors of college students (Dorr et al, 1999; Joireman, 1999; Rothspan & Read, 1996; Strathman et al, 1994), the consideration of future consequences of young college women does not seem to be connected to their decision to pursue a vaccine which may prevent cervical cancer and genital warts. The college women in the present sample do not seem to have differed substantially from college students in a past sample; the current study found a mean score of 42.03 (SD=6.87) for the CFC scale, while a 1994 study by Strathman et al. on a similar population found a mean score of 42.50(SD=7.90). This suggests that other factors must be considered in predicting a

woman's intent to become vaccinated. Several possible explanations will be explored in turn.

First, an individual's perceived risk for being infected with HPV could have affected the relationship between CFC and intent to become vaccinated. Prior studies looking at CFC and college women suggest that those high in CFC may be less likely to contract an STD. For example, Dorr et al (1999) found that students high in CFC were less likely to engage in risky sexual behaviors, while Rothspan and Read (1996) found that they had fewer sexual partners. The present study found that CFC was positively correlated with condom use with a new partner as well as attending regular gynecological visits (for both:  $r=0.16$ ,  $p < 0.05$ ). Both of these health-protective behaviors, in addition to getting vaccinated, are among the most effective in reducing the likelihood of acquiring the HPV and its negative effects. Thus, some young women with higher CFC are more likely to be engaging in some behaviors that are viewed as preventative against HPV or its effects. They may perceive themselves to be less at risk for contracting HPV or for developing cervical cancer if they do become infected and, consequently, may view getting vaccinated as less salient.

In a study in which no link was found between CFC and attitudes about alcohol consumption (Strathman et al, 1994), it was hypothesized that some college students failed to make a link between those behaviors and the future consequences associated with them. Similarly, students who view themselves as at low risk for HPV may not necessarily view vaccination as a necessary and sufficient precaution for future health, no matter how proactive their behaviors in ensuring future health in other areas. In part, this may be because the vaccine does not protect against all strains of HPV, most women who

are exposed to strains of the virus that can lead to cervical cancer or genital warts do not get either as their body clears the virus, and the majority of this sample was already sexually active and may therefore have perceived the vaccine as less likely to lower their risk of infection. Perceptions of being at low risk may be inaccurate, however, as prior research, as well as results of the current study, suggest that college women do not possess extensive knowledge about risk factors associated with HPV or about the vaccine itself (Fletcher & Bryden, 2005; Yacobi et al, 1999).

Furthermore, drinking among college students, unlike some other health behaviors, often takes place in a social context, adding an interpersonal component to decision-making around whether or not to drink. Likewise, sexual activity typically occurs in a dyadic interaction, thus factors related to one's partner and relationship may also be taken into consideration when considering whether or not to engage in preventative behaviors. For example, a woman's decision to use condoms with a partner may be influenced by her level of trust in the relationship, fears of communicating to her partner that she thinks he may be infected with an STD, and a power differential between her and her partner (Hoffman & Baker, 2003). Similar factors may contribute to her decision to become vaccinated.

Along these same lines, it is possible that some young women who are more focused on the future may be more likely to take into consideration both the positive and negative long term outcomes of a vaccine as new as Gardasil. As will be discussed later in this chapter, several participants mentioned fearing the emergence of yet-undiscovered side effects of the vaccine or expressed distrust of pharmaceutical companies or the FDA. Although much of the response to the idea of an HPV vaccine has been positive, when



faced with the actual prospect of becoming vaccinated, some more future-oriented individuals may be more likely to wait until long term studies have been conducted with large samples of people before seeking it out for themselves.

A recent study by NIH on a hypothetical HIV vaccine (Allen et al, 2005), for example, found that more than 40% of the general population did not trust that the U.S. government would protect HIV vaccine trial volunteers; in the same study some participants, especially those from minority groups, expressed belief or uncertainty regarding whether or not the vaccine could actually transmit HIV and reported that they would be unlikely to encourage someone they knew to participate in the trial. Although the HPV vaccine is no longer under trial, attitudes toward its maker, Merck, whose FDA-approved drug Vioxx was later found to cause serious health problems, could similarly affect the trust with which consumers approach the vaccine.

Attitudes toward vaccines in general were not measured quantitatively in this study, however a number of participants expressed uncertainty about the HPV vaccine in response to open-ended questions. For example, one woman stated: “The HPV vaccine is fairly new so there is not much of a case study or longitudinal information. In Europe, the HPV vaccine is not getting as much hype as it is in America which makes me skeptical as to how far the FDA has considered and reviewed the vaccine. There have been other types of vaccines in the past that were recalled because of detrimental side effects to neurological development in children; oftentimes the vaccines remain on the market and pushed because of ignorance.” In short, attitudes toward vaccinations, especially one that is newly approved by the FDA, could affect whether or not a future-minded individual chooses to use this medication to protect her or his future health. Deciding between the

lesser of two potential evils- getting HPV which is unlikely to lead to cervical cancer in most women or facing possible unknown side effects of the vaccine- could come down to the influence of factors such as perceived risk or social norms.

Finally, there may simply be other variables that are more strongly connected with one's intent to get vaccinated than time perspective. Those participants who had health insurance, for example, were significantly more likely to say that they intended to get vaccinated than those who did not ( $t=3.57$ ,  $p<0.01$ ). Thinking that one will not be able to afford the vaccine or not currently being connected to the health care system may be barriers that women, proactive about their health or not, feel will halt any preventative measures they might like to take. Also, women who reported thinking a lot about health issues were more likely to say that they intended to get vaccinated. Thinking about gynecological health ( $r=0.24$ ;  $p<0.01$ ), thinking about STD's ( $r=0.26$ ;  $p<0.01$ ), and thinking about cancer ( $r=0.25$ ;  $p<0.01$ ) were all significantly correlated with intent to be vaccinated. Since not all women who think about potential health problems are high in CFC (these were not correlated), it could be that another variable, such as general anxiety or fearfulness of the target illness (which was found to be a significant predictor in the Orbell and Hagger (2006) study of diabetes II) could better capture what motivates women to get vaccinated.

### Hypothesis 2

The second hypothesis, which held that participants who sought additional information about the HPV vaccine would be higher in CFC than those who did not, was also not supported by the data. A markedly low number of participants (15 out of 251) chose to seek additional information about this vaccine by clicking a link that would

connect them to websites about HPV and its vaccine. Understanding why these young women did not seek information seems important as, in the present study, possessing knowledge of the vaccine was significantly correlated with intent to get vaccinated ( $r=0.19$ ;  $p<0.01$ ) and participants reported low levels of knowledge about HPV and the vaccine (means of 3.30 and 3.02, respectively, on a 1-7 scale). There could be a number of reasons for the participants' seeming lack of interest, including already possessing adequate information prior to the study or believing that they did so after reading the health message about the vaccine. For example, several participants expressed feeling informed after reading the message, making statements such as "I had no idea what HPV did/how many strains/what the vaccine prevents. Thank you!" and "This disease is much more serious than I thought. I am much more aware of it now." Furthermore, it may be likely that some young women high in CFC already felt informed about the vaccine. Also, college students taking the online study for class credit may have wished to finish the survey as quickly as possible and, as the majority of college students have steady access to the internet, certainly may have sought additional information at a later date if they wished.

Furthermore, other factors may have been more strongly connected with the desire for additional information than time perspective. Again, those young women who perceived themselves as being at risk may have been more likely to want additional information than those who did not. In the answers to this study's open-ended questions, many participants commented on their level of sexual activity or relationship status as contributing to whether or not they perceived themselves as being at risk for HPV. For example, a number of respondents noted that they were in a monogamous relationship or

were a virgin and intended to remain one until married. Thus one's perception of oneself as being at risk may be connected to information seeking behavior, as at least one past study on health behavior has suggested (Kuttschreuter, 2006). Since there were no significant differences on information seeking among the variables in this study pertaining to sexual activity (i.e. condom usage, etc.) it could be hypothesized that one's perception of risk is probably more important than actual risk factors.

Prior research has suggested a variety of other variables that could be correlated with seeking health information. Wallston, Maides, and Wallston (1976), for example, found that undergraduate students who both placed a high value on health and possessed a high internal locus of control were more likely to seek out information on hypertension than students who did not value health highly and had either an internal locus of control or an external locus of control. Another variable that could affect information-seeking behavior is health anxiety. Eastin and Guinsler (2006) found that individuals with moderate to high levels of health anxiety sought higher amounts of online health information. Thus several individual difference variables, such as locus of control, health valuing, or health anxiety, could be correlated with whether or not a young woman decides to look for more information about a health issue.

### Hypothesis 3

Contrary to expectations, women high in CFC were not found to be more likely to write positive thoughts in response to the health message than women low in CFC. Unlike the findings of past studies in which CFC was found to be connected with positive statements following reading an environmental (Strathman et al, 1994) or health message on colorectal or diabetes II screening (Orbell et al, 2004;Orbell & Hagger, 2006), this

construct does not appear to be correlated with thoughts concerning the HPV vaccine. Again, this difference could be due to factors unique to the subject of getting vaccinated against a sexually transmitted disease. As the qualitative data attests, responses to the health messages included a range of considerations which often qualified positive thoughts about the vaccine, including perceived risk (for example, commenting that the vaccine seems like a good idea but “I don't intend to get the vaccine because I am in a long term, monogamous relationship.”), fear of side effects (for example “It sounds like a very good thing but I wouldn't get it just yet, until long term side effects are known”) and barriers associated with getting vaccinated (for example “It seems unfair that a vaccine as necessary as this costs so much money.”).

#### Hypothesis 4a.

The relationship between a woman's CFC level and her intention to get vaccinated was not found to be moderated by the temporal frame of the message (i.e. whether the benefits were framed in terms of the present or future) to which she was exposed. Thus, unlike the findings of the Orbell et al (2004) study, which found that participants responded to temporally framed messages about colorectal screening based on their level of CFC, these tendencies do not seem present in the present sample. Again, there may be several possible reasons for this unexpected finding.

First, as discussed earlier, other variables, such as perceived risk, might simply be more salient to a young woman's decision about whether or not to become vaccinated against HPV. Unlike colorectal cancer, which was examined in the Orbell et al (2004) study, HPV may be viewed as avoidable, especially by those who are not sexually active or are in committed relationships and have no reason to believe that they or their partner

are infected. If HPV is not viewed as a likely future consequence of not getting vaccinated, there may be little motivation to schedule a vaccination appointment. Furthermore, the act of getting screened for colorectal cancer, which was the health behavior in the Orbell et al (2004) study, may not evoke the same concerns as the HPV vaccination. Both may be similar in that they could protect against disease or advanced disease and are relatively unpleasant experiences. However, the vaccination also carries with it fears of side effects and, unlike the hypothetical colorectal screening, is not free of charge. To this age group, getting vaccinated may also require disclosing to one's parents that one is sexually active in order to be able to afford the vaccine or have it covered by insurance. As one participant stated, she might not get vaccinated "because I come from a very Catholic family where my parents do not realize that I'm sexually active. In our religion we believe that we should save ourselves for marriage, and so for me to tell them I want the vaccination they would have to know that I have had sex."

It is also possible that the health messages created for the study did not accurately capture the temporal framing that was intended. The time-oriented words in the various messages might not have been plentiful or obvious enough to have created the desired affect of creating a temporal frame. Creating messages about the HPV vaccine in which temporal frame was manipulated presented unique challenges. For instance, the vaccine demands long term commitment in that vaccination is spread out over several months, whereas colorectal screening, for example, can be completed in one appointment; such features of the vaccine may have interfered with efforts to frame the experience temporally. Furthermore, although the messages were piloted prior to the study, they were done so with a sample of women who were slightly older and had higher education

levels than the target sample; thus the two groups of women may have reacted differently to these messages. Finally, previously heard information about Gardasil, which was widely publicized around the time of the study through Merck's "One Less" campaign, might have affected the efficacy of the manipulation.

#### Hypothesis 4b.

The relationship between CFC level and whether or not a participant sought additional information about HPV and its vaccine was not moderated by temporal frame, as hypothesized. Since previous research has found that seeking health information can lead to increased knowledge and healthier behaviors (Rimal et al, 1999), this finding suggests that tailoring a message to a young woman's level of CFC may not in itself be useful in encouraging that woman to learn about certain health behaviors and subsequently take measures to protect herself. As noted earlier, other factors may simply be more predictive of information seeking behavior or could serve as better moderators between CFC and information seeking.

#### Hypothesis 4c.

Although the relationship between CFC level and the number of positive and negative thoughts about HPV vaccination was not moderated by temporal frame, as predicted, a significant interactive effect was found between CFC level and whether a thought was, overall, positive or negative. This interaction indicated that, when writing a negative statement, those women who were higher in CFC tended to write a greater number of negative thoughts than those lower in CFC; likewise, when writing a positive thought, those who were higher in CFC tended to write a greater number of positive thoughts than those who were lower in CFC. Thus, whatever her opinion might be, the

individual who was higher in CFC seemed to express more of it than her lower CFC counterpart. For instance, a participant who was higher in CFC wrote “HPV is a disease that is very preventable if they get young girls vaccinated before they start becoming sexually active. I think it is very stupid of parents not to get their daughters vaccinated and I feel that insurance should cover the whole cost of the shots like they do any other regular shots that children need. Being vaccinated is cheaper than what it costs in the long run to be treated for HPV and what it does to the woman physically and mentally.” A women who was lower in CFC commented, in comparison: “HPV sounds very scary, I hope I'm not one of the statistics one day.”

Personal factors associated with being high in CFC could have affected participants’ performance on the written aspects of this survey. For instance, past research has found that college students with higher CFC have higher GPAs and are more likely to be involved in social activism (Peters et al, 2005; Strathman et al, 1994). Thus, perhaps the women in the study with higher CFC took participation in class-related research more seriously and thus were more conscientious about writing down all their thoughts. Or, being interested in social activism, women with higher CFC may have been more interested in a subject matter that has great implications for our society and thus had more to say about it.

#### Hypotheses 5a.-5c.

Hypotheses 5a-5c posited that the effect of CFC level and temporal frame on intention to seek out HPV vaccination would be mediated by the selected Theory of Planned Behavior variables: attitude toward the vaccine, perceived social norms regarding it, and perceived behavioral control toward becoming vaccinated. These



hypotheses were not supported by the data. Thus, it appears that time perspective, as portrayed in the present study, does not influence intention through its effect on one of these variables.

The data does, however, lend support for the utility of the Theory of Planned Behavior's variables in predicting a woman's intention to be vaccinated against HPV. As mentioned in the previous chapter, attitude, social norms, and perceived behavioral control together contributed a significant amount of variance to intention to get vaccinated against the virus, suggesting that these constructs are useful in understanding what factors might contribute to this decision. Compared to the Armitage and Conner (2001) meta-analysis of TPB research, which found that attitudes, social norms, and perceived behavioral control together contributed to 39% of the variance in intentions to engage in health behaviors, the current study found that these factors explained 69% of the variance in intention to get vaccinated against HPV (see Table 16). The data also builds upon information from past studies pertaining to each individual TPB construct.

*Table 16: Regression Analysis with Theory of Planned Behavior variables*

	B	SE	$\beta$
Attitude	.88	.06	.65
Social Norms	.21	.06	.17
PBC	.16	.05	.13

$R^2=0.69$ ;  $F=(3,249)182.842$ ,  $p<0.01^{**}$ ; PBC= Perceived Behavioral Control

As in Kahn et al.'s study on the HPV vaccine (2003), attitude was a strong predictor of intention to get vaccinated. Of all the Theory of Planned Behavior constructs included in the present study, it was not only the strongest predictor of intention, but the only construct with a significant effect size (medium effect .33). Although social norms

and perceived behavioral control added to the variance in intention to be vaccinated, the lack of significance of their effect sizes indicated that they did not predict unique variance to the criterion variable. Thus, although perceived barriers and the opinions of others might be considerations, attitude toward the vaccine seems most important in deciding whether or not to get vaccinated. This seems supported by the analyses that were conducted with the open-ended questions, where attitude was more consistently connected with reasons why women would, would not, or felt unsure about getting vaccinated than were the other two constructs. Thus, it seems likely that if a woman believes that she will receive benefits from the vaccine, other factors may not be considered as important in her decision-making process.

Like the study by Rhodes and Courneya (2003), global, affective, and instrumental components of attitude were included in the current study's measures, as all have been found to be predictors of health behavior intent. The current study found the global measure of attitude to be most strongly correlated with vaccination intention ( $r=0.75$ ;  $p<0.01$ ). This was followed by the instrumental items ( $r_s=0.73$  and  $0.74$ ;  $p<0.01$ ) and the affective item ( $r=0.53$ ;  $p<0.01$ ). This seems to support Rhodes and Courneya's (2003) findings that the global and instrumental components of attitude are most important to college students when deciding whether or not to engage in a health behavior. The comments of participants in the current study seemed to support this, as the majority focused on instrumental components over affective, such as "I know the risk of cancer that lies in HPV. A vaccine may be a little painful or bit of a nuisance to get, but it will be worth reducing my risk."

With regard to predicting intent to be vaccinated, it should be noted that participants' intention to seek out HPV vaccination was quite high. On a total scale of intentions ranging from 4 to 28, participants reported a mean score of 22.65 (SD=6.68). Therefore, it is uncertain how useful attitude and the other Theory of Planned Behavior variables would be in predicting actual vaccination behavior. Future research could focus on the relative usefulness of a woman's attitude, perceived social norms, and perceived behavioral control in predicting whether or not she follows up on her intention to get the HPV vaccine.

### Additional Questions

#### *1. Is ethnicity related to CFC level?*

Previous research has found that White individuals differ from African-American individuals in temporal orientation (Bergadaa, 1990; Brown & Segal, 1996) and that African Americans' more present oriented time perspective can result in feelings of low susceptibility to illness and greater belief in the benefits of home remedies over traditional medicines (Brown & Segal, 1996). Thus, the current study sought to ascertain whether differences in CFC may have been present between people of varying ethnicities. Due to a low number of non-White participants in the present study, analyses were not conducted among participants from all the ethnic backgrounds represented, but between White and non-White participants only. No differences were found.

This finding could be related to either an issue with the analyses used in this study or to descriptive information that was not assessed. Brown and Segal (1996) suggested that many of the African American subjects in their study were living below the poverty line and that the culture of poverty may exert a strong influence on temporal orientation.

Not only were students of varied ethnicities included in the present analysis, but their socioeconomic status is unknown. Thus two possible explanations are that the act of grouping together varied non-White ethnicities missed important distinctions in CFC between them or that it is socioeconomic class, and not ethnicity, that contributes to differences in CFC.

*2. Is having health insurance related to intention to seek out vaccination for HPV?*

Participants who had health insurance were more likely to also intend to be vaccinated against HPV. This finding may provide further support for cost of the vaccine being a major barrier to young women who would like to be vaccinated and for socioeconomic status, as opposed to race or ethnicity, having a large influence on preventive health behaviors. Although causality cannot be established by this relationship, it could be possible that women who had insurance felt there was a greater chance that they could afford the vaccination through their insurance. Similarly, college women receiving health care through their parents may have expected that they would receive help with health-related costs. Those with health care also might have been more likely to have had more recent or frequent medical care or may have been more likely to have received information about HPV-related health conditions from their doctors and thus feel more motivated to become vaccinated, as may be evidenced by the fact that those with insurance were also significantly more likely to think about cancer ( $t=3.91$ ;  $p<0.01$ ) and STDs ( $t=3.91$ ;  $p<0.01$ ) and to view those around them as being supportive of the vaccine ( $t=3.56$ ;  $p<0.01$ ).

*3. Is number of past gynecological appointments related to intention to get vaccinated for HPV?*

There was a correlation between number of past gynecological visits and wishing to get vaccinated. However, this correlation was significant at the .05 level and should be interpreted with caution. Although causality cannot be implied here, this finding could reflect that women who take proactive measures with their health (e.g. attending regular medical appointments and screenings) are more likely to want to take part in other preventive health behaviors, either due to the influence of their doctors or to individual characteristics of the woman. On the other hand, a woman who attends a higher number of gynecological exams in a period of two years could either be experiencing problems with her health or be overly anxious about health symptoms. Either of these conditions could motivate her to take further action in protecting herself against needing more unpleasant doctor's visits.

*4. & 5. Is knowledge about HPV/the HPV vaccine related to intention to seek out HPV vaccination?*

Interestingly, while possessing knowledge about the HPV virus was not correlated to intention to seek out the vaccine, possessing knowledge about the vaccine itself was related to this intention ( $r=0.19$ ;  $p<0.01$ ). This may indicate that increased knowledge about the vaccine decreased barriers to pursuing it. Another variable may also be at play here, with women who were more concerned about getting HPV being more likely to seek out information about the vaccine as well as to subsequently get vaccinated. At the same time, women who knew about the HPV virus, but did not perceive themselves at

risk, may have been less likely to want to learn about or receive the vaccine. Finally, another possibility is that those women who heard about the vaccine had been informed by their doctor or another influential person who encouraged them to become vaccinated, thus strengthening their intention to do so. Responses to the open-ended questions show that a number of respondents mentioned their mother or their physician as encouraging them to become vaccinated.

*6. Is the relationship between CFC level and intention to get vaccinated for HPV moderated by risk factors (presence/absence of sexual activity and frequency of condom usage)?*

Of the three analyses run, only one found a significant moderating effect: the effect of CFC on intention to get vaccinated against HPV was moderated by reported frequency of condom use with a new partner. Participants with high CFC were more likely than those with low CFC to intend to get vaccinated when they reported always using condoms with a new partner. However, participants with low CFC were more likely than those with high CFC to intend to get vaccinated when they reported never or sometimes using condoms with a new partner. This finding was interesting because, at first glance, it seems to depict some participants with High CFC reporting engagement in risk behaviors and denying interest in preventive behaviors; conversely, those with Low CFC are depicted as, overall, being quite interested in vaccination.

An alternative factor may help to make sense of these differing responses. As mentioned earlier, perceived risk could be a moderating variable. The health message may have alerted those with Low CFC to their level of risk, something they may not have considered as carefully as those who are high in CFC. Therefore, those who were low in

CFC and perceived themselves at risk (i.e. by not always using condoms with new partners) may have seen vaccination as a useful tool, while those who always used condoms and perhaps did not perceive themselves at risk did not. This interpretation of the health message having an effect on the perceptions of women with low levels of CFC seems positive, as people low in CFC are theorized to be less likely to engage in preventative health behaviors and more likely to engage in risky sexual practices (Lukwago et al, 2003; Rothspan & Read, 1996). Further research could focus on what aspects of a health message most convey a sense of risk to this group as well as ascertaining how many young women actually follow up on their intention to get vaccinated.

For those participants with high CFC, one interpretation of the findings is that those who did not always use condoms with a new partner still may not perceive themselves at risk and therefore did not intend to get vaccinated. Since previous studies have found that CFC is not predictive of behavior in situations where a link between present behavior and future consequences is perceived (Strathman et al, 1994), it could be that women high in CFC who don't always use condoms engage in other behaviors that lower their perception of being at risk for HPV. For example, they may be more likely to talk about STDs with a partner, require that partners get tested for STDS, have sex with fewer partners or only with those with whom they intend to have a long-term or monogamous relationship. These behaviors may or may not, in reality, reduce their risk but may lead them to believe that they are engaging in health-protective behaviors and make them less interested in seeking out another prevention effort.

Those participants who were high in CFC, always use condoms, and were interested in vaccination, seemed most interested in all methods of prevention against HPV. This group may perceive themselves at risk for HPV even though they use condoms and therefore wish to take additional steps toward prevention. These participants may be the easiest to reach through health education because they seem responsive to information regarding protecting their future health and interested in multiple forms of health-protective behaviors. It may also be possible that another factor, such as health anxiety, could be a feature of these participants, as they may have been particularly sensitive to the health message's information about condoms not always ensuring protection against HPV, whereas other participants may not have overly focused on this piece of information.

#### *Qualitative Analyses*

There were significant differences among the five categories of women's responses for each additional analysis on the dependent variables Intention to be Vaccinated, Attitudes Toward Vaccination, Social Norms toward Vaccination, and Perceived Behavioral Control. First, in response to being asked for reasons why they would get vaccinated in the next two years, those women who responded that they did not intend to get vaccinated had, predictably, significantly poorer attitudes toward and lower intentions to seek vaccination than women in any other category. Examples of responses in this category included: "I do not plan and will not need to get vaccinated" and "If I was very promiscuous I would, or if I suspected that someone I was having sex with had it."

Interestingly, women who perceived themselves to be at risk for HPV were significantly more likely to report positive social norms toward the vaccine than women



who had no interest in vaccination. Thus it may be that women who have others in their lives who react positively to the HPV vaccine or see a need to get the vaccine may be more likely to perceive their own risk and thus want to be vaccinated. This would seem especially true if the members of a young woman's peer group also see themselves at risk or if a parent urges her child to get protected.

With regard to the second open-ended question, reasons why a woman would not get vaccinated, women who mentioned problems such as cost or inconvenience as being problematic (Category 1: Benefits Don't Outweigh Costs) were, however, significantly more likely to intend to get vaccinated than women who did not perceive themselves at risk or those who did not intend to get vaccinated. Furthermore, they were significantly more likely to hold positive attitudes toward the vaccine and positive social norms than these other women. This makes sense, considering that many of the responses in this category seemed somewhat positive, despite remarking upon barriers to the vaccine; for example, one woman wrote: "It would be hard to afford that if it was not covered by my insurance, but over two years I could definitely make an effort to save the money over the time." Thus, although barriers such as the price of the vaccine were of concern to many women, they did not seem to dampen their enthusiasm toward vaccination and their desire to get vaccinated.

Women in Category 2 (Increased Anxiety) were significantly less likely than those in Category 1 to have a positive attitude toward the vaccine, but their attitudes toward vaccination were significantly more positive than those of women who did not perceive themselves at risk for HPV. Examples of responses from this category include "I hate needles. Other than that, there's no reason I shouldn't" and "I would have to discuss

this issues with my parents first, and would feel uncomfortable talking about being sexually active.” They were also significantly more likely to intend to get vaccinated than women who didn’t perceive themselves at risk and those without interest in vaccination. However, women who expressed unease about some aspect of the vaccine (i.e. fear of needles, side effects) were significantly less likely than women who said they intended to get vaccinated to perceive themselves as having control over getting vaccinated. Thus, although women who are anxious about aspects of the vaccine may have a slightly less positive attitude toward it than women who are concerned about such things as cost alone; also, their fears may interfere with their sense of self-efficacy in getting themselves to and through the set of three vaccinations. This seems to support previous findings with regard to the importance of self-efficacy in predicting the health behaviors of college students (Rhodes & Courneya, 2003).

Women who did not perceive themselves to be at risk for HPV (Category 3) typically scored lower than the other groups of women on the Theory of Planned Behavior constructs. For instance, they reported less positive social norms toward the vaccine than did women in Categories 1 and 5 and were significantly less likely than those in Categories 1 and 2 to have intentions to get vaccinated or hold positive attitudes toward the vaccine. This suggests that not perceiving oneself to be at risk for HPV may be an important factor in the decision-making process around getting vaccinated. Women who reported that they did not perceive themselves at risk, when asked why they were “unsure about” getting vaccinated, were also significantly less likely to intend to get vaccinated and expressed less positive attitudes toward the vaccine than did women who gave other reasons. These findings support ideas discussed earlier in this chapter

concerning the effect that perceived risk might have on whether or not a women intends to get vaccinated. For instance, the significant interaction between CFC and condom use with a new partner on intention to get vaccinated may suggest that viewing one's self as engaged in risky behavior, combined with personal factors such as time perspective, could predict this health behavior.

### Limitations

Several limitations associated with the present study should be noted. First, although the sample of participants was drawn from several universities across the East coast, the majority of the students who took part in the study did so in order to attain extra credit for their introductory psychology classes. These psychology students were further given the opportunity of choosing which studies they wished to participate in. Thus, the students who participated may have self-selected into the present study and could have been more interested in the subject matter of a study entitled "Women's Attitudes Toward Sexual Health" than other college aged women. This could affect the generalizability of these findings to other groups of young women.

Although it is not possible to depict an accurate response rate, it is clear that this study did not represent a random sample of college-aged women. This has implications for the generalizability of its findings. Calculating the response rate was challenging, as the larger psychology subject pools from which the majority of participants were drawn either did not records of the ages of the women participating in the pool or did not have the pool's sample broken down by gender. This may have resulted in overestimations of the number of women who both saw the survey and were eligible to participate. Furthermore, by the time the present study was listed as a possible extra credit

opportunity, it is possible that some women in the subject pool had already signed up for or completed other studies and had received their maximum extra credit points. Thus, it is possible that the response rate was actually higher than the calculations noted here.

However, one must also consider that this study may have attracted a select sample of women and is therefore not highly generalizable to the targeted population.

It should also be noted that the current study's sample of college women differ from other similarly aged women who are also eligible to receive the HPV vaccine. For example, women in college are more likely to have insurance and to have access to health care, factors which were found, in the present study, to be connected to women's decisions to be vaccinated. Thus, these factors may be even more important for women who do not attend college, as may be other variables that were not assessed in this study.

Furthermore, the reliability of the participants' responses may have been affected by the study's design. All but one of the measures utilized in the present study were self report, a mode of measurement that has been found to differ from more objective types of measures in past research. For example, in a recent study on the drinking behaviors of college students, Hagman, Clifford, Noel, Davis, and Cramond (2007) found that college students' self reports of their drinking were greater than those of collateral informants (i.e. friends asked to assess the students' drinking habits). The content of the present study, with its questions about sexual behavior and STDs, might have caused some participants discomfort and could have likewise led to under or overreporting.

Furthermore, the survey was posted online and students were given the opportunity of taking it wherever and whenever they pleased. Thus, the researchers had little control over the circumstances under which students took the survey. This may have especially

affected participants' responses to the health messages about HPV and its vaccine, as reading and responding to this and other information in the study requires some degree of concentration. In future research, this limitation could be addressed by scheduling students to take the survey in a computer lab, ideally with partitions between computer stations to increase confidentiality.

Although the health messages created for this study were piloted before participants were recruited, it is possible that significant effects were not found for the messages due to some aspect of the messages themselves. For example, the time-oriented words and phrases used may not have been prominent enough or other information in the message may have better caught participants' attention. Therefore, a manipulation check on the health messages utilizing female students between the ages of 18-24 would have been helpful in understanding the women's reactions to these messages.

This study is also limited by its focus on only heterosexual relationships and sexual activity. Although HPV can also be passed through lesbian sexual activity (Marrazzo, 2004), only penis/vagina and penis/anus sex was assessed here, due to the perception of the STD being more prevalent among straight than gay women. Furthermore, the present study did not ask participants to self-identify as heterosexual, bisexual, or homosexual; therefore, there is no way of knowing whether or not differences in attitudes toward HPV and the vaccine may have existed among women with varying sexual orientations.

In retrospect, several additional questions would have provided important information toward understanding what factors contribute toward a young woman's decision to become vaccinated against HPV. First, although questions pertaining to HPV

risk, such as number of sexual partners and condom use, were asked, no measure of the participants' own perception of being at risk was included in the study. As the qualitative data suggested, perception of one's own risk seemed an important factor in whether or not vaccination was sought. Thus, in addition to the risk factors that were examined in this study, a measure of perceived risk would be helpful. Similarly, although participants were asked about having health insurance, additional information about the participant's financial status, and that of their parents, might have been helpful. Many participants reported feeling that the cost of the vaccine was a major obstacle and that they would be more likely to get vaccinated if their insurance covered this procedure. Also, several women expressed reluctance to ask their parents to help them get vaccinated or confusion about where or when they could go to get vaccinated. It is possible that such variables might have either been more important than CFC in predicting intent or served a mediating or moderating role between CFC and getting vaccinated.

Finally, this study is limited by its lack of a behavioral measure regarding the participants' intent to get vaccinated. Although, according to research using the Theory of Planned Behavior variables, there is a reliably significant correlation between intention and action (Armitage & Conner, 2001), there was no way for the present study to assess whether or not the young women who stated that they planned to get vaccinated actually did. It may be that their intentions were increased immediately after reading the message, but it is unclear how this may translate into action. Future work on this issue should include a way to follow up with participants to examine differences between those who actually follow through on the target health behavior and those who do not.

### Future Directions for Research and Practice

This study was conducted with the aim of understanding the role of time perspective, as well as attitudes, subjective norms, and perceived behavioral control as defined by the Theory of Planned Behavior, in predicting young college women's intentions to become vaccinated against the human papillomavirus. Specifically, the utility of tailoring a health message to a person's time perspective, as defined by the consideration of future consequences, was explored. Although tailoring health messages to a person's level of CFC was not found to predict intention to get vaccinated, the elements of the Theory of Planned Behavior were significant predictors. Furthermore, the majority of the college women exposed to these brief messages, all of which presented both risks and benefits associated with vaccination, expressed positive responses to them (with 43.7% expressing at least one positive thought and 48.2% expressing two or more), ranging from feeling that they had learned something new about HPV to stating their resolve to get vaccinated against the HPV virus. These findings, in addition to other information learned from the study, can be quite useful in directing future research and practice. In addition, the lack of significant findings for CFC may be useful in considering when this variable might be predictive of health behaviors and when other factors may be more salient.

First, taking into account the factors that could contribute to a person's attitude toward perceived social norms surrounding, and perceived behavioral control around, HPV vaccination is vital to a young woman's decision about getting the vaccine. Thus mental health professionals, in their roles as health educators and advocates, should consider these variables when sharing information with the public about preventive

health measures. For example, several material barriers were mentioned as being strong reasons why women would not get vaccinated against HPV (i.e. cost, accessibility of vaccine, scheduling hassles, etc.). A number of women expressed social variables that might prevent them from getting vaccinated (e.g., acknowledging to parents or physicians that they were sexually active or interested in becoming so). At the same time, some women seemed resolute, despite these barriers, to become vaccinated while others seemed to perceive them as insurmountable. Future research could focus on better understanding what contributes to a woman's sense of self-efficacy regarding pushing past perceived barriers while information about the negative impact of these barriers could be used to examine them in greater depth.

Further investigation of how time perspective affects intention to get vaccinated against HPV is also indicated by the present study. Although CFC and the temporal framing of messages did not have a significant effect on intention to get vaccinated, there was some indication that the effect of CFC on intention was moderated by risk (i.e. condom use with a new partner). According to past work with CFC (Strathman et al, 1994), an individual must believe that the current health behavior could actually have consequences on her long term health, if her level of CFC is to have an effect on her decision making around that health behavior. Thus, research exploring how the perception of being at risk could strengthen the relationship between CFC and intention to get vaccinated is warranted. Furthermore, other conceptualizations of time perspective, such as using Zimbardo and Boyd's (1999) Future Time Orientation categories, could be studied with regard to their relationship to getting vaccinated against HPV. For example, a woman with a past positive bias who has not acquired an STD may frame her new



sexual experiences in light of those in her past, which may make it difficult to see information about the HPV vaccine as relevant to her.

The participants in this study reported low levels of knowledge about the HPV vaccine and about HPV in general. College students may possess little knowledge about the vaccine due to the pharmaceutical industry mainly marketing the product to younger girls and their parents at this time. As some responses in the qualitative data implied, this lack of information may have led to misunderstandings about the vaccine (for example, believing one has to be a virgin to be vaccinated) and doubts about its applicability to college women. Thus research could focus upon increasing the accuracy of health messages and finding ways to address “myths” that have spread about HPV vaccination. Furthermore, although many of the participants in the study responded with some positive thoughts toward the health message, very few then went on to request additional information. Research aimed at understanding what makes a college woman pursue health-related information would help in getting this knowledge to the women who need and do not yet possess it.

A possible reason for participants’ decisions to not seek out information at the end of the study could be related to their emotional reactions to the health message. Several participants reacted to the health message to which they were exposed with anxiety. For example, one participant commented: “I was shocked. I did not know any of this information, and now I want to get an HPV screening!” Several participants expressed surprise and displeasure toward hearing that men cannot be tested; for example, one participant stated: “I already knew that men could carry the HPV virus without showing signs of it but I was shocked to learn that it is impossible to detect it and that condoms

don't always prevent the spread of HPV.” Thus, it is possible that the message heightened the anxiety of the participants. One critique of using models such as the Theory of Planned Behavior to predict health behaviors is that the cognitive nature of the model, with its focus on rational decision-making, may overlook affective processing that takes place when people are exposed to information about health topics (Dutta-Bergman, 2005). Therefore future research could examine the emotional responses of women to the HPV vaccine. Including variables such as trait anxiety as additional measures could provide further information about personal factors that may influence a woman’s emotional response to a health message.

The fact that so few women sought additional information after reading the health message about HPV and its vaccine raises the question of how many actually went on to get vaccinated. Unfortunately, this study did not have a way of following up with those who reported strong intentions to get vaccinated. Although previous research has found a strong relationship between intentions and behaviors (Armitage & Conner, 2001), one certainly does not always lead to the other. Future research should include a longitudinal design that provides more information concerning how many participants actually scheduled and attended all three vaccination appointments after stating their intentions to do so. Also interesting would be a comparison of those women who have already been vaccinated and those who have not; this was not assessed in the present study as it was outside its original purpose, but such analyses could provide information about individual differences between the vaccinated, those who said they intend to get vaccinated, and those who did not intend to get vaccinated.

In the realm of practice, mental health professionals who work with college aged women should be aware of the complex factors that contribute to their attitudes about vaccination and their decision to get vaccinated against HPV. These women may hold misperceptions about the vaccine (i.e. its applicability to this age group or its utility to women who are sexually active) or may fail to perceive themselves as at risk due to a lack of knowledge about the virus or to factors pertaining to their current intimate relationships. Equally important, mental health practitioners should stay updated regarding research on the vaccine, as more information about long term effects will be forthcoming. Practitioners who have a greater awareness of these issues will be more likely to be of aid in helping young women to make decisions about HPV vaccination.

Furthermore, considering the negative psychological, as well as physical, ramifications of being diagnosed with HPV (Hoffman & Baker, 2003; Maissi et al, 2004), counseling psychologists should, in their roles as advocates, work toward making the HPV vaccine more accessible and affordable to women in this age group. Many young women in the sample expressed uncertainty about being able to get vaccinated, despite interest, because they did not think they would be able to afford the vaccine if it was not covered by insurance. Furthermore, some women expressed strong discomfort around asking their parents to fund a vaccination against an STD. It is important that this vaccine be available to all women who would benefit from it and mental health professionals should support legislature focused on funding programs that will make the vaccine accessible to low-income women.

## Summary

The main goal of this study was to examine whether the personal factor of consideration of future consequences might affect college aged women's responses to a message about the human papillomavirus vaccine. Response to the message was defined as the individual's attitudes toward vaccination, perceived social norms toward vaccination, perceived behavioral control, and intention to get vaccinated, constructs that were modified from the Theory of Reasoned Action and Planned Behavior. It was hoped that this research would shed light on factors contributing to young women's intentions to engage in this health behavior and would suggest promising avenues for future research.

Overall, the study's findings suggested that the decision to get vaccinated against HPV is likely based on a broad array of variables and that CFC alone is not a useful predictor of this health behavior. Support was provided, however, for the utility of the Theory of Reasoned Action and Planned Behavior in predicting intention to get vaccinated, with attitudes toward vaccination being a particularly strong predictor. These findings have implications for future attempts to create health messages about the HPV vaccine to which college women will respond and suggest that tailoring messages to address such factors as critical attitudes toward vaccine safety or perceived susceptibility to being transmitted the HPV virus may be helpful in reaching this population. Future research could revisit how time perspective may interact with these and other variables to predict intention to get vaccinated.

In summary, the human papillomavirus vaccine has only recently been introduced to the United States and there is much yet to be learned about individuals' reactions to the possibility of being vaccinated against this common sexually transmitted disease. This

study revealed some interesting findings which could provide the impetus for future research focused on this understudied area. It is hoped that such research will raise awareness of this important new method of prevention and increase understanding of how to effectively communicate information about the vaccine to the girls and women who it may protect.

Appendix A

CFC

For each of the statements below, please indicate whether or not the statement is characteristic of you. If the statement is extremely uncharacteristic of you (not at all like you) please write a "1" to the left of the question; if the statement is extremely characteristic of you (very much like you) please write a "5" next to the question. And, of course, use the numbers in the middle if you fall between the extremes. Please keep the following scale in mind as you rate each of the statements below.

Extremely	Somewhat	Uncertain	Somewhat	Extremely
Uncharacteristic	Uncharacteristic		Characteristic	Characteristic
1	2	3	4	5

1. I consider how things might be in the future, and try to influence those things with my day to day behavior.

<b>Extremely</b>	<b>Somewhat</b>	<b>Uncertain</b>	<b>Somewhat</b>	<b>Extremely</b>
<b>Uncharacteristic</b>	<b>Uncharacteristic</b>		<b>Characteristic</b>	<b>Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

2. Often I engage in a particular behavior in order to achieve outcomes that may not result for many years.

<b>Extremely</b>	<b>Somewhat</b>	<b>Uncertain</b>	<b>Somewhat</b>	<b>Extremely</b>
<b>Uncharacteristic</b>	<b>Uncharacteristic</b>		<b>Characteristic</b>	<b>Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

3. I only act to satisfy immediate concerns, figuring the future will take care of itself.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

4. My behavior is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

5. My convenience is a big factor in the decisions I make or the actions I take.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

6. I am willing to sacrifice my immediate happiness or well-being in order to achieve future outcomes.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

7. I think it is important to take warnings about negative outcomes seriously even if the negative outcome will not occur for many years.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

8. I think it is more important to perform a behavior with important distant consequences than a behavior with less-important immediate consequences.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

9. I generally ignore warnings about possible future problems because I think the problems will be resolved before they reach crisis level.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

10. I think that sacrificing now is usually unnecessary since future outcomes can be dealt with at a later time.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

11. I only act to satisfy immediate concerns, figuring that I will take care of future problems that may occur at a later date.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

12. Since my day to day work has specific outcomes, it is more important to me than behavior that has distant outcomes.

<b>Extremely Uncharacteristic</b>	<b>Somewhat Uncharacteristic</b>	<b>Uncertain</b>	<b>Somewhat Characteristic</b>	<b>Extremely Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>



## Appendix B

**Please read the following health message and respond to the questions following:**

**HPV Vaccine Message A (Present Framed Negatively; Future Framed Positively):**

Human papillomavirus (HPV) is one of the most common sexually transmitted diseases among young adults, with 75% of sexually active women and men being infected with the virus at some point in their lives. Certain types of HPV have been found to cause painful and embarrassing genital warts, while other "high-risk" types of HPV are the primary cause of potentially life-threatening cervical cancer in women. High-risk strains of HPV can lead to precancerous cell changes in a woman's cervix that require invasive treatments that may contribute to fertility problems over time. Furthermore, it can be difficult to protect oneself against being infected with HPV. The virus is passed through various types of skin-to-skin sexual activity, so condoms are not always effective in preventing transmission, and there is currently no HPV test for men, making it impossible to know whether or not a male sexual partner is carrying the virus. Recently, however, a new form of protection, the HPV vaccine, has been found to be an effective method of preventing infection against several of the most harmful strains of HPV. This vaccine has been approved by the FDA for girls and women between the ages of 9-26.

The HPV vaccine is now widely available, giving women the option of becoming vaccinated against four types of HPV, two of which lead to 70% of cervical cancer cases and two of which have been commonly linked to genital warts. Getting vaccinated as soon as possible against HPV may mean putting up with some hassles in the short run. For instance, you may have to find time in your current schedule to attend the first of three doctor's appointments needed to complete the vaccination. In the short term, you

may also dislike the discomfort of receiving injections and possibly experiencing soreness at the injection site. Finally, getting vaccinated may mean that, upfront, you could be paying \$180 for each of the three injections (the vaccine is covered by some but not all types of insurance). On the other hand, getting vaccinated against HPV may provide several benefits in the years to come. You may experience peace of mind knowing that you have reduced your future chances of becoming infected with HPV. You may feel relieved as time passes knowing that, as you get older, you will be much less likely to suffer from the serious health problems associated with HPV, including cervical cancer and genital warts, because you got vaccinated against the virus when you were younger. Getting vaccinated now could, in the long run, save you time and money on future doctor's appointments needed to monitor and treat health concerns associated with HPV.

**HPV Vaccine Message B : (Present Framed Positively; Future Framed Negatively)**

Human papillomavirus (HPV) is one of the most common sexually transmitted diseases among young adults, with 75% of sexually active women and men being infected with the virus at some point in their lives. Certain types of HPV have been found to cause painful and embarrassing genital warts, while other "high-risk" types of HPV are the primary cause of potentially life-threatening cervical cancer in women. High-risk strains of HPV can lead to precancerous cell changes in a woman's cervix that require invasive treatments that may contribute to fertility problems over time. Furthermore, it can be difficult to protect oneself against being infected with HPV. The virus is passed through various types of skin-to-skin sexual activity, so condoms are not always effective in preventing transmission, and there is currently no HPV test for men, making it impossible

to know whether or not a male sexual partner is carrying the virus. Recently, however, a new form of protection, the HPV vaccine, has been found to be an effective method of preventing infection against several of the most harmful strains of HPV. This vaccine has been approved by the FDA for girls and women between the ages of 9-26.

The HPV vaccine is now widely available, giving women the option of becoming vaccinated against four types of HPV, two of which lead to 70% of cervical cancer cases and two of which have been commonly linked to genital warts. Getting vaccinated against HPV may provide several benefits in the present moment. First, you may immediately experience peace of mind about HPV. You may also experience a sense of relief, knowing that you now have reduced your risk of getting a virus that could cause serious health problems, such as genital warts or cervical cancer. Finally, you may at once feel satisfaction in investing time and money into a vaccine that will right away start protecting you from acquiring HPV. On the other hand, getting vaccinated against HPV may mean putting up with some hassles in the future. These include scheduling and attending three vaccination appointments extended over a time period of six months. If you choose to get vaccinated, you may also dislike anticipating the discomfort of receiving a series of three injections and the possibility of later experiencing soreness at the injection site. Getting vaccinated may also mean that over time you will have to pay the \$180.00 cost for each of the three injections (the vaccine is covered by some but not all types of insurance).

**HPV Vaccine Message C (Present Framed Negatively; Future Framed Positively-order switched):**

Human papillomavirus (HPV) is one of the most common sexually transmitted diseases among young adults, with 75% of sexually active women and men being infected with the virus at some point in their lives. Certain types of HPV have been found to cause painful and embarrassing genital warts, while other "high-risk" types of HPV are the primary cause of potentially life-threatening cervical cancer in women. High-risk strains of HPV can lead to precancerous cell changes in a woman's cervix that require invasive treatments that may contribute to fertility problems over time. Furthermore, it can be difficult to protect oneself against being infected with HPV. The virus is passed through various types of skin-to-skin sexual activity, so condoms are not always effective in preventing transmission, and there is currently no HPV test for men, making it impossible to know whether or not a male sexual partner is carrying the virus. Recently, however, a new form of protection, the HPV vaccine, has been found to be an effective method of preventing infection against several of the most harmful strains of HPV. This vaccine has been approved by the FDA for girls and women between the ages of 9-26.

The HPV vaccine is now widely available, giving women the option of becoming vaccinated against four types of HPV, two of which lead to 70% of cervical cancer cases and two of which have been commonly linked to genital warts. Getting vaccinated against HPV may provide several benefits in the years to come. You may experience peace of mind knowing that you have reduced your future chances of becoming infected with HPV. You may feel relieved as time passes knowing that, as you get older, you will

be much less likely to suffer from the serious health problems associated with HPV, including cervical cancer and genital warts, because you got vaccinated against the virus when you were younger. Getting vaccinated now could also, in the long run, save you time and money on future doctor's appointments needed to monitor and treat health concerns associated with HPV. On the other hand, getting vaccinated as soon as possible against HPV may mean putting up with some hassles in the short run. For instance, you may have to find time in your current schedule to attend the first of three doctor's appointments needed to complete the vaccination. In the short term, you may also dislike the discomfort of receiving injections and possibly experiencing soreness at the injection site. Finally, getting vaccinated may mean that, upfront, you could be paying \$180 for each of the three injections (the vaccine is covered by some but not all types of insurance).

**HPV Vaccine Message D** : (Present Framed Positively; Future Framed Negatively- order switched) Human papillomavirus (HPV) is one of the most common sexually transmitted diseases among young adults, with 75% of sexually active women and men being infected with the virus at some point in their lives. Certain types of HPV have been found to cause painful and embarrassing genital warts, while other "high-risk" types of HPV are the primary cause of potentially life-threatening cervical cancer in women. High-risk strains of HPV can lead to precancerous cell changes in a woman's cervix that require invasive treatments that may contribute to fertility problems over time. Furthermore, it can be difficult to protect oneself against being infected with HPV. The virus is passed through various types of skin-to-skin sexual activity, so condoms are not always effective in preventing transmission, and there is currently no HPV test for men, making it

impossible to know whether or not a male sexual partner is carrying the virus. Recently, however, a new form of protection, the HPV vaccine, has been found to be an effective method of preventing infection against several of the most harmful strains of HPV. This vaccine has been approved by the FDA for girls and women between the ages of 9-26.

The HPV vaccine is now widely available, giving women the option of becoming vaccinated against four types of HPV, two of which lead to 70% of cervical cancer cases and two of which have been commonly linked to genital warts. Getting vaccinated against HPV may mean putting up with some hassles in the future. These include scheduling and attending three vaccination appointments extended over a time period of six months. If you choose to get vaccinated, you may also dislike anticipating the discomfort of receiving a series of three injections and the possibility of later experiencing soreness at the injection site. Getting vaccinated may also mean that over time you will have to pay the \$180.00 cost for each of the three injections (the vaccine is covered by some but not all types of insurance). On the other hand, getting vaccinated against HPV may provide several benefits in the present moment. First, you may immediately experience peace of mind about HPV. You may also experience a sense of relief, knowing that you now have reduced your risk of getting a virus that could cause serious health problems, such as genital warts or cervical cancer. Finally, you may at once feel satisfaction in investing time and money into a vaccine that will right away start protecting you from acquiring HPV.

## Appendix C

**Please take a few minutes to write down any thoughts that came to your mind while you were reading this passage.**

Appendix D

**A vaccine that protects against four types of human papillomavirus (HPV) was approved by the Food and Drug Administration (FDA) in June 2006 and is available to the public this year. Please answer the following questions regarding your thoughts about this HPV vaccine. Please answer these questions regardless of whether or not you are currently sexually active.**

1. For you, getting vaccinated against the human papillomavirus (HPV) within the next two years would be:

1	2	3	4	5	6	7
Extremely Harmful					Extremely Beneficial	

2. For you, getting vaccinated against the human papillomavirus (HPV) within the next two years would be:

1	2	3	4	5	6	7
Extremely Worthless					Extremely Valuable	

3. For you, getting vaccinated against the human papillomavirus (HPV) within the next two years would be:

1	2	3	4	5	6	7
Extremely Bad					Extremely Good	



4. For you, getting vaccinated against the human papillomavirus (HPV) within the next two years would be:

1	2	3	4	5	6	7
An Extremely Unpleasant Experience				Not at All an Unpleasant Experience		

Appendix E

1. If they knew about the HPV vaccine, most people whose opinions I value would approve/disapprove of me getting vaccinated against human papillomavirus (HPV) within the next two years.

Strongly Disapprove Strongly Approve

1            2            3            4            5            6            7

2. If they knew about the HPV vaccine, my friends would approve/disapprove of me getting vaccinated against the human papillomavirus (HPV) within the next two years.

Strongly Disapprove Strongly Approve

1            2            3            4            5            6            7

3. If they knew about the HPV vaccine, my parents would approve/disapprove of me getting vaccinated against the human papillomavirus (HPV) within the next two years.

Strongly Disapprove Strongly Approve

1            2            3            4            5            6            7

4. If they knew about the HPV vaccine, my doctor would approve/disapprove of me getting vaccinated against the human papillomavirus (HPV) within the next two years.

Strongly Disapprove Strongly Approve

1            2            3            4            5            6            7

5. If they knew about the HPV vaccine, most women who are important to me would get themselves vaccinated against the human papillomavirus (HPV) within the next two years if they were at risk.

Strongly Disagree

Strongly Agree

1            2            3            4            5            6            7

Appendix F

1. For me, to attend an appointment get vaccinated against HPV within the next two years would be:

Very Difficult						Very Easy
1	2	3	4	5	6	7

2. I am confident that I am able to take the necessary steps to get vaccinated against HPV within the next two years.

Not at all confident						Very confident
1	2	3	4	5	6	7

3. For me, to get vaccinated against HPV within the next two years would be:

Totally outside of my control						Totally within my control
1	2	3	4	5	6	7

4. There are significant barriers that could get in my way of receiving the HPV vaccine within the next two years..

Not at all true						Very true
1	2	3	4	5	6	7

Appendix G

1. I want to get vaccinated against the human papillomavirus (HPV) within the next two years.

Strongly Disagree

Strongly Agree

1            2            3            4            5            6            7

2. I expect that I will get vaccinated against the human papillomavirus (HPV) within the next two years.

Strongly Disagree

Strongly Agree

1            2            3            4            5            6            7

3. I do not intend to get vaccinated against the human papillomavirus (HPV) within the next two years.

Strongly Disagree

Strongly Agree

1            2            3            4            5            6            7

4. I plan to make an appointment for an HPV vaccination within the next two years.

Strongly Disagree

Strongly Agree

1            2            3            4            5            6            7

Appendix H

**This study will be examining the attitudes and behaviors of college women with regard to gynecological health. Please choose the number which best describes how often you think about the following health conditions:**

A. How often do you think about your gynecological health?

None At All ----- Quite a Lot  
1            2            3            4            5            6            7

B. How often do you think about getting a sexually transmitted disease (STD)?

None At All ----- Quite a Lot  
1            2            3            4            5            6            7

C. How often do you think about getting cervical cancer?

None At All ----- Quite a Lot  
1            2            3            4            5            6            7

Appendix I

**Please choose the number that best describes your knowledge level of the following:**

How would you rate your knowledge of the human papillomavirus (HPV)?

**Very Poor**-----**Moderate** -----**Very High**  
1            2            3            4            5            6            7

How would you rate your knowledge of the new vaccine that protects against infection by the human papillomavirus?

**Very Poor**-----**Moderate**-----**Very High**  
1            2            3            4            5            6            7

## Appendix J

If you would like more information about HPV and the HPV vaccine, please click on the link to the left. You will be brought to a survey page with links about these health topics which could be looked over now or printed/bookmarked for later. Then, you will be directed to the end of the survey. If you would like to finish the study now, please click on the link to the right.

{ Get More Information on HPV  
and HPV Vaccine, then Finish Study }

{ Finish Study Now }



## Appendix K

### **Links to More HPV Information**

**Important! If you click on a link, make sure to keep the window to this survey open and to return to this page when you are ready to finish the survey.**

1. This link leads to a fact sheet including Frequently Asked Questions about human papillomavirus by the Centers for Disease Control and Prevention:

<http://www.cdc.gov/std/HPV/STDFact-HPV.htm>

2. This link will connect you with lots of information about the HPV virus and its vaccine that has been compiled by the Centers Disease Control and Prevention:

<http://www.cdc.gov/std/hpv/>

3. This link to the American Social Health Association's (ASHA) National HPV and Cervical Cancer Prevention Resource Center has information, chat rooms, support groups, and publications about HPV, as well as ways to get involved in the prevention effort against HPV:

[http://www.ashastd.org/hpv/hpv\\_overview.cfm](http://www.ashastd.org/hpv/hpv_overview.cfm)

4. This link leads to information from the International Council on Infertility Information Dissemination on how the HPV vaccine could indirectly be helpful in preventing infertility:

<http://www.inciid.org/article.php?cat=&id=437>

Would you like to finish the study now?

**YES**

**NO**

## Appendix L

Thank you so much for participating in this study! Please read the following to make certain you get class credit, if applicable. This information will be kept separate from the rest of your responses.

---

If you are participating for class credit, please write the following below\*

1. Your university
2. Your class name (ex. EDCP 310)
3. A self-generated 4 digit ID number (ex. the last four digits of your cell phone, social security number, or student ID number)

\*Exception: If you are taking this through Experimetrix/subject pool, please just submit the name of your university.

---

If you are not taking this for class credit, please list below your

1. university name
  2. where you learned about this study (ex. “sorority” or “class 325”).
- 

If you are NOT taking this for class or community service credit and would like to enter a raffle for a \$20 gift certificate for Starbucks, please email the researcher (AFTER submitting your survey with the above information) at [holly.costar@gmail.com](mailto:holly.costar@gmail.com) and put the word “raffle” as the subject line.

Your information:

Appendix M

Demographics

In order to further our knowledge of reactions to a vaccine for a sexually transmitted disease, it is important that we ask questions pertaining to the health habits and sexual histories of the participants taking the questionnaire. Therefore, although some of the following information may be personal in nature, we ask that you answer as truthfully as possible. Questions marked with an asterisk must be answered if you intend to complete the study; please answer as many non-asterisked questions as possible, even if you choose to skip some.

1. Age:

2. Gender:        **female**        **male**        **transgender**

3. Ethnicity/Race:

**African-American/Black**

**Asian-American/Pacific Islander**

**Latina/Hispanic**

**White/European Descent**

**Middle-Eastern/Arab**

**Asian Indian/ Pakistani**

**Biracial/Multiracial**

**Native American/Native Alaskan**

**Foreign National (please specify)**

**Other (please specify)**

4. Current year of undergraduate study:

5. Current relationship status:

**Single**        **Married**

**Committed Relationship (6 months or**

**longer)        **Divorced**        **Widowed****

**Other (Please specify)**

6. Are you currently sexually active (defined, for the purpose of this study, as engaging in penis/vagina or penis/anus intercourse)?      **YES**      **NO**
7. Have you ever engaged in penis/vagina intercourse?      **YES**      **NO**  
(If you have never been sexually active, please skip to question #13)
8. Have you ever engaged in anal (penis/anus) intercourse?      **YES**      **NO**
9. At what age did you first engage in penis/vagina intercourse?
10. With how many partners have you engaged in penis/vagina intercourse?
11. At what age did you first engage in penis/anus intercourse? (if not applicable, skip this question)
12. With how many partners have you engaged in penis/anus intercourse? (if not applicable, skip this question)
13. How often do you use a condom when you have sexual intercourse with a new partner?  
**ALWAYS    USUALLY    SOMETIMES    NEVER**
14. How often do you use a condom when you have sexual intercourse with a partner with whom you are in a committed relationship (6 months or longer)?  
**ALWAYS    USUALLY    SOMETIMES    NEVER**
15. What is your usual method of birth control?
16. Which of the following best describes your current situation?
- a. Have completed the series of 3 shots for the HPV vaccine
  - b. Have started, but not completed, the series of 3 shots for the HPV vaccine
  - c. Have scheduled an appointment with my doctor to receive the HPV vaccine

d. Have discussed the HPV vaccine with my doctor, but currently have no plans to be vaccinated

e. Have not discussed the HPV vaccine with my doctor or made plans to be vaccinated

17. Do you currently have health insurance, either on your own or under the insurance plan of another person?      **YES**      **NO**

18. Would you be willing to pay for the human papillomavirus (HPV) vaccine if it was not covered by insurance (vaccine will likely cost around \$360)?

**YES**      **NO**

19. How many times over the past two years have you visited a gynecologist for a regular examination (including a Pap smear test)?

20. Have you ever been diagnosed with the human papillomavirus (HPV)?

**YES**      **NO**

21. Have you ever had an abnormal Pap smear test (e.g. atypical cervical cells)?

**YES**      **NO**

22. Have you ever been diagnosed with a sexually transmitted disease?

**YES**      **NO**

If yes, please indicate which disease(s):

23. Have you ever been diagnosed with cervical cancer?      **YES**      **NO**

24. Has anyone close to you ever been diagnosed with the human papillomavirus (HPV)?      **YES**      **NO**

25. Has anyone close to you ever been diagnosed with cervical cancer?      **YES**      **NO**

## Appendix N

Dear Participant,

Thank you for your interest in this study, which is being conducted by researchers at the University of Maryland, College Park. Your participation will contribute important knowledge regarding the perceptions of female college students toward a critical area of women's health involving a common sexually transmitted disease and its prevention. This questionnaire will take most people under 15 minutes to complete. It is important that you answer all questions in one sitting so, if you are completing this questionnaire on your own, please seek out a quiet place that is free from distractions while taking the study.

In order to better understand the attitudes of women toward this health topic, it will be necessary for the researchers to ask questions about perceptions and behaviors of the participants that are relevant to the subject of sexually transmitted diseases (STDs). Some of these questions may be personal in nature, including items inquiring about sexual behaviors. The responses of women who are sexually active, as well as those who are not currently active or never have been, are all vital to the success of this research. Due to the personal nature of some of this material, it is important for you to know that the information you give **will be kept confidential**. If you are submitting an ID number to specify to a professor that you have taken the study, this number will be stored separately from the rest of your questionnaire and will be destroyed as soon as we report your participation. All information will be stored in a secure, locked location to which only the investigators have direct access.

Risks associated with this study may include feeling discomfort in response to some content; benefits include the likelihood that you will learn information about a common STD that might help to protect your health now or in the future and that you are contributing to research about an important health topic. Your participation in this study is **voluntary** and you may choose against participation and may stop at any time. If you experience any difficulty in submitting your responses please contact the first researcher at the email address below.

If you have any questions or comments about the study, please feel free to contact either of the researchers (contact information below). If you have questions about your rights as a research subject, please contact the Institutional Review Board (also below). This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects. Thank you again for your participation. By giving your consent to participate, you indicate that: **1. you are at least 18 years of age, 2. the research has been explained to you, 3. your questions have been fully answered, and 4. you freely and voluntarily choose to participate in this research project.**

[Fill Out The Questionnaire \(Link\)](#)

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