

ABSTRACT

Title of Dissertation: AN EXTENSION OF THE RISK PERCEPTION ATTITUDE (RPA) FRAMEWORK: EXAMINING THE RELATIONSHIPS BETWEEN THINKING STYLE, LOCUS OF CONTROL, ANXIETY, AND INFORMATION SEEKING

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The purpose of this dissertation was to reexamine the effects of psychological determinants, specifically risk perceptions and self-efficacy beliefs as predicted by the Risk Perception Attitude Framework (RPA) (Rimal & Real, 2003) on anxiety, information seeking behavior, and knowledge acquisition. Additional goals of this dissertation were to test anxiety as a mediating variable between RPA group membership and information seeking, as well as between RPA group membership and knowledge acquisition; to begin to understand what types of information each of the RPA groups seek; and to test the RPA framework as a model. Furthermore, this dissertation extended the RPA framework by incorporating the effects of cognitive processing, namely thinking style (Nisbett, Peng, Choi, & Norenzayan, 2001) and locus of control (Rotter, 1954) on anxiety to increase the predictive power of the RPA framework model. After conducting a pilot test, it was determined that the context of the experimental messages would be about human papillomavirus (HPV). The data supported the hypotheses that those in the

anxious group (individuals with high risk perceptions and low self efficacy beliefs) experienced higher levels of anxiety than the other groups, that the RPA framework was a viable model for predicting information seeking and knowledge acquisition, and finally, that cognitive processing (i.e. thinking style and locus of control) increased the predictive power of the RPA framework. However, the data indicated that that the relationship between RPA group membership (based on an interaction between perceived risk and self efficacy beliefs) and HPV information seeking, as well as knowledge acquisition was not mediated by anxiety. Participants who engaged in HPV information seeking were predominantly interested in finding out general information regarding the virus, rather than specific to risk or efficacy information. Limitations, implications, practical application and future directions are discussed.

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EXAMINING THE RELATIONSHIPS BETWEEN THINKING STYLE, LOCUS OF
CONTROL, ANXIETY, AND INFORMATION SEEKING

by

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Dedication

I dedicate this dissertation to my family:

to Akash for being my rock;

to BlackJack, Shehnai, and Jahaan for being my light.

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Chapter 1: Introduction

With the rapid growth of the Internet, people have gained unprecedented access to a vast array of sources of health information (Cotten & Gupta, 2004; Harris Interactive, 2011; Jadad & Gagliardi, 1998). Although people seek health information from interpersonal sources of information (e.g. family and friends), experts (e.g., health professionals) and print sources (e.g., newspapers, magazines, etc.; Dutta-Bergman, 2004a, 2004b), health information is often sought on the Internet (Cotten, 2001; Elliott & Elliott, 2000; Fox & Fallows, 2003; Harris Interactive, 2001; Suarez-Amazon, Kendall, & Dorgan, 2001). Health communication researchers have remarked on the shift from scholarship which primarily focused on the influence of physicians on patients' decisions toward patient-centered research exploring the reliance of patients on their own abilities to research health and risk issues (Vanderford, Jenks, & Sharf, 1997). This latter type of scholarship views patients as self-motivated participants and collaborators playing an active role in their health (Brashers, Haas, Klinge, & Neidig, 2000) instead of mere passive recipients of treatment and other medical services (Degner & Sloan, 1992). As a vital player and capable agent, the patient "seeks out, receives, and uses information from a number of sources and whose experiences shape the way the individuals makes decisions" (Vanderford, Jenks, & Sharf, 1997, p. 16).

Given this paradigm shift in the role of the patient in health information seeking, numerous scholars have focused on the predictors and outcomes of patient driven information seeking (Afifi & Wiener, 2004; Cegala, Bahnson, Clinton, David, Gong, Monk, Nag, & Pohar, 2008; Cline & Haynes, 2001; Folkman & Lazarus, 1980; Perugini & Bagozzi, 2001; Rimal & Real, 2003; Turner, Rimal, Morrison, & Kim, 2006). One

component in determining the amount of information seeking and knowledge acquisition rates are the psychological factors affecting health information seeking (see Turner et al., 2006). Addressing such issues, Rimal and Real (2003) forwarded the Risk Perception Attitude Framework (RPA). The RPA posits that the two most fundamental predictors of health information seeking are perceived risk (severity of and susceptibility to a health issue) and efficacy beliefs (self and response efficacy; Rimal & Real, 2003). Employing perceived risk (high versus low) and perceived efficacy (high versus low) as audience segmentation variables, the RPA argues that the four resultant audience segments seek information at different rates and are more or less likely to actually retain that information. Turner et al. (2006) found that individuals experiencing high risk and holding weak efficacy beliefs sought as much, if not more information as other groups; yet, retained the least information. They explained that this finding was due to the heightened anxiety experienced by this particular audience segment, as they perceived a serious risk but did not perceive a viable coping mechanism to overcome the threat.

Although the RPA serves as a useful framework for predicting information seeking behaviors and knowledge acquisition outcomes, it has consistently yielded small effect sizes (for the effects of RPA group membership on information seeking outcomes). Anxiety has been theorized to mediate the relationship between RPA group membership (based on the interaction between perceived risk and self-efficacy beliefs) and information seeking behaviors and knowledge acquisition (Turner et al., 2006); but, anxiety has not been statistically assessed for mediation. Furthermore, although the individual relationships have been tested, the RPA framework has not been tested in its entirety as a viable structural model to explain differences in information seeking and

knowledge acquisition.

Of particular interest to this dissertation, the RPA predicts that information seeking behaviors are due to risk and efficacy alone and not necessarily to other individual difference factors. I argue in this dissertation that one particular individual difference variable, thinking style, predicts cognitive patterns in individuals and affects locus of control, which, in turn, affects anxiety. I propose that adding thinking style and locus of control will arguably increase the predictive power of the RPA framework.

Chapter 2 of this dissertation will first conceptualize health information seeking, provide an in-depth overview of the RPA, and further explicate the rationale for the RPA framework. Next, a review of analytical and holistic thinking styles and locus of control and their relationship with anxiety will be presented. Arguments for incorporating these cognitive processes into the RPA framework are explained. The method and results for four pilot studies and the method of the main study will be presented in Chapter 3. Chapter 4 presents the results of the hypotheses and research question, as well as the model fit statistics of the RPA framework model and the extension of the RPA framework. Finally, limitations, implications, practical application and future directions for research are discussed in Chapter 5.

Chapter 2: Predictors of Health Information Seeking

Health Information Seeking

Information seeking (IS) is “the purposive acquisition of information from selected information carriers” (Johnson, 1997, p. 26). Tardy and Hale (1998) defined health information seeking as both verbal and nonverbal messages discovered by individuals that provide health status information, to raise the level of one’s overall sense of health.

Researchers have identified a variety of positive outcomes associated with health-related information seeking. First, it enables individuals to monitor their own health, as well as to seek expert advice and to choose strategies that enable them to be healthy (Kreps, 1988). Health-related information seeking has also been regarded as a successful approach for helping individuals cope with illnesses, for helping people make decisions about treatment, and for adopting healthy behaviors (Bandura, 1986; Gotcher & Edwards, 1990; Green & Roberts, 1974; Johnson, 1997; Zemore & Shepel, 1987). Two large-scale public health interventions, the Stanford Five-City Project (Winkleby, Flora, & Kraemer, 1994) and the Minnesota Heart Health Program (Viswanath & Finnegan, 1996), indicated that people’s information seeking motivations can be significantly enhanced by a campaign, and that increased information seeking behaviors were positively correlated with the resiliency of campaign effects (Rimal, Flora, & Schooler, 1999).

However, information seeing can have adverse outcomes, too. Individuals can experience high levels of anxiety when an urgent need for information leads to seeking information that is deceptive, confusing, or difficult to cognitively process (Afifi & Weiner, 2004; Brashers, 2001; Cline & Haynes, 2001). Miller’s (1987) work on coping

mechanisms described individuals with high levels of anxiety as ‘monitors.’ Monitors tend to be sensitized and highly attentive, and they magnify perceived threats. For example, when ‘monitors’ hear “abnormal Pap smear,” they are more likely to assume cervical cancer (Miller, 1987). For ‘monitors,’ being informed about possible threat-related situations helps to alleviate their stress level and uncertainty about the situation. Miller also characterized individuals who minimize stress and anxiety by way of avoidance as ‘blunters.’ As actual risk increases, ‘blunters’ tend to play down their susceptibility to the risk by not engaging in information seeking or seeking out information confirming their beliefs. Individuals can be either high or low monitors and be either high or low blunters. Miller suggested that healthcare professionals discover the different coping styles of their patients and tailor messages to them to increase effective decision-making and compliance.

Given the current technologically-based information climate, there is virtually an infinite amount of health information available online (Cotten, 2001; Elliott & Elliott, 2000; Fox & Fallows, 2003; Harris Interactive, 2001; Suarez-Amazon, Kendall, & Dorgan, 2001), causing information overload and decreased ability for patients to make effective healthcare decisions (LaPerriere, Romeder, & Maxwell-Young, 1998). A recent Harris Poll (2011) indicated that about three quarters (74%) of all adults have gone online at some time to look for health information, and that 60% have done so in the previous month. With the shift towards patient-driven healthcare decision making and the growing volume of online information seeking, it is important to understand what motivates people to seek health-related information and the outcomes of their behavior.

Predictors of Health-related Information Seeking

Given the variance in information seeking tendencies (Brashers, Goldsmith, & Hsieh, 2002), health communication scholars have focused on the causal antecedents to health information seeking. This literature can be categorized into three major categories of IS predictors: demographic factors, disease related factors, and psychological factors.

Certain demographic characteristics have been studied to help explain who is more likely to seek health information. Research indicates that individuals who have a higher level of education seek more information than those who are not as well educated (Manfredi, Czaja, Buis, & Derk, 1993; Nair, Hickok, Roscoe, & Morrow, 2000). Also, women are more likely to ask for information than men (Johnson, 1997; Kaplowitz, Campo, & Chiu, 2002). However, although women were more likely than males to inquire about cancer screening/diagnosis, support services, and psychosocial issues, they were less likely to seek specific cancer treatment information (Squiers, Rutten, Treiman, Bright, & Hesse, 2005). Beisecker and Beisecker (1990) found that the elderly tend to ask physicians for information. However, Kaplowitz, Osuch, Safron, and Campo's (1999) results indicated that doctors perceived younger patients to be more interested in cancer prognosis information than older patients were. Younger patients were more interested in support services, psychosocial issues, and prevention/risk factors, whereas older patients were more likely to seek specific treatment information (Squiers et al., 2005). Research shows that Hispanics are less likely to engage in health information seeking compared to Caucasians and Asians (Rutten, Squires, & Hesse, 2006). This dissertation is not focused on demographic predictors of information seeking behaviors; however, this literature does point to the need to methodologically and/or statistically control for such factors.

Although there is a sizeable amount of research on the demographic factors

leading to information seeking, there is less scholarly work on the other antecedents of information seeking. This dissertation is primarily concerned with the psychological predictors of health-related information seeking, as well as the primary mediating variable affecting it: Anxiety.

The Risk Perception Attitude (RPA) Framework

Of the psychological antecedents of information seeking, two specific constructs have emerged as robust predictors: risk perceptions and efficacy beliefs (Rimal & Turner, 2009). The Risk Perception Attitude Framework (RPA) was developed by Rimal and Real (2003) to explain the relationship between perceived risk, self-efficacy, and information seeking behavior; specifically, health information seeking behavior is guided by an interaction between an individual's risk perceptions and efficacy beliefs regarding a particular health topic.

Perceived risk. Risk perceptions are an individual's beliefs about susceptibility and severity to various diseases and risk factors (Janz, Champion, & Stretcher, 2002). Risk perception is a predictive variable in many theories of health behavior change, including Protection Motivation Theory (Rogers, 1975), Health Belief Model (Janz & Becker, 1984) and the Extended Parallel Process Model (EPPM) (Witte, 1992), which all posit that individuals are motivated to reduce threat when their beliefs about personal risk are elevated. Rimal and Turner (2009) pointed out that it is difficult to promote behavioral change by increasing individuals' perceptions of threat due to the optimistic biases that people may hold. That is, individuals are less likely to see themselves as less vulnerable to threat than are other people; this belief is constant across contexts and cultures (Davison, 1983; Perloff, 1999; Weinstein, 1982). In order to change behaviors,

individuals need to actually perceive a threat and perceive they are susceptible to that threat (see Witte, 1992).

The literature examining the causal relationship between perceived risk and behavior has yielded inconsistent findings. Some studies have supported the hypothesized relationship (i.e., that perceived risk leads to behavior action; Dolinski, Gromsk, & Zawisza, 1987; Larwood, 1978; Weinstein, 1982, 1983; Weinstein, Sandman, & Roberts, 1990); other studies have indicated no relationship among the variables (Joseph, Montgomery, Emmons, Kirscht, Kessler, Ostrow, Wortman, O'Brien, Eller, & Eshleman, 1987; Robertson, 1977); and yet other studies have revealed a negative correlation between risk perception and behavioral action (Svenson, Fischhoff & McGregor, 1985; van der Velde, Hooykaas, & van der Joop, 1992; Weinstein, Grubb, & Vautier, 1986). Rimal (2001) offered two reasons for these contradictory findings: one methodological and the other conceptual. From a methodological perspective, findings may have been inconsistent because most of the studies were based on correlational data and a causal relationship between perceived risk and behavioral change cannot be inferred from correlational data. From a conceptual perspective, a possible reason for why a relationship may not have been found between risk perception and behavior change or why there a negative correlation may exist between the two variables, is that individuals may feel at risk, but may not believe there is anything that could be done to prevent the risk. Therefore, they assume that any behavioral action would be fruitless. Individuals must hold strong efficacy beliefs in order for risk perceptions to affect behavioral actions (Rimal, 2001).

Rimal and Turner (2009) pointed out that that although the major focus of disease

prevention has centered around specific behaviors that are targeted at disease prevention (e.g., exercising, eating healthy foods, and getting screened for diseases), more and more health communication scholars are focusing on the role people's use of health information plays on their health and well-being. They presented two explanations for the effect of risk perceptions on behavioral action: the mediator account and the moderator account. The RPA framework was developed based on a combination of both explanations.

The mediator account. The mediator account is based on appraisal processes that conjure up particular emotions. Moreover, the account proposes that these emotions mediate the relationship between risk perception and behavioral outcomes. Rimal and Turner (2009) explained that among the numerous underlying dimensions of risk identified by Slovic (1987), two that are particularly interesting to risk communication scholars are the dimensions of control (the degree to which events are the cause of human versus situational agency) and certainty (the degree to which future events seem predictable). In their study on the cognitive appraisals of emotions, Smith and Ellworth (1985) discovered that two commonly experienced emotions in risk-related situations, anger and fear, are differentiated by these two dimensions. Fear arises when events are unpredictable and brought about by situational agency, whereas anger arises when events are predictive and brought about by human agency. Furthermore, Lerner and Keltner (2001) found that fearful individuals tended to make more risk-averse choices and had more pessimistic risk estimates, whereas angry individuals tended to make risk-seeking choices and had more optimistic risk estimates. Similarly, Nabi's (1999) Cognitive-Functional Model describes how fearful people tend to seek information regarding ways

to control a threat, whereas angry people tend to seek information regarding ways to get retribution.

The moderator account: Efficacy beliefs. The moderator account predicts that the relationship between risk perception and health information seeking is dependent upon the strength of one's efficacy beliefs. Bandura (2004) defined self-efficacy as individuals' confidence in their ability to exercise personal control over specific behaviors. Furthermore, he pointed out that self-efficacy affects people's behaviors directly and indirectly based on outcome expectations and goal-setting. Those with stronger efficacy beliefs tend to have more positive outcome expectations, the belief that engaging in specific behaviors will generate more preferred benefits, than those with weaker efficacy beliefs (Bandura, 1986). Likewise, individuals with higher levels of efficacy tend to set more challenging goals for themselves and interpret failures as consequences of insufficient preparation, whereas individuals with lower levels of efficacy take failure as further evidence of inability.

When individuals believe that they are at risk, they are more willing to engage in activities to prevent the threat if they also believe that *they have the ability to* affect the outcome (Rimal & Turner, 2009). That is, individuals are likely to turn high-risk perceptions into behavioral actions if they have strong efficacy beliefs. This reasoning forms the basis of the RPA.

The idea that efficacy beliefs moderate the relationship between risk and health related behaviors is not novel. According to Witte (1994), when risk perceptions are high, efficacy is important because increased levels of risk do not only motivate people, but also arouse anxiety. Witte explained that, when perceived risk levels are high and

efficacy is low, counterproductive behaviors ensue but, when perceived risk levels are high and efficacy is also high, risk-reducing behaviors are enacted (Rimal, 2002; Witte, 1994). Although the RPA is partially derived from the Extended Parallel Processing Model (EPPM) (Witte, 1992), Rimal and Turner (2009) explained that there are important differences between the two models. The first difference between the RPA framework and the EPPM is that *perceived threat* is the main motivation for change in the EPPM; whereas the analogous feature in the RPA framework is *perceived risk*. This distinction is important. Perceived threat is conceptualized as a message component, but perceived risk is conceptualized as an individual level characteristic. Rimal and Turner pointed out that high-threat messages often induce heightened perceptions of risk, but this effect is significantly reduced if individuals believe that the threat is not applicable to them. They give the example of an image of dirty lungs to show the effects of smoking as a high fear-provoking message. Although this high-threat message may induce high perceptions of risk, the effect might be stronger for people who feel vulnerable to lung cancer. For people who either do not smoke, or are optimistically biased about the outcomes of their smoking behavior, may believe the message is not intended for them. In such a case, the high-threat message may not translate into high risk. This difference is manifested methodologically and statistically. Turner et al. (2006), for example, experimentally manipulated risk and efficacy and then measured these outcomes (as well as mediating variables) in a post-test. Then, measured risk perceptions and measured efficacy beliefs were entered into a *k*-means cluster analysis to create the four RPA groups. As such, Rimal and Turner (2009) refer to the RPA as an audience segmentation strategy based on perceptions. So, the RPA is not a message design theory, as is the

EPPM.

The second difference between the RPA and the EPPM is the difference between individuals with high self-efficacy beliefs and individuals with low self-efficacy beliefs when risk perceptions are low (Rimal & Turner, 2009). The RPA predicts that efficacy beliefs always have a bearing on individuals' behaviors, whether risk perceptions are high or low. By contrast, the EPPM posits that efficacy beliefs affect behavior only when a certain level of threat is reached; when perceptions of threat are low, efficacy beliefs have no bearing on behavioral outcomes.

Working from the EPPM, the RPA framework was created by Rimal and Real (2003) to categorize individuals into one of four attitudinal groups (see Table 1): responsive (high risk, high efficacy), avoidance (now known as anxious; high risk, low efficacy), proactive (low risk, high efficacy), and indifference (low risk, low efficacy) who differ in health outcomes, namely intention to seek information, behavioral intention, knowledge acquisition, and time spent seeking information. In Study 1 of that article, Rimal and Real hypothesized that the responsive group would score higher than a control group, that the avoidance group would score lower than the control group, and that the proactive and indifference group would not differ from the control group on health outcomes. However, their data were not consistent with those predictions. The avoidance group actually scored higher on information seeking intentions and behavioral intentions, and the responsive, indifference, and proactive groups did not differ from the control group on either type of intention. Furthermore, none of the groups differed from the control group on information seeking behavior or knowledge acquisition. Rimal and Real conducted Study 2 to examine the 4 RPA groups against one another. Here, the

responsive group intended to seek more information than the other groups as predicted. However, the proactive group scored the next highest on information seeking intention, followed by the avoidance group and finally by the indifference group. Once again, the data did not support the predictions.

Turner et al. (2006) replicated the Rimal and Real (2003) study to retest the central propositions of the RPA framework. In an effort to understand why some of the predictions were not consistent with their data (namely that individuals who perceive a high level of risk and a low level of efficacy should seek out the least amount of information), Turner et al. theorized that efficacy moderated the relationship between risk perception and feelings of anxiety. More specifically, Turner et al. argued that anxiety served as a mediator between the risk by efficacy interaction and information seeking, as well as between the risk by efficacy interaction and knowledge acquisition (notably, this prediction combines the mediator and moderator account). Indeed, their data indicated that the avoidance group experienced higher levels of anxiety, engaged in the most information seeking, and retained the least amount of knowledge compared to the other RPA groups. Although the 4 groups differed in the amount of anxiety reported, Turner et al. did not engage a formal test for mediation; thus, it is unclear as to whether anxiety truly (i.e., statistically) mediated the relationship between the RPA interaction and information seeking (and knowledge acquisition). One of the goals of this dissertation is to test that path model, thereby testing that both the moderator and mediator effects are simultaneously at work within the RPA framework.

RPA's four attitudinal groups: *indifference, proactive, anxious and responsive*. As previously noted, the RPA is also an audience segmentation strategy that

uses the interaction between risk perceptions and efficacy to classify four possible attitudinal groups with regard to information seeking: *indifference*, *proactive*, *anxious*, and *responsive* (Rimal & Real, 2003; Turner et al., 2006; see Table 1). Results from prior studies indicated that these groupings predicted cardiovascular disease-related motivation, knowledge, and information-seeking behaviors over time (Rimal, 2002). Since then, the four groups have been used to predict other dependent variables in other health contexts, as well. This literature will be reviewed later in the dissertation.

People with low risk perceptions and weak efficacy beliefs make up the *indifference group*. The members of this group are believed to be the least motivated to engage in healthy behaviors and to seek out information because their risk perceptions are low. Moreover, the belief that they are not able to do much to prevent risk or to engage in healthy behaviors further lessens the likelihood that they will seek out information and change their behaviors (Rimal & Real, 2003).

The *proactive* group consists of individuals whose risk perceptions are low, but whose efficacy beliefs are strong. Although these individuals believe that they are not at risk, they are able to seek out information and are able to change their health related behaviors. Although these individuals are able to actively seek information that helps them avoid a disease and remain disease free, chances are that they will not because they experience very little anxiety and personal vulnerability, which in turn decreases their motivation to act and seek information (Rimal & Real, 2003).

The *anxious* group is comprised of people who exhibit high-risk perceptions and weak efficacy beliefs. These individuals exhibit higher levels of anxiety (Turner et al., 2006) because they believe they are highly at risk for a health threat, but believe that

there is not much they can do about it. Initially, Rimal and Real (2003) posited that this group would act in an avoidant manner with regard to seeking out information, and dubbed this group as *avoidant*. According to the Elaboration Likelihood Model (Petty & Cacioppo, 1986) and the Heuristic Systematic Model (Chaiken, 1980), individuals who lack motivation or the ability to process information (i.e., lack ability) process cues using a ‘peripheral route’ and are thus more likely to not accurately recall information. By this logic, people in the avoidant group would be less likely to retain the information they seek out. Thus, the RPA initially predicted that this group would seek more information, but would retain less of it. However, as mentioned in the previous section, Turner et al. theorized that the anxiety that high-risk perceptions induce causes higher motivations to seek out more information. Research outside of health-information seeking has demonstrated that anxiety debilitates cognitive functioning. Data from several RPA studies (Rimal & Real, 2003; Turner et al., 2006; Turner et al., 2011) indicated that individuals in this group exhibit higher amount of information seeking intentions and/or behavior. Turner et al. (2006) found that this group also reported the highest amount of anxiety and suggested relabeling this group the *anxious* group. Indeed, in their most recent paper, Turner and Rimal (forthcoming) began calling this group *anxious* and in this dissertation, this group will be referred to as the *anxious* group.

Finally, individuals with high-risk perceptions and strong efficacy beliefs fall into the *responsive* group. Members of this group are motivated to seek out information because they believe they are ‘at risk’ of the health threat and they are highly able to do something about it. Thus, the prediction for this group is that they will engage in high amounts of information seeking and subsequent behavioral change (Rimal & Real, 2003).

Individuals who are both motivated and able to process information do so by means of a 'central route' (Petty & Cacioppo, 1986). Using this logic, members of the *responsive* group are also expected to retain the most amount of information.

The construction of the four groups by way of low/high risk perceptions and low/high efficacy beliefs is illustrated in Table 1. The next section will discuss the empirical findings from RPA research regarding these four groups and will provide the rationale for the RPA hypotheses of this dissertation.

Empirical Findings for the RPA

Most of the previous tests of the RPA framework have found mixed results for the predicted interaction between risk perception and self-efficacy on information seeking, and information retention. As previously mentioned, Rimal (2006) offered two reasons for the contradictory findings: methodological differences and conceptual differences. Conceptual differences can lead to ambiguous results stemming from a lack of variance in risk perceptions and efficacy beliefs due to varying topics. Methodological differences include using correlational data to make causal inferences in lieu of conducting experimental studies, as well as using inconsistent measurements of independent and dependent variables.

The RPA has been replicated and/or tested within a variety of health contexts. Most commonly, the RPA has been studied in the context of cancer, including: a) cancer (generally) (Nan, Underhill, Jiang, Shen & Kuch, 2012); b) breast cancer (Beckjord, Rutten, Hesse, & Arora, 2008; Nan et al., 2012; Rimal & Juon, 2010; Wong, 2009); c) colon cancer (Wong, 2009), prostate cancer (Nan et al., 2012; Wong, 2009); and d) skin cancer (Rimal & Real, 2003; Turner, et al., 2006). Other RPA studies have looked at

specific behaviors leading to cancer, such as: a) tanning in tanning beds (Turner, Patel, Boudewyns, Rimal, & Raines, 2011); b) smoking and lung cancer (Zhao & Cai, 2009); and c) and nutrition and cancer prevention (Sullivan, Beckjord, Rutten & Hesse, 2008). Still other RPA topics have included HIV and AIDS (Rimal, Bose, Brown, Mkandawire & Folda, 2006; Rimal, Brown, Mkandawire, Folda, Bose & Creel, 2009), workplace safety (Real, 2008), diabetes (Turner et al., 2006) and genital herpes (Turner, Dart, & Rimal, 2006). As mentioned earlier, some topics may result in the variance of risk perceptions and efficacy beliefs differing across studies and consequently leading to mixed results.

The first major methodological difference between RPA investigations is the measurement of dependent variables. Initial RPA studies (Rimal & Real, 2003; Turner et al., 2006) made predictions about behavioral intentions, information seeking intentions, and information retention without directly measuring whether people engaged in those behaviors or not. Only Turner et al. (2006) actually assessed actual information seeking behaviors (versus self-report only) . Turner et al. (2011) improved upon this measurement by allowing participants to freely roam the internet while unobtrusively observing their seeking behaviors. Specifically, these researchers recorded the number of websites visited, search terms used, and the time spent seeking information online.

The other major methodological difference between RPA studies is the manipulation and measurement of the model's central variables. Risk perceptions and efficacy beliefs can be manipulated in the message participants read, or can be measured at the individual level. The majority of RPA studies have measured perceived risk and efficacy beliefs and subsequently used correlational data to study the RPA. If risk

perceptions and efficacy beliefs are measured and not manipulated, then it is unclear whether risk and efficacy from the message caused anxiety or if individuals experience heightened anxiety due to some other factor, which, in turn, influenced information seeking. Correlational data in these studies could not be indicative of causation even though the authors made arguments to that end. Only three of 16 RPA studies are experimental and have manipulated the independent variables within the messages (Rimal & Real, 2003, Turner et al., 2006; Turner et al., 2011). Only these experimental RPA studies will be reviewed as the rationale of the hypotheses in this dissertation.

RPA findings for experimental studies. As previously mentioned, Rimal and Real (2003) conducted two studies designed to test the RPA framework within the context of skin cancer. The first study experimentally manipulated perceptions of risk and efficacy. Participants were randomly assigned to receive a high or low risk message coupled with either a high or low efficacy message, or were randomly assigned to a no message control group. The authors predicted that the proactive and indifference groups would not differ from the control group, but that the responsive group would score higher and the avoidance (renamed anxious) group would score lower than the control group in skin cancer-related health outcomes.

In the first study, the predictions associated with the avoidance group were not supported by the data. When participants' risk and efficacy perceptions were manipulated, members of the avoidance group seemed more motivated and reported higher levels of information seeking intentions and engaged in more information seeking behaviors compared to the control group (whose risk and efficacy perceptions were not manipulated). In the second study, Rimal and Real (2003) predicted that the proactive

and the indifference groups would not differ from each other, but that the responsive group would score higher than the avoidance group in skin cancer-related health outcomes.

In Study 2, when risk and efficacy perceptions were only measured in a telephone survey and not manipulated, findings were more consistent with the RPA framework predictions. The responsive group reported the highest and the indifference group reported the lowest level of intention to seek information and engage in self-protective behaviors, with the avoidance and proactive groups somewhere in between. But, again, these results were based on correlational and not experimental data.

The main difference between the RPA framework predictions and observed findings was in respect to the avoidance group in the experimental setting versus the correlational study in which risk perceptions and self efficacy were measured. In the experimental setting, participants were made to believe (through experimental inductions) that both their risk and efficacy were either high or low. Rimal and Real (2003) proposed that the higher levels of information seeking in the experimental study could be attributed to the anxiety that the high-risk induction may have created. Furthermore, they proposed the idea of *affective interference* to describe the decrease in information processing and information retention that would go along with anxiety-induced information seeking. In other words, although anxiety may promote higher levels of information seeking, it would also reduce the ability to remember the information found. In 2006, Turner, Rimal, Morrison, and Kim tested this prediction.

In Study 1, Turner et al. (2006) induced risk and efficacy perceptions to test whether the interaction between the two influenced behavioral intentions, information

seeking, and knowledge acquisition regarding skin cancer. As with the Rimal and Real (2003) study, participants were randomly assigned to read a low or high risk message coupled with a low or high efficacy message. It was hypothesized that, for all outcomes, the relative ordering of the four RPA groups from most to least positive outcomes would be responsive, proactive, avoidance, and indifference. Dependent variables included behavioral intentions, information-seeking intentions, information-seeking behaviors, and knowledge acquisition. The results indicated that the avoidance group spent the most time seeking information, but did not score better on the knowledge measure. Study 2 tested to see whether this relationship was mediated by anxiety within the context of diabetes.

Using identical procedures to those in Study 1, Study 2 predicted that members of the avoidance group would experience significantly greater amounts of anxiety than the indifferent and the proactive groups. Turner et al. (2006) mentioned that those in the responsive group were also likely to experience anxiety due to their high-risk perceptions, but this anxiety would likely be alleviated due to their high-efficacy perceptions. The authors also posited that members of the avoidance group would seek more information than all other RPA groups. Finally, it was hypothesized that members of the avoidant group would score lower on retention measures than the other RPA groups when taking into account (a) the amount of time spent seeking information and (b) their prior knowledge about diabetes.

Turner et al. (2006) found that participants in the avoidance group reported higher levels of anxiety than the other groups. Furthermore, results indicated that those in the avoidance group retained less information than those in both the responsive and proactive

groups, even though they sought a similar amount of information. Based on these data, Turner et al. concluded that anxiety causes motivation to seek information but lowers the cognitive ability to process the information and acquire new knowledge.

Although Turner et al. (2006) provided the theoretical foundation for this dissertation, there were limitations to their measurement of information seeking. In their study, participants were asked to spend time looking at their choice of five inactive, fabricated, one-page websites. Participants were able to visit as many of the five websites and in the order that they choose to. However, the study lacked ecological validity because it did not allow participants to look for information as they normally would on the Internet and, therefore, participants were constrained in the amount of information they were able to seek.

Turner, Patel, Boudewyns, Rimal, and Raines (2011) replicated the Turner et al. (2006) study and manipulated levels of risk and efficacy using the topic of indoor tanning and skin cancer to test whether the RPA framework could be extended to explain difference between those initially at risk (tanners) and those who are not at risk (non-tanners). They allowed participants to actually search the Internet, instead of just choosing between fabricated websites, and they recorded the amount of time participants engaged in information seeking online, as well as the number of websites they visited. Like Turner et al. (2006), Turner et al. (2011) predicted that the avoidance (renamed anxious) group would have the highest level of anxiety and that the proactive group would have the lowest level of anxiety. The results from the Turner et al. (2011) study indicated that although non-tanners did not differ in anxiety amongst the RPA groups, tanners in the avoidance group reported higher levels of anxiety than tanners in the other RPA groups.

Extending the RPA Framework

The RPA framework explains how self efficacy moderates the relationship between (personal) risk perceptions and anxiety, which in turn affects the amount of information sought and retained, however, it does not take different individuals' cognitive styles into account in determining effects on anxiety, information seeking, information retention. One way to differentiate cognitive processing across groups is analytic and holistic (AH) thinking styles.

Analytic vs. holistic (AH) thinking styles. Nisbett, Peng, Choi, and Norenzayan (2001) suggested that there are cross-cultural differences in thinking styles. Social differences between cultures are believed to affect how individuals cognitively process information. Interdependent, collective societies (societies in which group goals are prioritized over individual goals and the importance of cohesion are stressed within social groups) have been hypothesized to promote attention to relationships and to the context. This style of thinking described is known as holistic or field-dependent cognition. (Nisbett et al., 2001) Conversely, independent, individualistic societies, comprised of societies in which individual goals are prioritized over group goals and the importance of autonomy is stressed within social groups, have been thought to encourage individuals to focus on a single object and one's goals regarding it without being influenced by the surrounding context or others' demands. This style of thinking has been termed as analytic or field-independent cognition (Nisbett et al., 2001).

Nisbett and his colleagues theorized that cultural differences in cognitive processes could be traced back to the different ecological and social environments of Ancient Greek and Chinese societies (Nisbett, 2003; Nisbett et al., 2001). Analytic and

holistic differences can be understood from two perspectives. First, according to the Eco-cultural Model, different ecological limitations resulted in field independent-interdependent cognition (Berry, 1976). For example, groups who engaged in hunting and gathering exhibited field independent perception, whereas those who engaged in farming exhibited field dependent perception (Berry, 1976). These eco-cultural limitations provided a filter through which members of a group saw the world (Klein, 2004). A second perspective for understanding AH cognitive differences comes from two ancient philosophic traditions: Greek Aristotelian philosophy and Chinese Confucian philosophy (Nisbett, 2003). The Greeks Aristotelian philosophy encouraged analytic thinking and the Chinese Confucian philosophy promoted holistic thinking.

Four components comprise AH thinking in regards to processing information: causal attribution, tolerance for contradiction, perception of change, and attention (Choi, Koo, & Choi, 2007). *Causal attribution* describes explanations based on situational or dispositional causes. Analytic thinkers target dispositional causes (causes attributed to character or temperament), whereas holistic thinkers also include situational causes (causes attributed to circumstance). *Tolerance for contradiction* describes the degree to which differing information is unobjectionable. Analytic thinkers feel the need to choose amongst contradict information, whereas holistic thinkers tend to be more comfortable with discrepancies due to synthesizing information. This difference is known as dialecticism. *Perception of change* explains beliefs about change. Phenomena are typically viewed as stable and change occurring in a gradual, linear way by analytic thinkers, whereas holistic thinkers predicting greater change and more cyclical patterns. Finally, *locus of attention* describes the scope of information considered or needed.

Holistic thinkers look towards the relationship between an object and the field in which the object is embedded (Fernald & Morikawa, 1993), leading to a more field interdependent view, in which attention is given to the whole picture and the relationships between objects. Analytic thinkers focus on individual objects rather than on the field as a whole (Fernald & Morikawa, 1993). The focus is on individual parts, which is a more field independent view.

Masuda and Nisbett (2001) found that Japanese participants, typically holistic thinkers, recalled more contextual information (i.e., background stimuli), and relationships among objects than American participants, typically analytical thinkers. Japanese were also better than Americans at remembering objects with original presented backgrounds than when objects were placed with novel backgrounds. Other studies also support the idea that East Asians are more field dependent than Westerners are (Kitayama, Duffy, Kawamura, & Larsen, 2003; Masuda & Nisbett, 2006; Miyamoto, Nisbett, & Masuda, 2006).

The two thinking styles have been often linked to differences in hemispheric functioning. According to Leonard and Straus (1997), the distinction between left- and right-hemisphere ways of thinking is the most widely recognized cognitive distinction. The basic assumption is that each hemisphere has different cognitive functions while processing information (Prevedi & Carli, 1987; Riding, Glass, & Douglas, 1993). Left-hemisphere thinking suggests analytical processing, whereas right hemisphere thinking suggests holistic processing (Beyler & Schmeck, 1992). The left hemisphere involves rational, convergent, realistic, objective, and critical thinking. The right hemisphere involves holistic, synthetic, intuitive, analogical, divergent, and creative thinking (Al-

Sabaty & Davis, 1989; Entwistle, 1981; Leonard & Straus, 1997; Prevedi & Carli, 1987).

Although the inductions seemed to have worked in previous RPA studies in creating the four groups, they did not generate large effect sizes for anxiety. One reason may be that inductions work differently in inducing anxiety for individuals based on thinking styles. The risk and efficacy inductions in previous RPA studies may not have had the same effect in inducing anxiety for holistic and analytic thinkers.

de Jong, Merckelbach, and Nijman's (1995) data provided evidence that participants with a stronger reliance on a right hemisphere thinking style (holistic approach) experienced higher state anxiety and anxiety sensitivity scores than participants with a stronger reliance on a left hemisphere thinking style (analytic approach). However, research also indicates that negative emotions, such as anxiety, involve right hemisphere activation, whereas positive emotions involve left hemisphere activation (Borod, 1992). Although thinking style has been correlated with right and left hemispheric activity, and hemispheric activity has been associated with anxiety (Borod, 1992; de Jong, et al., 1995), there is no published work that directly tests the relationship between thinking style and anxiety. Moreover, the contradictory findings between hemispheric activity and anxiety, along with the lack of data that support a relationship between thinking style and anxiety may be attributed to a mediated relationship between the thinking style and anxiety. One variable that may mediate the relationship between thinking style and anxiety is locus of control.

A-H thinking style and locus of control. Rotter developed the locus of control (LOC) construct as a component of social-learning theory of personality (Rotter, 1954, 1966; Rotter & Hochreich, 1975). The likelihood of a given behavior occurring varies

according to (a) the expectancy that a particular reinforcement will occur as a result of the behavior, (b) the value of the expected reinforcement, and (c) the psychological situation (Rotter, 1982; Rotter, 1954). When reinforcement is viewed as a result of one's own behavior, *internal* expectancies exist, whereas when reinforcement is viewed as a result of other factors, *external* expectancies exist (Rotter, 1982). The distinction between generalized expectancies as primarily internal or primarily external has become known as the "locus of control" distinction (Rotter & Hochreich, 1975).

The locus of control construct is useful for studying expectancies for health-related behaviors (Wallston & Wallston, 1982). The application of the locus of control construct in relation to health behaviors has become known as the health locus of control (HLOC). As defined by Wallston and colleagues, HLOC refers to "the degree to which individuals believe that their health is controlled by internal versus external factors" (Wallston & Wallston, 1982, p. 62). This construct has been measured predominantly using the Multidimensional Health Locus of Control (MHLC) scales, published in 1978 by Wallston, Wallston, and DeVellis. The MHLC was developed to measure HLOC as one factor in SLT accounting for the likelihood that an individual will engage in a particular health-related behavior.

Van Den Broeck, Vanderheyden, and Cools (2003) hypothesized that holistic thinkers have an internal locus of control, and that analytical thinkers have an external locus of control. However, their results indicated the opposite: Holistic thinkers tended to have a more external locus of control and analytic thinkers tended to have a more internal locus of control. The explanation they provided for their findings was that holistic thinkers like to take others into account, they tend to sympathize and become heavily

involved emotionally with both individuals and events, and they also tend to be more compliant with respect to social demands. Consequently, they cannot control all of the events in their lives and have an external locus of control. For example, holistic thinkers believe that change is constantly occurring and thus may feel as if they have less control over situations. This lack of internal locus of control may cause holistic thinkers to experience higher levels of anxiety.

Locus of control and anxiety. As early as the mid-60's, researchers found that an internal locus of control produced lower levels of anxiety and external locus of control produced higher levels of anxiety (Mandler & Watson, 1966; Watson, 1967). Archer (1979) found support for the relationship between locus of control and anxiety for three types of anxiety measures: general trait anxiety, situation specific trait anxiety, and state anxiety. In general, his findings supported the hypothesis that internal locus of anxiety was correlated with lower levels of anxiety and external locus of control was correlated with higher levels of anxiety.

Several studies have investigated the relationship between health locus of control and anxiety (Frazier & Waid, 1999; Katerndahl, 1991; Molinari & Khanna, 1981; Vandervoort, Luis, & Hamilton, 1997). All the studies found a positive and significant correlation between external health locus of control (chance and powerful others) and anxiety and a negative correlation between internal locus of control and anxiety. Thus, this dissertation predicts (H6) that the relationship between thinking style and anxiety will be mediated by health locus of control. Specifically, this dissertation predicts that type of thinking style will yield a significant main effect on health locus of control; such that participants with a more analytic style of thinking will exhibit higher levels of

internal locus of control than those with a more holistic style of thinking, and that (H6b) controlling for trait anxiety, health locus of control will yield a significant main effect on level of (state) anxiety, such that participants with a higher internal locus of control will exhibit lower levels of anxiety than those with a lower internal locus of control.

Finally, with the prediction that thinking style will affect health locus of control and that internal locus of control will cause lower levels of anxiety, an extended model of the RPA framework which includes both thinking style and locus of control will have better predictive power than the RPA framework model alone, because more of the variance of anxiety will be accounted for.

Predictions and Rationale

Although the RPA framework has been proposed as a model to understand the interaction effect between perceived risk and self-efficacy beliefs on anxiety, information seeking behavior, and information retention/acquisition, only the individual hypotheses of the model have been tested. This dissertation seeks to test the RPA framework as a viable model for predicting information seeking and information acquisition.

Hypothesis one. According to Witte (1994), when risk perceptions are high, efficacy is important because increased levels of risk arouse anxiety. Thus, individuals in the anxious group are wrought with anxiety because they believe they are highly at risk for the health threat, but believe that there is not much they can do about it. Likewise, with the absence of perceived risk, and the presence of high self-efficacy, as is the case for the proactive group, anxiety will be low. Based on Turner et al. (2006) and Turner et al. (2011) findings, this dissertation predicts that (H1) controlling for demographic factors and trait anxiety, the interaction between perceived risk and perceived efficacy will significantly affect level of anxiety resulting in differences among the four RPA groups. Specifically, the anxious group will have significantly higher levels of anxiety than the other 3 groups; the proactive groups will have significantly lower levels of anxiety than the other 3 groups; and, the indifference group and responsive group will statistically differ from the other two groups, but, they will not statistically differ from each other. Table 2 includes the contrast coefficients associated with this hypothesis.

Hypothesis two. Witte (1994) also mentions that when perceived risk levels are high, but efficacy is low, counterproductive behaviors may ensue, like the avoidance of information seeking. However, Turner et al. (2006) argued for the anxiety-reduction

hypothesis in which people seek out information in order to reduce anxiety. In accordance with previous RPA studies, Turner et al. (2011) predicted that for all outcomes, the relative ordering of the four RPA groups from most to least positive outcomes would be responsive, proactive, avoidance (now anxious), and indifference. The outcomes under investigation were information-seeking behaviors (at Time 1 and Time 2), information-seeking intentions, behavioral intention, and information retention. It was theorized that the avoidance group with its combination of high-risk perception and weak efficacy beliefs leads individuals to become defensive and the initial thought was that this group would in turn be avoidant to seeking out information (Rimal, 2002; Witte, 1994).

With regard to predictions about information seeking, this study proposes a slightly different ordering of the RPA groups than previous studies have predicted, specifically, that the responsive group will seek the most information, followed by the anxious group and then by both the proactive and indifference groups. The reasoning for why the responsive group will seek the most information is that members of this group are motivated to seek out information because they believe they are 'at risk' of the health threat, as well as highly able to do something about that perceived risk. This logic stems from the idea that individuals who are both motivated and able to process information do so by means of a 'central route' (Petty & Cacioppo, 1986). However, the anxious group should seek out more information than the proactive and indifference groups due to the effect of anxiety experienced by high risk perceptions and low self-efficacy beliefs, as mentioned in Hypothesis 1. High levels of anxiety will provide the motivation for individuals in the avoidance group to seek information, whereas low levels of anxiety due

to lower perceptions of risk will deter those in the proactive and indifference groups from seeking information. Thus, this dissertation predicts that (H2) controlling for demographic factors, sexual health and history, past information seeking, and the rate of information seeking, the interaction between perceived risk and perceived efficacy will significantly affect the amount of information seeking resulting in differences among the four RPA groups; specifically the responsive group will H2a) visit the most HPV relevant websites at Time 1, H2b) spend the most time looking for HPV information online at Time 1, and H2c) report spending the most time looking for HPV information online in the week after the in-laboratory experiment, followed by the avoidance group, and lastly by both the proactive group and indifference group. Table 3 includes the contrast coefficients associated with this hypothesis.

Hypothesis three. Although Rimal and Real (2003) proposed the idea of *affective interference* to describe the decrease in information processing and information retention that would go along with anxiety-induced information seeking, and both Turner et al. (2006) and Turner et al. (2011) tested and showed support for the interaction effect between perceived risk and self-efficacy beliefs on level of anxiety, no RPA study to date has actually tested the theoretical proposition that anxiety acts as a mediator between RPA group membership and information seeking. The results of Turner et al. (2011) indicated that there was not a significant difference in information seeking between the RPA groups in the at risk condition (tanners) nor in the not-at-risk condition (non-tanners). The failure of previous RPA studies to show support for differences in the amount of information sought between the RPA groups may be due to the lack of a direct relationship between the interaction of perceived risk and self-efficacy beliefs on

information seeking. If the relationship between RPA group membership, based on risk perceptions and self-efficacy beliefs, and information seeking is mediated by anxiety, as proposed by Rimal and Real (2003) as well as by Turner et al. (2006) and Turner et al. (2011), then the effect of anxiety on information seeking needs to be tested, along with a path analysis with anxiety as a mediating variable. In essence, this hypothesis combines both the mediator and moderator effects mentioned previously. Thus, this dissertation predicts that (H3) the relationship between RPA group membership and information seeking will be mediated by anxiety. Furthermore, this dissertation predicts that, (H3b) controlling for trait anxiety, demographic factors, sexual health and history, past information seeking, and the rate of information seeking, state anxiety will yield a significant main effect on amount of information seeking, such that as state anxiety increases, the number of HPV relevant websites at Time 1 increases, time spent seeking HPV information online at Time 1 increases, and time reported seeking HPV information online in the week after the in-laboratory experiment increases.

Hypothesis four. The ELM (Petty & Cacioppo, 1986) best explains the rationale for the fourth hypothesis. Individuals who are both motivated and able to process information do so by means of a ‘central route’ and so, members of the responsive group are expected to acquire the most amount of new information. Furthermore, the ELM predicts that individuals who lack motivation and/or ability to process information, process cues using a ‘peripheral route’ and are thus more likely to not remember information. By this logic, people in the anxious group are more likely to not retain the information that they seek out compared to the other groups.

Based on Turner et al. (2006) and Turner et al. (2011), this dissertation predicts

that (H4) controlling for demographic factors, sexual health and history, past information seeking, and the rate of information seeking, the interaction between perceived risk and perceived efficacy will significantly affect amount of knowledge acquisition, resulting in differences among the four RPA groups; specifically, the anxious group will score significantly lower on the post knowledge measure when taking into account their scores on the prior knowledge measure than the other three groups will. The contrast coefficients for this hypothesis can be found in Table 4.

Hypothesis five. As with information seeking, Rimal and Real (2003) also theorized that anxiety caused by higher levels of perceived risk coupled with lower levels of efficacy beliefs may affect the ability to acquire and remember information. In other words, although anxiety may promote higher levels of information seeking, it would also reduce the ability to remember the information found. Although Turner et al. (2006) and Turner et al. (2011) tested the direct relationship between RPA group membership and knowledge retention/acquisition, the data did not support the hypothesis both times. In both the 2006 and 2011 RPA studies, the mediating role of anxiety between the relationship RPA group membership and knowledge retention/acquisition was theorized, but never tested. The differences in knowledge acquisition may be attributed to differing levels of anxiety between the RPA groups, rather than the interaction between perceived risk and self-efficacy beliefs. Thus, this dissertation predicts that (H5) the relationship between RPA group membership and knowledge acquisition will be mediated by anxiety. Moreover, this dissertation predicts that (H5b) controlling for trait anxiety, demographic factors, sexual health and history, past information seeking, and the rate of information seeking, state anxiety will yield a significant main effect on amount of knowledge

acquisition, such that as state anxiety increases, post knowledge decreases when taking into account scores on the prior knowledge measure.

Research question one. Thus far, RPA framework studies have examined the interaction effect between perceived risk and self-efficacy beliefs on anxiety, behavioral intentions, information seeking intentions, information seeking behavior, and information retention/acquisition. Turner et al. (2011) indicated that a future direction would be to study the type of information sought. They theorized that, to lessen anxiety, individuals are likely to be selective in the information they seek; information that makes their risk status more salient would be avoided and information that reduces their anxiety would be sought out.

They proposed two competing hypotheses, the compensation hypothesis and the resonance hypothesis, for understanding the type of information individuals seek. First, the compensation hypothesis would suggest that individuals try to compensate for that which they don't have. So, if individuals lack efficacy (i.e., indifference and avoidance groups), they would search for items to increase their efficacy. Similarly, if individuals have high risk perceptions (i.e., avoidance and responsive), then they would search for items that would decrease perceived risk. Alternatively, the resonance hypothesis would predict that individuals would gravitate toward messages/sites that highlight their current perceptions. Hence, those with high risks (i.e., avoidance and responsive) would gravitate toward sites that emphasize risks and those with higher efficacy (i.e., proactive and responsive) would gravitate toward sites that emphasize efficacy.

This dissertation is interested in expanding the RPA framework by beginning to understand (RQ1) what types of information participants will seek. In other words, will

participants use search terms and click on webpage descriptions in the search engine (RQ1a) that are relevant to health?; (RQ1b) that are relevant to the topic referenced in the message?; (RQ1c) that are congruent with or contradict their level risk perceptions?; and (RQ1d) that are congruent with or contradict their self-efficacy beliefs?

The goals of this dissertation are numerous thus far: to test anxiety as a mediating variable between RPA group membership and information seeking; to test anxiety as a mediating variable between RPA group membership and knowledge acquisition; to find out what types of information each of the RPA groups seek; and to test the RPA framework as a model. The last goal of this dissertation is to increase the predictive power of the RPA framework by incorporating the effects of cognitive processing. The discrepancies between predictions and observed finding in the RPA may be explained based on the lack of statistical analysis for anxiety as a mediator between the interaction effect of perceived risk and self-efficacy beliefs on information seeking and information acquisition. But, individual differences in cognitive patterns, or thinking styles, may further contribute to varying levels of anxiety, which, in turn, will affect the amount of information seeking and information acquisition.

Overview of Hypotheses and Research Question

H1: Controlling for demographic factors and trait anxiety, the interaction between perceived risk and perceived efficacy will significantly affect level of anxiety resulting in differences among the four RPA groups. Specifically, the anxious group will have significantly higher levels of anxiety than the other 3 groups; the proactive groups will have significantly lower levels of anxiety than the other 3 groups; and, the indifference group and responsive group will statistically differ from the other two groups, but, they will not statistically differ from each other.

H2: Controlling for demographic factors, sexual health and history, past information seeking and the rate of information seeking, the interaction between perceived risk and perceived efficacy will significantly affect amount of information seeking resulting in differences among the four RPA groups; specifically the responsive group will:

H2a) visit the most HPV relevant websites at Time 1,

H2b) spend the most time looking for HPV information online at Time 1, and

H2c) report spending the most time looking for HPV information online in the week after the in-laboratory experiment, followed by the anxious group, and lastly by both the proactive group and indifference group.

H3: The relationship between RPA group membership and information seeking will be mediated by anxiety such that:

H3a) Controlling for demographic factors and trait anxiety, the interaction between perceived risk and perceived efficacy will significantly affect level of anxiety resulting in differences among the four RPA groups (H1)

H3b) Controlling for trait anxiety, demographic factors, sexual health and history,

past information seeking and the rate of information seeking, state anxiety will yield a significant main effect on amount of information seeking, such that as state anxiety increases, the number of HPV relevant websites at Time 1 will increase, time spent seeking HPV information online at Time 1 will increase, and time reported HPV information seeking online in the week after the in-laboratory experiment will increase.

H4: Controlling for demographic factors, sexual health and history, past information seeking and the rate of information seeking, the interaction between perceived risk and perceived efficacy will significantly affect amount of knowledge acquisition resulting in differences among the four RPA groups; specifically the anxious group will score significantly lower on the post knowledge measure when taking into account their scores on the prior knowledge measure than the other three groups.

H5: The relationship between RPA group membership and information seeking will be mediated by anxiety such that:

H5a) Controlling for demographic factors and trait anxiety, the interaction between perceived risk and perceived efficacy will significantly affect level of anxiety resulting in differences among the four RPA groups. (H1)

H5a) Controlling for trait anxiety, demographic factors, sexual health and history, past information seeking and the rate of information seeking, state anxiety will yield a significant main effect on amount of knowledge acquisition, such that as state anxiety increases, post knowledge will decrease when taking into account scores on the prior knowledge measure.

H6: The relationship between thinking style and anxiety will be mediated by health locus

of control such that:

H6a) Type of thinking style will yield a significant main effect on health locus of control such that participants with a more analytic style of thinking will exhibit higher levels of internal locus of control than those with a more holistic style of thinking.

H6b) Controlling for trait anxiety, health locus of control will yield a significant main effect on level of (state) anxiety such that participants with a more internal locus of control will exhibit lower levels of anxiety than those with a lower internal locus of control.

RQ1: What types of information will participants who have been given varying risk and efficacy messages seek? In other words, will participants use search terms and click on webpage descriptions in the search engine:

RQ1a) that are relevant to health?

RQ1b) that are relevant to HPV?

RQ1c) that are congruent with or contradict their level risk perceptions?

RQ1d) that are congruent with or contradict their self-efficacy beliefs?

Chapter 3: Method

In Chapter 3 of this dissertation, the methods used in four pilot studies and one main experiment are explained. For each of the four pilot tests, the description of participants, study design, procedures, instrumentation, and analysis are included. The University of Maryland Institutional Review Board approved all data collection for this dissertation (IRB #12-0084). *Pilot Study 1* and the second part of the main study were conducted online via SurveyMonkey (www.surveymonkey.com). *Pilot Studies 2, 3, and 4*, as well as the first part of the main experiment were in-person laboratory studies.

Pilot Study 1: Determination of Topic

The purpose of *Pilot Study 1* was to select a health related topic for the main experiment. The selected topic had to meet particular requirements to be chosen for the main experiment. First, in accordance with previous RPA studies, the topic must regard a health risk. Second, the topic must be relevant to the population being studied in the main experiment (i.e., 18-24 year old college students) so that they would experience at least moderate levels of outcome involvement. Third, perceived levels of risk with regard to the topic (severity and susceptibility) must vary within the population. Finally, the topic must regard an issue that corresponds with specific discrete behaviors that this population can engage in to either increase or decrease their risk.

Participants. A sample of 57 students was recruited from undergraduate Communication courses at the University of Maryland in January 2010. Forty-six percent ($n = 25$) were male and 54% were female ($n = 29$). Sixty-one percent ($n = 34$) of participants were Caucasian, 14% ($n = 8$) were African-American, 14% ($n = 8$) were Asian or Asian American, 4% ($n = 8$) were Latino/a or Hispanic and the remaining participants (7%) categorized themselves as 'Other.' All

students received extra-credit in a communication course for their participation.

Design and procedures. This study employed a within-subjects repeated measures design. The survey was constructed using Survey Monkey (www.surveymonkey.com). Course instructors in the Department of Communication at the University of Maryland emailed the survey link to their students and some students chose to participate in the study for extra credit by following the link for the online questionnaire. After participants provided consent, they were instructed to answer 29 questions, including demographics, open-ended questions, and 7-point Likert questions. The last page of the study thanked them for their participation.

Instrumentation. The questionnaire for *Pilot Study 1* can be found in Appendix A. Confirmatory factor analyses (CFA) were conducted using LISREL 8.80 (Jöreskog & Sörbom, 2006) for all scales used to measure variables. Despite being previously used and validated in prior research, it is still important to conduct CFAs and report fit statistics for each scale (Levine, Hullet, Turner, & Lapinski, 2006). Experts suggest reporting a fit index from each of the different classes (Kline, 1998). The first class is absolute fit indices. These indices assess how well the a priori model fits, or in other words, whether the observed data were able to reproduce the hypothesized model (McDonald & Ho, 2002). The next class of fit indices is relative fit indices, which compare the chi-square for the hypothesized model to the chi-square for its null model. The third and last type of index is a parsimonious fit index. These fit indices are relative fit indices with adjustments to penalize models that are less parsimonious; simpler theoretical models are favored over more complex ones and thus, the more complex the model, the lower the fit index. Although several varying opinions exist, one of the leading experts in the field, Kline (2010) recommends reporting the Root Mean Square

Error of Approximation (RMSEA), Standardized Root Mean Residual (SRMR), and Comparative Fit Index (CFI), and, therefore, these are the statistics that were reported as fit indices within this dissertation wherever a CFA was conducted. The general rules for good model fit values are that $RMSEA \leq .06$, $SRMR \leq .08$, and $CFI \geq .95$ (Hu & Bentler, 1999). A “good model fit” indicates that the model is plausible (Schermelleh-Engel, Moosbrugger, & Muller, 2003). χ^2 statistics are also reported. However, Kline (2010) indicated that although χ^2 is often reported, this statistic may be misleading because it is heavily influenced by sample size. For Pilot Study 1, CFAs were conducted for both the severity and the susceptibility scales.

General health concerns. Two open-ended questions were employed to assess students’ top three health concerns. The first question asked about the health concerns of the participant and the second question asked about the health concerns of the average student at the University of Maryland.

The health topics included in this pilot study were taken from the CDC’s (2009) Youth Risk Behavior Surveillance Report: alcohol consumption, smoking, drug use, obesity, and sexually transmitted diseases, specifically chlamydia, gonorrhea, herpes, HIV (Human Immunodeficiency Virus), HPV (Human Papillomavirus), and syphilis.

Concern. Participants were asked a 7-point Likert question about how concerned they were about each topic, in which where 0 meant "not at all" and 6 meant "extremely." Means and standard deviations are reported in Table 5.

Riskiness. Participants were asked a 7-point Likert question about how risky they believed the consequences associated with each topic were, in which where 0 meant "not at all" and 6 meant "extremely." Means and standard deviations are reported in Table 5.

Knowledge. Participants were asked a 7-point Likert question about how knowledgeable they were about each topic, in which where 0 meant "not at all" and 6 meant "extremely." Means and standard deviations are reported in Table 5.

Severity. Severity items were taken from previous RPA studies (Rimal & Real, 2003; Turner et al., 2006; Turner et al., 2011). To measure severity perceptions, ten items were asked using 7-point Likert scales, with 1 indicating the participants "strongly disagree" and 7 indicating that they "strongly agree" with the statement presented. Three items were reverse-coded (items 7, 8, and 9). An initial confirmatory factor analysis of all items revealed a good fit for only one index ($RMSEA = .06$, $SRMR = .08$, $CFI = .96$). Means standard and deviations for the severity scale for each topic are reported in Table 6.

Susceptibility. Susceptibility items were taken from previous RPA studies (Rimal & Real, 2003; Turner et al., 2006; Turner et al., 2011). To measure susceptibility perceptions, 7 items were asked, measured with 7-point Likert scales, with 1 indicating the participants were "not at all likely" and 7 indicating "extremely likely" to experience any of the risks associated with each topic. The initial confirmatory factor analysis of all items revealed a poor fit ($RMSEA = .29$, $SRMR = .11$, $CFI = .83$). In assessing the face validity of the susceptibility items, it could be that the data did not fit the overall model because the scale consists of two factors. Specifically, items 1-4 asked about the participant's susceptibility to HPV risks in the next year, five years, ten years and lifetime, and items 5-7 dealt with general susceptibility to the adverse effects of HPV. Upon further investigation, a Principal Component Analysis (PCA) indicated that all of the items loaded highly on the first factor, but items 5-7 loaded highly on Factor 2 as

well. The second-order CFA had satisfactory fit ($RMSEA = .12$, $SRMR = .04$, $CFI = .97$), and all items were averaged to create a susceptibility scale. The scale was reliable ($M = 3.31$, $SD = 1.52$, $\alpha = .92$). Means and standard deviations for the susceptibility scale for each topic are reported in Table 6.

Results. Open-ended responses. When asked about the participants' top health concerns, cancer was mentioned 21 times, STDs were mentioned 14 times, and sexual health was mentioned four times, for a total of 24% of the responses (39 out of 160 responses). When asked about the top health concerns of the average student at the University of Maryland, cancer was mentioned 11 times, STDs were mentioned 25 times and sexual health was mentioned four times, for a total of 25% of the responses (40 out of 157 responses).

Concern. Concern was analyzed as a function of health risk using a repeated measures analysis of variance (ANOVA). Mauchly's test indicated that the assumption of sphericity had been violated ($X^2(44) = 398.60$, $p < .001$), and therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\epsilon = .40$). The ANOVA indicated a significant difference in participants' level of concern by topic, $F(3.51) = 2.55$, $p < .001$. The top three health topics that participants were most concerned about were HIV ($M = 4.09$, $SD = 2.32$), HPV ($M = 4.07$, $SD = 2.17$), and herpes ($M = 2.15$, $SD = 2.15$).

Riskiness. Attitudes about perceived risk was analyzed using a within-subjects repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated ($X^2(44) = 365.85$, $p < .001$), and therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\epsilon = .38$). The ANOVA indicated a

significant difference in the level of concern by topic $F(3.40) = 10.90, p < .001$. The top three health topics that were rated as the most risky were HIV ($M = 5.80, SD = 1.78$), HPV ($M = 5.47, SD = 1.73$), and drug use ($M = 5.40, SD = 1.68$).

Knowledge. Attitudes about perceived knowledge were analyzed using a within-subjects repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated ($X^2(44) = 336.94, p < .001$), and therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\epsilon = .32$). The ANOVA indicated a significant difference in the level of concern by topic, $F(2.89) = 22.07, p < .001$. The top three health topics that participants believed that they were most knowledgeable about were alcohol consumption ($M = 5.62, SD = 1.57$), smoking ($M = 5.40, SD = 1.58$), and drug use ($M = 4.95, SD = 1.84$) and the three topics that participants believed they were least knowledgeable about were syphilis ($M = 3.58, SD = 1.77$), chlamydia ($M = 3.78, SD = 1.77$), and gonorrhea ($M = 3.84, SD = 1.73$).

Severity. Severity was analyzed using a within-subjects repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated ($X^2(44) = 496.78, p < .001$), and therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\epsilon = .28$). The ANOVA indicated a significant difference in the level of severity by topic $F(2.41) = 9.28, p < .001$. The top three topics that participants perceived as the most severe were HIV ($M = 6.04, SD = .77$), HPV ($M = 5.87, SD = .84$), and syphilis ($M = 5.77, SD = .81$). Means, standard deviations, and Cronbach's alphas for all topics can be found in Table 6.

Susceptibility. Susceptibility was analyzed using a within-subjects repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been

violated ($X^2(44) = 648.85, p < .001$), and therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\epsilon = .39$). There was a significant difference in the level of severity by health topic, $F(2.95) = 14.40, p < .001$. Participants believed themselves to be more susceptible to (top three): alcohol consumption ($M = 3.85, SD = 1.72$), smoking ($M = 2.74, SD = 1.52$), and HPV. Means, standard deviations, and Cronbach's alphas for all topics can be found in Table 6.

Discussion. Out of all of the topics studied, HPV was the one topic that yielded consistent results: HPV was a top three health topic that students were most concerned about, a top three health topic that was rated most risky, and had one of the top three means for severity and susceptibility. HPV was also a topic that participants did not seem to know too little or too much about. The open-ended responses provided further evidence that HPV would be an appropriate topic. Cancer, STDs, and sexual health can all be linked to HPV. Therefore, based on the results of the questionnaire and according to the requirements mentioned earlier in this section, the topic of HPV was chosen for this dissertation.

Pilot Study 2: Risk Induction Messages Pilot

On the basis of the Pilot 1 results, messages were developed to induce low and high risk about HPV. The purpose of Pilot Study 2 was to test that the low risk induction messages elicited low risk perceptions and that the high risk messages elicited high risk perceptions. Based on Pilot Study 1 data, messages were created around the topic of HPV. Messages from the Turner et al.'s recent (2011) RPA study were used as templates for constructing the risk messages for this dissertation.

Participants. Fifty students from the University of Maryland in the United States

participated in this pilot study. The mean age was approximately 20 ($M = 19.79$, $SD = 2.54$). Thirty-five percent of the participants were males ($n = 18$) and 64% were female ($n = 32$). Participants were asked to indicate all races that applied to them. Sixty percent identified as Non-Hispanic White ($n = 30$), 18% identified as Black or African American ($n = 9$), 12% identified as Asian or Asian America ($n = 6$), 6% as Hispanic or Latino ($n = 3$), and 2% as Pacific Islander ($n = 1$). One percent of participants in the sample identified as other races ($n = 2$). The participants included 12% freshmen ($n = 6$), 34% sophomores ($n = 17$), 28% juniors ($n = 14$), and 26% seniors ($n = 13$).

Design and procedures. Pilot Study 2 employed a one-way experimental design in which students were randomly assigned to either a low risk or high risk message condition. After providing informed consent, participants were instructed that they would be reading and responding to a message about HPV (see Appendix B). After reading the message, participants answered questions about the severity and susceptibility of HPV. Finally, they were asked to provide demographic information about their age, sex, race, and year in school and thanked for their time. Participants received extra credit for their participation in the study.

Risk induction. Participants were randomly assigned to read a low or high risk message about HPV. Participants in the *low-risk condition* read information that was less focused on the severity and susceptibility of the health risks associated with HPV. They were asked to assess their individual level of risk using a mental checklist that contained 8 items total that could be checked. Participants were told “Checking 4 or more of these items puts you in the top 10% of individuals that are at high risk.” However, the list of items in the low-risk condition was created so as to make it very difficult to check off

more than four items.

Participants in the *high-risk condition* read information that strongly emphasized the serious health risks associated with HPV. In order to increase perceived susceptibility participants were then told that they will self-assess their individual level of risk. Participants in the high-risk condition were presented with a list containing 15 risk factors and were asked to “mentally check off and tally the items that put you at risk.” Participants were told “Checking 4 or more of these items puts you in the top 10% of individuals that are at high risk.” They were also told “A high risk person is more likely to experience the dangers associated with HPV, such as ...” (See Appendix B).

Instrumentation. The items for each scale can be found in Appendix D.

Confirmatory factor analyses were conducted on each scale using LISREL 8.80 (Jöreskog & Sörbom, 2006). Fit statistics for each scale are reported below. The Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Residual (SRMR), and Comparative Fit Index (CFI) were used as fit indices with satisfactory fit values being $RMSEA \leq .06$, $SRMR \leq .08$, and for $CFI \geq .95$ (Hu & Bentler, 1999). Means, standard deviations, Cronbach’s alpha, and fit indices for each scale are reported in Table 7.

Perceived severity. Severity items were taken from previous RPA studies (Rimal & Real, 2003; Turner et al., 2006; Turner et al., 2011). To measure severity perceptions ten items were asked using 7-point Likert scales, with 1 indicating that participants “strongly disagree” and 7 indicating participants “strongly agree” with the statement described. Three items were reverse coded (items 7, 8, and 9). An initial CFA of all items revealed a poor fit for only one index ($RMSEA = .11$, $SRMR = .08$, $CFI = .88$). Upon further investigation, a Principal Component Analysis (PCA) indicated that for the initial

model, although most of the items loaded highly on the first factor, items 1a and 8 did not load highly on Factor 1. Item 1 was the only item that loaded highly on Factor 2 and both items 1a and 8 were the only items to load highly on Factor 3. Item 1a stated that “the risks associated with HPV are a severe threat to me” and participants might have been experiencing a third person effect when answering this question. Item 8 stated that “researchers exaggerate the risks associated with HPV” and participants may have been experiencing a response bias because they were taking part in HPV research. Thus, items 1a and 8 were dropped. The CFA for the shortened scale confirmed that the remaining 8 severity items loaded on one factor with satisfactory fit ($RMSEA = .08$, $SRMR = .04$, $CFI = .97$). The scale was reliable ($M = 6.15$, $SD = .63$, $\alpha = .88$). Scale means, standard deviations, Cronbach’s alpha, and fit indices are reported in Table 7.

Perceived susceptibility. Susceptibility items were taken from previous RPA studies (Rimal & Real, 2003; Turner et al., 2006; Turner et al., 2011). To measure susceptibility perceptions, 7 items were asked, measured with 7-point Likert scales, with 1 indicating participants believed they were “not at all likely” and 7 indicating “extremely likely” to do what? Participants were asked how likely they were to experience any of the risks associated with HPV in the next year, five years, ten years, or in their lifetime. An initial CFA of all items revealed a poor model fit ($RMSEA = .13$, $SRMR = .11$, $CFI = .78$). Upon further investigation, a PCA indicated that for the initial model, although all of the items loaded highly on the first factor, the last three items loaded highly on Factor 2 as well, which makes sense because items 1-4 deal with the susceptibility of HPV risks in the next year, five years, ten years and lifetime, and items 5-7 deal with the general susceptibility to the adverse effects of HPV. The second-order

CFA confirmed that all 7 susceptibility items loaded on one factor with satisfactory fit ($RMSEA = .07$, $SRMR = .04$, $CFI = .97$) and all items were averaged to create a susceptibility scale. The scale was reliable ($M = 3.62$, $SD = 1.66$, $\alpha = .95$). Scale means, standard deviations, Cronbach's alpha, and fit indices are reported in Table 7.

Results. ANOVA was performed on participants' reported severity and susceptibility. Participants who received a high risk message perceived HPV to be more severe ($M = 6.30$, $SD = .55$) than those who read a low risk message ($M = 5.39$, $SD = .68$), $F(1, 48) = 4.96$, $p < .05$; $\eta^2 = .06$). Similarly, participants who received a high risk message perceived that individuals were more susceptible to HPV ($M = 4.01$, $SD = 1.73$) than those who read a low risk message ($M = 3.17$, $SD = 1.48$), $F(1, 48) = 5.48$, $p < .05$; $\eta^2 = .07$). Thus, the inductions were judged effective and appropriate for use in the main study. Means and standard deviations are reported in Table 8.

Pilot Study 3: Induction Messages Pilot

The purpose of Pilot Study 3 was to test that the low self-efficacy induction messages elicited low self-efficacy perceptions and that the high self-efficacy messages elicited high self-efficacy perceptions. Based on Pilot Study 1 data, messages were created around the topic of HPV. Messages from the Turner et al.'s recent (2011) RPA study were used as templates for constructing the self-efficacy messages for this dissertation.

Participants. Fifty students from the University of Maryland in the United States participated in this pilot study. The mean age was approximately 20 ($M = 19.94$, $SD = 1.49$). Thirty-six percent of participants were male ($n = 18$) and 64% were female ($n = 32$). Participants were asked to indicate all races that applied to them. Sixty-one percent

identified as Non-Hispanic White ($n = 61$), 18% identified as Black or African American ($n = 18$), 12% identified as Asian or Asian America ($n = 12$), 6% as Hispanic or Latino ($n = 6$), and 2% as Pacific Islander ($n = 2$). Two percent of participants in the sample identified as other races ($n = 1$). The participants included 26% freshmen ($n = 13$), 28% sophomores ($n = 14$), 28% juniors ($n = 14$), and 16% seniors ($n = 9$).

Design and procedures. Pilot Study 3 employed a one-way experimental design in which students were randomly assigned to a low efficacy or a high efficacy. After providing informed consent, participants were instructed that they would be reading and responding to a message about HPV (see Appendix C for messages). After reading the message, participants answered questions self-efficacy. Finally, they were asked to provide demographic information about their age, sex, race, and year in school, and thanked for their time. Participants received extra credit for their participation in the study.

Self-efficacy induction. Participants were randomly assigned to read either a low-self efficacy or high-self efficacy message. In the low-self efficacy condition, participants read “Preventing the dangers associated HPV is difficult-but there are some things you can do.” They were given five ways to “prevent the dangers associated with contracting HPV,” and were warned how difficult each behavior is. Finally, they were told, “Remember-even if you do these things you don’t have the ability to reduce certain personal risk factors so you’ll still be at risk.”

In the high-self efficacy condition, participants read that “Preventing the dangers associated with HPV is easy-there’s a lot you can do!” They then read the same five ways to “prevent the dangers associated with contracting HPV,” and were told how easy each of those steps were. Finally, participants in the high-self efficacy condition were told “Remember-you

have the ability to prevent the dangers associated with HPV by following these easy steps.”

Instrumentation. The items for the scale can be found in Appendix D. CFAs were conducted on each scale using LISREL 8.80 (Jöreskog & Sörbom, 2006). Fit statistics for each scale are reported below. The Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Residual (SRMR), and Comparative Fit Index (CFI) were used as fit indices with satisfactory fit values being $RMSEA \leq .06$, $SRMR \leq .08$, and for $CFI \geq .95$ (Hu & Bentler, 1999). Means, standard deviations, Cronbach’s alpha, and fit indices for each scale are reported below and in Table 7.

Perceived self-efficacy. The self-efficacy scale was comprised of ten questions using a 7-point Likert scale, in which 1 signified participants were “not at all confident” to 7 signifying participants were “extremely confident” about? Participants had the option of indicating “0” also, which meant “does not apply to me”. CFA model fit was good ($RMSEA = .04$, $SRMR = .04$, $CFI = .98$). The scale was reliable ($M = 5.63$, $SD = .86$, $\alpha = .82$). Scale means, standard deviations, Cronbach’s alpha, and fit indices are reported in Table 7.

Results. ANOVAs was performed on participants’ reported self-efficacy. Participants who received a high self-efficacy message reported higher levels of self-efficacy ($M = 5.90$, $SD = .47$) than those who read a low self-efficacy message ($M = 5.39$, $SD = 1.05$), $F(1, 48) = 4.79$, $p < .05$, $\eta^2 = .09$). Thus, the inductions were judged effective and appropriate for use in the main study. Means and standard deviations are reported in Table 8.

Pilot Study 4: Assessing the HPV Post-Knowledge Questionnaire

The purpose of Pilot Study 4 was to assess the internal validity of the knowledge

measures. Participants who have read more information about HPV should be able to answer more questions correctly than those who have not read anything regarding the virus.

Participants. One hundred students from the University of Maryland participated in this pilot study. The mean age of participants was approximately 20 ($M = 19.78$, $SD = 1.49$). Fifty-eight percent of the participants were males ($n = 58$) and 40% were female ($n = 40$). Two people did not identify as male or female. Participants were asked to indicate all races that applied to them. Sixty-three percent identified as Non-Hispanic White ($n = 63$), 13% identified as Black or African American ($n = 13$), 11% identified as Asian or Asian America ($n = 11$), 3% as Hispanic or Latino ($n = 3$), 1% as Pacific Islander ($n = 1$), and 1% as Middle Eastern ($n = 1$). Four percent of participants in the sample identified as other races ($n = 4$). Four participants chose not to disclose their ethnic background. The participants included 39% freshmen ($n = 39$), 28% sophomores ($n = 28$), 14% juniors ($n = 14$), and 18% seniors ($n = 18$). One respondent did not indicate his or her year in school.

Procedures. Participants gave their consent for participation prior to beginning the study. Participants were randomly assigned to one of two groups: one group was given several pages of texts from actual websites that include accurate HPV information (see Appendix E), followed by the knowledge retention questionnaire. The other group was given only the knowledge retention questionnaire (see Appendix F). Participants answered 18 questions, including 14 knowledge questions and four demographic questions. The last page of the study thanked them for their participation.

Instrumentation. Both knowledge instruments contained 14 questions each and included items in multiple-choice format and true/false format. Items included questions

that would be indicative of someone who carefully read up on the risks associated with HPV, as well as items most people would know the answers to without having read HPV information. Each correct answer was awarded one point, thereby creating a scale that ranged from 0 to 14 for each instrument.

Results and discussion. An independent *t*-test was conducted to analyze differences between the number of questions correctly answered by the group that received the reading materials on HPV and the group that did not. The group that received the reading material ($M = 4.12$, $SD = 2.13$) scored significantly higher on the assessment than those that did not ($M = -1.06$, $SD = 1.22$), $t(78) = -14.90$, $p < .001$.

Based on Pilot Study 1 results, HPV was chosen to be the topic in the main study. Pilot Study 2 indicated that the low risk induction messages would elicit a lower amount of risk than the high risk message, and, likewise, Pilot Study 3 indicated that the low efficacy induction messages would elicit a lower amount of self-efficacy than the high efficacy message. Finally, Pilot Study 4 indicated that the pre and post knowledge scores would differ based on whether participants read about HPV information online. The main study was constructed on the basis of these pilot studies.

Main Study

A 2 (risk message: low or high) x 2 (self efficacy message: low or high) x 2 (measured thinking style: holistic or analytical) between-subjects quasi-experimental design was used in the main study of this dissertation. Participants were randomly assigned to the risk and efficacy groups. Thinking style was measured; lower scores indicated an analytic thinking style and higher scores indicated a holistic thinking style.

Participants. Participants were undergraduate students at the University of

Maryland who were recruited using SONA, an online participant pool in the Department of Communication. A power analysis for ANCOVA with fixed effects, main effects and interaction effects was conducted using the software G*power (Erdfelder, Faul, & Buchner, 1996) to determine the needed sample size. The power analysis indicated that for alpha of .05, power of 0.8, and a medium effect size of .25, the sample should consist of at least 279 participants.

A total of 492 participants completed both Time 1 and Time 2 phases of the study. Participants were between the ages of 18 and 32, with a mean age of approximately 20 years ($M = 19.69$, $SD = 1.52$). The sample consisted of more females ($n = 288$, 58%) than males ($n = 194$, 39%), with 10 students choosing not to identify their biological sex. Sixty percent identified themselves as Caucasian ($n = 295$), 13% as African-American ($n = 62$), 12% as Asian ($n = 61$), 4% as Latin American ($n = 21$), 1% as Middle Eastern ($n = 6$), .4% as Pacific Islander ($n = 2$), and 6% as other ($n = 30$). Fifteen participants did not answer this question. Forty percent were freshman ($n = 199$), 27% were sophomores ($n = 131$), 18% were juniors ($n = 90$), and 14% were seniors ($n = 69$). Three students did not indicate their year in school.

Procedures. Procedures were adopted from Turner et al. (2006) and Turner et al. (2011). Participants, who were blind to the four experimental conditions, were randomly assigned to one of them. Once seated in a cubicle (with a laptop computer on the desk), participants read and signed a consent form, and were given a packet of questionnaires and messages. First, participants completed an inventory of trait anxiety questions, followed by questions assessing thinking styles and prior knowledge questionnaire about HPV. Next, participants were presented with the risk and efficacy inductions (See

appendices B and C). Participants were able to read the inductions at their own speed. Next, participants were asked to fill out a series of questions measuring the induction checks, mediating, and dependent variables.

Once participants completed the questions, the last page of the questionnaire packet informed them that they “if they wish, they may take some time to use the Internet, perhaps to look for information regarding HPV or for any other purpose” and that “after some time, the research assistant will give you further instructions and will indicate that it is time to move on to the next part of the experiment.” Their Internet surfing activity was recorded using the SpectorPro software (2006). SpectorPro took a video of their activity, as well as saved text files of the names of the websites they visited and the length of time spent on each site. Fifteen minutes before the experiment was set to end, the researcher asked people to stop surfing the Internet and participants were asked to complete a paper and pencil-based questionnaire testing their knowledge about HPV. On the last page of the questionnaire was a written debriefing statement informing participants that the risk and efficacy information varied based on condition and was administered at random, as well as informed them that their Internet surfing was recorded and they have the option to decline participation in the study if they did not feel comfortable with the researcher having access to this information. None of the participants withdrew from the study following debriefing. The participants were thanked and their questions were answered before they left the laboratory. The entire quasi-experiment took approximately 45 minutes to complete. One week later, participants received a follow-up questionnaire, administered online via SurveyMonkey, regarding their information seeking behavior since the laboratory experiment. The online portion of the experiment took participants less than 15 minutes to complete.

Preliminary data analysis. The data were first “cleaned;” responses from participants who abandoned the experiment or who did not complete the Time 2 questionnaire were removed from the data set ($n = 12$). Also, time measurements (for time spent surfing the Internet) in hours, minutes, and seconds format were converted to decimals so that the software used to conduct the analyses could ‘read’ the data.

Next, each dependent variable was checked to assess whether the assumptions of the general linear model (i.e., normality, homogeneity of variance, and independence (Bauer & Fink, 1983; Fink, 2009; Lomax, 2006)) were met. Frequency distributions for the residuals were examined, as well as skewness values, kurtosis values, and the results of Kolmogorov-Smirnov tests to test for normality. Levene’s tests were conducted to examine homogeneity of variance, and residuals were also examined to check whether they systematically increased or decreased. Finally, to examine the assumption of independence, residual plots were analyzed to check whether residuals made a random pattern or whether they were ordered in a cyclical pattern (Lomax, 2006). State anxiety did not meet the homogeneity of variance assumption as indicated by a significant p -value for the Levene’s statistic. Several transformations were performed on this variable to meet the assumption of homogeneity; however, none of the transformations yielded a non-significant Levine’s test. The inability to meet this assumption could possibly be attributed to the use of a Likert scale for state anxiety because Likert scales often reduce variance (Fink, 2009). As a remedy, Dunnett’s C post-hoc tests, which do not assume homogeneity of variance or equal variances, were used and are reported instead of results from a traditional Tukey’s post hoc test for testing state anxiety.

Next, CFAs were conducted to test the factor structure of the proposed scales

using a measurement model of all latent variables and their indicators in LISREL 8.80 (Jöreskog & Sörbom, 2006). The purpose of the CFA was to check the factor structure of each scale and to examine the possibility of cross-loadings between indicators. CFAs were also conducted for each scale and their fit statistics are reported below. The Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Residual (SRMR), and Comparative Fit Index (CFI) were used as fit indices with satisfactory fit values as $RMSEA \leq .06$, $SRMR \leq .08$, and for $CFI \geq .95$ (Hu & Bentler, 1999).

Instrumentation. Trait anxiety, thinking style, and prior knowledge were measured in the Time 1 study before participants read the induction? messages to ensure baseline measures. After the messages were read, state anxiety, locus of control, severity, susceptibility, efficacy (self, response, collective, and communication, respectively), past information seeking, behavioral intention, information seeking intention, and demographic questions were measured in that order. Post knowledge questions were asked after participants had the opportunity to seek information online. Time 2 data measured participants' self-reported information seeking behavior in the week following the in-laboratory experiment. All measures for Time 1 are included in Appendix G and all measures for Time 2 are included in Appendix H. The discussion below begins with the independent variables, then moves to the dependent variables and finally to the covariates.

Independent variables. The independent variables in this study are perceived risk, self-efficacy beliefs and thinking style.

Perceived risk. Participants indicated their perceived susceptibility and perceived severity of HPV. Susceptibility and severity items from previous RPA studies (Rimal &

Real, 2003; Turner et al., 2006; Turner et al., 2011) were used. To measure severity perceptions ten items were asked using 7-point Likert scales, with 1 indicating participants “strongly disagree” and 7 indicating participants “strongly agree.” Three items were reverse coded (items 7, 8, and 9). An initial confirmatory factor analysis of all items revealed a poor fit (RMSEA = .11, SRMR = .08, CFI = .88). Upon further investigation, a Principal Component Analysis (PCA) indicated that for the initial model, although most of the items loaded highly on the first factor, items 1a and 8 did not load highly on Factor 1, although item 1 was the only item that loaded highly on Factor 2 and both items 1a and 8 were the only items to load highly on Item 3. Item 1a stated that “the risks associated with HPV are a severe threat to me” and participants might have been experiencing a third person effect when answering this question. Item 8 stated that “researchers exaggerate the risks associated with HPV” and participants may have been experiencing a response bias because they are taking part in HPV research. Thus, items 1a and 8 were dropped. The PCA indicated a one factor model in which all of the remaining items loaded highly. The CFA on the revised scale confirmed that the remaining eight severity items loaded on one factor with satisfactory fit (RMSEA = .08, SRMR = .04, CFI = .97). The eight items were averaged to create a severity index. The scale was reliable ($M = 6.07$, $SD = .73$, $\alpha = .84$).

To measure susceptibility perceptions, seven items were asked, measured with 7-point Likert scales, with 1 indicating participants thought it “not at all likely” and 7 indicating participants thought it “extremely likely.” Participants were asked how likely they are to experience any of the risks associated with HPV in the next year, five years, ten years, or in their lifetime. An initial confirmatory factor analysis of all items revealed

a poor fit ($RMSEA = .29$, $SRMR = .11$, $CFI = .83$). Upon further investigation, a Principal Component Analysis (PCA) indicated that for the initial model although all of the items loaded highly on the first factor, the last three items loaded highly on Factor 2 as well, which makes sense because items 1-4 deal with the susceptibility of HPV risks in the next year, 5 years, 10 years and lifetime, and items 5-7 deal with the general susceptibility to the adverse effects of HPV. The second-order CFA confirmed that all 7 susceptibility items loaded on one factor with satisfactory fit ($RMSEA = .12$, $SRMR = .04$, $CFI = .97$) and all items were averaged to create a susceptibility scale. The scale was reliable ($M = 3.31$, $SD = 1.52$, $\alpha = .92$).

The data indicated that the sample as a whole perceived that HPV was severe, however they differed in their beliefs regarding susceptibility. Thus, the decision was made to use the susceptibility scale as a proxy measure for perceived risk.

*Self-efficacy beliefs*¹. Self-efficacy items were taken from previous RPA studies (Rimal & Real, 2003; Turner et al., 2006; Turner et al., 2011). Self-efficacy was measured with ten 7-point Likert questions, in which 1 signified “not at all confident” and 7 signified “extremely confident”. Participants had the option of indicating “0” also, which meant “does not apply to me”. Responses from participants who indicated a “0” (n

¹ Other types of efficacy, such as response efficacy, collective efficacy, and communication efficacy were also measured. No single measure of response efficacy is universally applicable because response-efficacy is generally measured with a specific health problem in mind. Therefore, any measure of response efficacy must include a specific behavior to be taken and the health benefit that will occur from it. The template of the self-efficacy questions used in this study was adapted to fit the criteria of response efficacy measures. Seven, 7-point Likert scales were developed to measure response efficacy, in which 1 indicated “Not at all confident” to 7, which indicated, “Extremely confident.” Confirmatory factor analysis showed that the items loaded on one factor with poor fit ($RMSEA = .15$, $SRMR = .11$, $CFI = .94$). Attempts were made to improve the fit, but to no avail. Bandura (1997) states that response efficacy is only useful in predicting behavior in so much as individuals believe that they possess self-efficacy in carrying out the behavior. Thus, the response efficacy scale was dropped from the study. Collective efficacy and communication efficacy were also dropped from the study because those scales also lacked good fit, as well as the theoretical support to retain them.

= 5) were not retained in the analysis and therefore, the means and standard deviations reported of the items and scale do not include responses of "0." An initial confirmatory factor analysis of all items yielded a poor fit ($RMSEA = .29$, $SRMR = .11$, $CFI = .83$). However, this was theorized to occur because 4 items (items 1, 8, 9, and 10) measured general self-efficacy questions and 6 items (items 2-7) measured behavior specific questions. Upon further investigation, a Principal Component Analysis (PCA) indicated that for the initial model although all of the items loaded highly on the first factor, the general efficacy items loaded high and the behavior specific items loaded low on Factor 2.

The CFA on the general self-efficacy scale confirmed that the items loaded on one factor with satisfactory fit ($RMSEA = .05$, $SRMR = .00$, $CFI = 1.00$). The scale was reliable ($M = 5.75$, $SD = 1.11$, $\alpha = .87$). The CFA on the behavior specific self-efficacy scale confirmed that the items loaded on one factor with satisfactory fit ($RMSEA = .04$, $SRMR = .04$, $CFI = .96$). The scale was marginally reliable ($M = 5.37$, $SD = 1.04$, $\alpha = .67$). The behavior specific self-efficacy scale was retained as the proxy measure for self-efficacy beliefs.

Thinking styles. The Analysis-Holism scale (AHS) was developed by Choi, Koo, and Choi (2007). The twenty-four item scales measures 4 components of analytic-holistic thinking: locus of attention, causality, perception of change, and tolerance for contradiction. Choi et al. (2007) and Klein, Lin, Peng, Bhal, Radford, Choi, Mohd Noor, Khalid, & Chan (2008) supported the validity of the scale. M. Liu (personal communication, February 7, 2013) suggests using the subscale that best represents analytic-holistic thinking style for the relationship at hand. Analytic thinkers' perception

of change is that most objects do not dramatically change over time, nor are they affected much by other factors such as an external sources (Choi et al., 2007). Thus, when examining the relationship between A-H thinking and locus of control, analytic thinkers would have a more internal locus of control. Holistic thinkers perceive change as complex; they believe that elements are interconnected with one another and expect that a state of constant change exists because of the intricate pattern of interactions among the elements (Nisbett, 2003). Thus, holistic thinkers have a more external locus of control. The perception of change subscale was chosen as the analytic-holistic thinking style measure.

Six 7-point Likert items measured perception of change (items 1, 6, 10, 14, 17, and 18 in the A-H scale) in which 1 indicated participants “strongly disagree” and 7 indicated participants “strongly agree.” Five items were reverse coded (items 1, 6, 10, 17, and 18). Confirmatory factor analysis showed that the items loaded on four factors, as predicted, with satisfactory fit ($RMSEA = .02$, $SRMR = .03$, $CFI = .98$). The scale was reliable ($M = 4.62$, $SD = .85$, $\alpha = .80$). Lower scores indicated analytic thinking and higher scores indicated holistic thinking.

Dependent variables. The dependent variables in this dissertation were state anxiety, information seeking (two measures at Time 1 and one measure at Time 2), knowledge acquisition, and health locus of control.

State anxiety. Twenty 7-point Likert items from Spielberger’s (1970, 1983) State-Trait Anxiety Inventory (STAI) were used to measure state anxiety, in which 1 signified “not at all” and 7 signified “very much so.” Example questions include “I feel tense” and “I am relaxed.” Nine items were reverse coded (items 1, 2, 5, 8, 11, 15, 16, 19, and 20).

Confirmatory factor analysis confirmed that the items loaded on one factor, as predicted, with satisfactory fit ($RMSEA = .11$, $SRMR = .04$, $CFI = .98$). The scale was reliable ($M = 2.79$, $SD = 1.09$, $\alpha = .95$).

Information-seeking behaviors at Time 1. Amount of time spent viewing HPV websites and the number of HPV websites visited constituted two separate measures of amount of information seeking. As participants used the Internet to search for information, the software used to monitor information seeking behavior, SpectorPro, recorded a video of their activity, as well as logged the amount of time spent surfing, the number of domains and web pages visited, and any text entered into search engines. Participants who did not access the Internet or accessed the Internet for other purposes than to look for HPV information were considered to have not engaged in information seeking. Participants averaged about three minutes looking for HPV information ($M = 3.48$, $SD = 6.78$), but amount of time information seeking ranged from 0 to about 25 minutes. Although the range for the number of HPV websites was from 0 to 15, participants looked at an average of one HPV website ($M = 2.7$, $SD = 1.16$). Notably, only 53% of participants looked for HPV information ($n = 262$).

Knowledge acquisition. Although knowledge acquisition was calculated as the ratio of the total knowledge score to the amount of time spent looking for information in order to determine learning as a function of time spent on the Internet (Turner et al., 2006), in this dissertation, knowledge-acquisition rate was calculated as the difference between post knowledge score and the prior knowledge score. To account for learning as a function of time spent on the Internet, the number of HPV websites and the time spent surfing for HPV information are used as covariates in data analysis involving knowledge

acquisition.

Prior knowledge. Participants' prior knowledge about the health risks associated with HPV was measured using 14 questions. Some of the questions were in a multiple-choice format and others were in a true/false format. The questions were recoded so that correct answers were given 1 and all incorrect answers were given 0s. The 14 questions were added together to create a prior knowledge index ranging from 0 to 14 ($M = 7.10$, $SD = 2.41$)

Post knowledge. At the end of the laboratory experiment, participants were asked 14 questions about HPV. Some of these questions were in a multiple-choice format and others were in a true/false format. Items included information that would be indicative of someone who carefully read up on the risks associated with HPV, as well as items most people, would know the answers to. Similar to the prior knowledge questionnaire, the questions in the post knowledge questionnaire were recoded so that each correct answer was awarded 1 point and each incorrect answer was awarded 0 points. The 14 questions were added together to create a post knowledge index ranging from 0 to 14 ($M = 8.90$, $SD = 1.57$).

Participants averaged an increase of about 1 question between the pre and the post knowledge questionnaire ($M = 1.08$, $SD = 2.47$), with a range in difference from -4 to 11.

Information-seeking behaviors at Time 2. To assess whether respondents sought information after the study, respondents were asked about their Internet use for the week following the laboratory study. Participants answered seven 7-point Likert scales in which 0 was "none" and 6 was "a lot of time," to assess how much time they spent looking for information on the Internet in the week following the in-laboratory study,

specifically how much time they spent looking for information on a search engine (such as Google), social networking sites (such as Facebook and Twitter), health websites, government websites, blogs, discussion boards, and other websites. Only 32 participants reported looking for information in the week following the in-laboratory study. Items were summed and averaged to create an Internet information seeking index ($M = 2.50$, $SD = 1.18$).

Types of information seeking. Types of information were examined by determining whether a participant's Internet activity was health-related, HPV-related and consequently if the activity was HPV-related, if it was indicative of risk information or efficacy information. The first search term used, the description in the search engine of the first website visited, and the description in the search engine of the longest website visited were treated as individual units for coding. A coding scheme was developed that looked at the health relevancy (relevant or irrelevant) and HPV relevancy (relevant or irrelevant) for each of those three units of information. If the information was judged as HPV relevant, it was further coded into three separate items: whether the unit contained information that could be categorized as susceptibility (susceptibility-related or non-susceptibility), severity (severity-related or non-severity), or efficacy (efficacy-related or non-efficacy). For each of the five items that were coded, a 0 indicated an absence of relevancy and a 1 indicated the presence of relevancy. The researcher trained a pair of blind, independent research assistants to code the data. The research assistants were responsible for coding each participant's first search term used, the description in the search engine of the first website visited, and the description in the search engine of the longest website visited ($n = 861$) for health relevancy, HPV relevancy, susceptibility,

severity and efficacy. After being trained, the pair was asked to code a portion of the data set to practice coding and to establish inter-coder reliability. Cohen's Kappa was calculated as a measure of inter-coder reliability (Cohen, 1960; 1968) and is reported below. As a rule of thumb, values of Kappa from 0.40 to 0.59 are considered moderate, 0.60 to 0.79 substantial, and 0.80 outstanding (Landis & Koch, 1977), however, most commonly, Kappa values of at least 0.60 and most often higher than 0.70 are considered a good level of agreement.

Health relevance. A health relevant unit was classified as any term, description or website relating to a health topic (e.g. "sexually transmitted disease" or "STD", "how can I tell if I'm a diabetic?," "cancer", "can HPV kill me?"; etc.); an irrelevant unit was any entity that did not relate to health (e.g. "football" or "ESPN", "Gmail", "Who is Kim Kardashian dating?"). After one round of coding the portion of the data set, the pair was reliable in their assessments of health relevance for each of the five units: first search term ($\kappa = 1.00$), description in search engine of first website visited ($\kappa = 1.00$), and description in search engine of longest website visited ($\kappa = .99$). The remaining data set was divided amongst the two research assistants and examined by the researcher.

HPV relevance. An HPV relevant unit was classified as any term, description or website related to a health topic about HPV specifically (e.g. "Human Papillomavirus" or "HPV", "cancer", "can HPV kill me?"; etc.); an irrelevant unit was any entity that did not relate to HPV (e.g. "high blood pressure", "how do I get rid of athlete's foot?"; as well as non health-related topics, e.g. "football" or "ESPN", "Gmail", "Who is Kim Kardashian dating?"). After one round of coding the portion of the data set, the pair was reliable in their assessments of HPV relevance for each of the five units; first search term ($\kappa = 1.00$),

description in search engine of first website visited ($\kappa = .99$), and description in search engine of longest website visited ($\kappa = .97$). The remaining data set was divided amongst the two research assistants and examined by the researcher.

Susceptibility information. Susceptibility information was indicated if the participant seemed concerned with how likely it was that he/she or someone like he/she would get HPV or be affected by the outcomes of HPV (e.g. “Will I get HPV?,” “How can I tell if I have HPV?,” “Percentage of students with HPV”); if the unit did not indicate that the participant was thinking about susceptibility, it was coded as non-susceptibility related. After two rounds of coding the portion of the data set in which disagreements were settled through discussions with the researcher, the pair was reliable in their assessments of susceptibility for each of the five units; first search term ($\kappa = .92$), description in search engine of first website visited ($\kappa = .75$), and description in search engine of longest website visited ($\kappa = .81$). The remaining data set was divided amongst the two research assistants and examined by the researcher.

Severity information. Severity information was indicative if the participant seemed concerned with how severe or adversely affected he/she or someone like he/she would be by HPV or the outcomes of HPV (e.g. “How severe is HPV?,” “Can you die from HPV?,” or “Symptoms of HPV”); if the unit did not indicate that the participant was thinking about severity, it was coded as non-severity related. After two rounds of coding the portion of the data set in which disagreements were settled through discussions with the researcher, the pair was reliable in their assessments of severity for each of the five units; first search term ($\kappa = .98$), description in search engine of first website visited ($\kappa = .87$), and description in search engine of longest website visited ($\kappa = .86$). The remaining

data set was divided amongst the two research assistants and examined by the researcher.

Efficacy information. Efficacy information was indicated if the participant seemed concerned with the ability or capability to avoid the contraction of HPV or its outcomes, as well as the effectiveness of the HPV vaccination, the use of condoms, etc. (e.g. “How can I not get HPV?,” “Is the HPV vaccine effective?,” or “HPV prevention”); if the unit did not indicate that the participant was thinking about their ability to produce a desired result or whether recommended actions would diminish the threat of HPV, then it was coded as non-efficacy related. After two rounds of coding, the portion of the data set in which disagreements were settled through discussions with the researcher, the pair was reliable in their assessments of efficacy for each of the five units; first search term ($\kappa = .96$), description in search engine of first website visited ($\kappa = .72$), and description in search engine of longest website visited ($\kappa = .86$). The remaining data set was divided amongst the two research assistants and examined by the researcher.

Health locus of control. The Health Locus of Control (HLC) Scale was developed by Wallston, Wallston, and DeVellis in 1978 to measure the extent to which individuals believe that they can control their own healthiness or whether their healthiness depends on external forces. The scale contains three, 6-item subscales for internality, powerful others externality, and chance externality. Several articles assessing the reliability and validity of the HLC Scale have been published (Kuwahara, Nishino, Ohkubo, Tsuji, Hisamichi, Hosokawa, 2004; Malcarne, Fernandez, & Flores, 2005; Wallston, 2005; Winefield, 1982). The alpha reliabilities ranged from .79 to .86. An initial confirmatory factor analysis of all items yielded a poor fit ($RMSEA = .11$, $SRMR = .09$, $CFI = .76$). However, this was theorized to occur because the scale consists of three

subscales.

The CFA for the internality scale confirmed that the items loaded on one factor with satisfactory fit ($RMSEA = .06$, $SRMR = .04$, $CFI = .95$). The scale was reliable ($M = 5.12$, $SD = .84$, $\alpha = .87$). The items were averaged to create an internality index. The CFA for the powerful others externality scale also confirmed that the items loaded on one factor with satisfactory fit ($RMSEA = .04$, $SRMR = .04$, $CFI = .97$). The scale was marginally reliable ($M = 3.88$, $SD = .89$, $\alpha = .63$). The items were averaged to create an externality index. However, the CFA for the chance externality scale yielded a poor fit ($RMSEA = .11$, $SRMR = .08$, $CFI = .78$). Therefore these items (2, 4, 9, 11, 15, and 16) were dropped.

Covariates. The control variables in this dissertation were trait anxiety, topic relevance (in terms of sexual and sexual health history), past HPV information seeking, and rate of information seeking, as well as demographic information (age, sex, race, and year in school). Control variables were included in analyses for which there was a theoretical and logical reason for including them, and thus not all covariates were used in every analysis. The effects of the covariates are reported in the results chapter.

Trait anxiety. Trait anxiety was predicted to covary with state anxiety (H1, H3, H5, and H6) because trait anxiety is described as a manifestation of frequent past experiences of state anxiety, which increases an individual's proneness towards experiencing future state anxiety (Spielberger, 1966, 1972).

Twenty 7-point Likert items from Spielberger's (1970, 1983) State-Trait Anxiety Inventory (STAI) were used to measure trait anxiety. Nine items were reverse coded (items 1, 3, 6, 7, 10, 13, 14, 16, and 19). An initial confirmatory factor analysis of all

items yielded a poor fit ($RMSEA = .09$, $SRMR = .08$, $CFI = .63$). Caci, Baylé, Dossios, Robert, and Boyer (2003) argued that the trait portion of the STI measures three separate constructs: anxiety, depression, and well-being. Evidence to support their claim was provided by a poor fitting CFA model of all 20 items, and subsequently well-fitting models for each of the three subscales. The items included in the anxiety subscale were consistent with latent terms that are clinically related, namely restlessness (items 2 and 7), worrying (items 9, 11, 17, and 18), and lack of self-confidence (items 7, 12, 14, and 15). Cronbach's alpha for the 10-item anxiety scale was .80. Using Caci et al.'s evidence as support, the researcher decided to use the shortened measure mentioned in their article. The CFA confirmed that the items loaded on one factor with satisfactory fit ($RMSEA = .04$, $SRMR = .04$, $CFI = .97$). The ten items were averaged to create the trait anxiety index. The scale was reliable ($M = 3.32$, $SD = .88$, $\alpha = .84$).

Topic relevance. Sexual history and sexual health history was measured as a means to control for topic relevance and was predicted to covary with RPA framework outcomes (H2 through H5). Turner et al. (2011) demonstrated that topic relevance influenced the outcome variables of the RPA framework. In their study, results were affected by whether participants engaged in tanning or not and were dampened for those that were not initially at risk for skin cancer.

Participants' relevance regarding HPV was measured using 3 questions about the participants' sexual history and sexual health history. Specifically, participants were asked "Have you been diagnosed with HPV?," "Have you been diagnosed with any of the following cancers: cervical, vulval, vaginal, penile, anal?," and "Are you currently sexually active or have you ever been sexually active?" Ninety-seven percent ($n = 478$)

reported they had not been diagnosed with HPV and less than 1% ($n = 2$) of participants had been diagnosed with cervical, vulval, vaginal, penile or anal cancer. Twenty-seven percent ($n = 129$) of participants were not sexually active and 73% ($n = 359$) of participants were or had been sexually active in the past. Three (less than 1%) participants did not answer the last question.

Past information seeking. Past information seeking behaviors was predicted to covary with information seeking behaviors and knowledge acquisition (H2, through H5). Wilkinson and Wilson (1983) found that individuals who had prior knowledge were less likely to seek information than those who did not have prior knowledge.

Two items assessed whether participants have looked for information regarding the risks associated with contracting HPV in the past and talked to someone to learn about the risks associated with contracting HPV in the past. Seventy-one percent ($N = 346$) of participants had not looked for information regarding the risks associated with contracting the disease. Four (less than 1%) participants did not answer the last question. Fifty-six percent ($n = 274$) of participants had not talked to someone regarding the risks associated with contracting the disease, but 43% ($n = 211$) of participants reported that they had done so in the past. Four (less than 1%) participants did not answer the last question.

Rate of information seeking. Information seeking rate was predicted to covary with information seeking behaviors and knowledge acquisition (H2 through H5). Lorence, Park, and Fox (2006) found that health information seeking is associated with a variety of factors, including experience level of Internet use. To account for differences in the amount of information sought within a given time, rate of information seeking was

calculated as a ratio of numbers of websites visited over the amount of time spent information seeking.

Demographic information. As mentioned in Chapter 2, demographic factors can influence health information seeking behavior. For example, Hispanics are less likely to engage in health information seeking compared to Caucasians and Asians (Rutten, Squires, & Hesse, 2006). Current research also indicates that females are more likely than males to search for health information (Fox & Jones, 2009). Although this dissertation is not focused on demographic predictors of information seeking behaviors, the literature does point to the need to statistically control for such factors. As such, participants were asked their age, sex, race, and year in college.

Chapter 4: Results of the Main Study

Manipulation Checks

Manipulation checks for perceived risk and self-efficacy beliefs were conducted to test the effectiveness of the risk and efficacy inductions using one-way Analysis of Variance (ANOVA). Means and standard deviations for the manipulation checks of risk and self-efficacy beliefs are reported in Table 10.

Perceived risk. The ANOVA indicated that participants who received a high risk message perceived higher levels of susceptibility ($M = 3.63$, $SD = 1.56$) than those who received a low risk message ($M = 2.99$, $SD = 1.42$; $F[1,488] = 22.72$, $p < .001$, $\eta^2 = .04$).

Self-efficacy beliefs. The ANOVA indicated that participants who received a high self-efficacy message perceived higher levels of self-efficacy ($M = 5.46$, $SD = 1.01$) than those who received a low self-efficacy message ($M = 5.28$, $SD = 1.06$; $F[1,484] = 3.55$, $p < .05$, $\eta^2 = .01$).

Test of Hypotheses, Models, and Research Question

Analyses of Covariance (ANCOVAs) with specified contrast coefficients were used to test hypotheses that predicted the effects of a categorical independent variable (e.g., RPA group membership) on a continuous dependent variable (e.g. level of anxiety, information seeking at Time 1 and Time 2, knowledge acquisition). As mentioned in the methods of the main study in chapter 3, demographic information, trait anxiety, sexual health and history, past information seeking, and/or rate of information seeking were potential covariates (CVs). Potential CVs were first tested for the assumptions that control variables must meet to be included in ANCOVA, namely 1. correlation between the CV and the DV (see Table 9); 2. homogeneity of regression across all four groups, 3.

independence of measure from IV; and 4. small or no correlation between CVs.

Covariates were not included in the ANCOVA if they violated at least one assumption. If none of the potential covariates in a given analysis met the assumptions for ANCOVA, then ANOVA was conducted. Thus, ANCOVA was used to test Hypotheses 1 and 2a and ANOVA was used to test Hypotheses 2b, 2c and 4. Assumption testing is discussed below within the analysis results of Hypotheses 1, 2, and 4.

Consistent with Turner et al. (2006), rather than use the manipulations for risk and self-efficacy to ascribe RPA group membership when conducting ANOVA or ANCOVA, a four-group cluster analysis from the post-induction risk and efficacy scores was conducted to ensure that group membership was based on participants' perceptions rather than on the assumptions of the researcher. Thus, each cluster describes group membership in terms of the data collected. Cluster analysis is a data analysis tool for addressing classification concerns (Tryon, 1939). In this case, the object of cluster analysis was to sort people into groups, or clusters, so that the degree of association is strong between members of the same cluster and weak between members of different clusters. The four-group solution converged in thirteen iterations, yielding four clusters corresponding to the four RPA groups, and both risk perception, $F(3, 489) = 560.79, p < .001$, and self-efficacy beliefs, $F(3, 481) = 293.51, p < .001$, were significantly associated with the cluster classification. It is notable that when comparing the four clusters from the K cluster analysis to the four experimentally induced groups, the mean differences between the clusters based on induction checks and the experimental condition groups did not vary significantly, $F(3, 479) = 7.22, p < .001, \eta^2 = .04$. That is, the cluster analysis converged with the experimental inductions providing further evidence of the

effectiveness of the inductions. The four groups, indifference (low perceived risk and low self-efficacy, $n = 105$), proactive (low perceived risk and high self-efficacy, $n = 144$), anxious (high perceived risk and low self-efficacy, $n = 105$), responsive (high perceived risk and high self-efficacy, $n = 131$) did not have equal cell sizes. Means and standard deviations for perceived risk and self-efficacy beliefs for each group are reported in Table 11.

Hierarchical multiple regression was used to test hypotheses 3, 5, and 6 because these predicted the effect of a continuous independent variables (e.g., anxiety, thinking style, and internal health locus of control) on a continuous dependent variable (e.g., anxiety, amount of information seeking, and knowledge acquisition) with demographic information, trait anxiety, topic relevance, past information seeking, and/or rate of information seeking as covariates whenever appropriate as indicated within each analysis.

Path analyses and structural equation analysis (SEM) were examined to test the fit of the models in hypotheses 3, 5, and 6, as well as the overall fit of the RPA framework model and the extended RPA framework model, which included thinking style and health locus of control.

Chi-square tests were used to analyze data for RQ1 because the question looked at the effect of a categorical independent variable (e.g., RPA group membership) on dichotomous variables (e.g., types of information).

SPSS 18.0 (IBM, 2011) was used to conduct ANCOVAs, ANOVAs, hierarchical multiple regression analyses, chi-square tests, and logistic regression analyses. LISREL 8.80 was used to test the path and structural equation models (Jöreskog & Sörbom, 2006). Model parameters were estimated using maximum likelihood procedures. Statistical

significance of each parameter estimate was determined by its t -statistic.

Hypothesis 1. H1 predicted that controlling for demographic factors and trait anxiety, the interaction between perceived risk and perceived efficacy would significantly affect levels of anxiety resulting in differences among the four RPA groups; specifically, that the anxious group will have significantly higher levels of anxiety than the other groups, that the proactive groups will have significantly lower levels of anxiety than the other groups, and that although the indifference group and responsive group would statistically differ from the other two groups, and that they would not statistically differ from each other.

Of the possible covariates, only trait anxiety met the assumptions of ANCOVA and was thus retained. An ANCOVA with specified contrast coefficients (see Table 2) revealed a substantial effect for the predicted contrast model, $F_{\text{contrast}}(3, 459) = 11.69, p < .001, \eta^2 = .05$. The anxious group expressed the highest levels of anxiety ($M = 3.20, SD = 1.11$), followed by the indifference group ($M = 2.90, SD = 1.05$), the responsive group ($M = 2.75, SD = 1.04$), and, finally, the proactive group ($M = 2.45, SD = 1.04$). Means and standard deviations are reported in Table 12. Trait anxiety accounted for 25% of the variance in state anxiety ($F_{\text{contrast}}(1, 459) = 177.76, p < .001, \eta^2 = .26$).

As predicted, both the Bonferroni post-hoc tests (Bonferroni was used as a post hoc test because it adjusts error variance for statistically significant covariates) and the Dunnett's C post-hoc tests (Dunnett's C post-hoc tests was used because it does not assume equal variances and state anxiety violated the assumption of homogeneity), revealed that the anxious group experienced statistically higher levels of anxiety than the indifference [$M_{\text{diff}} = 0.45 (p < .05)$], proactive [$M_{\text{diff}} = 0.75 (p < .001)$], and responsive

groups [$M_{diff} = 0.30$ ($p < .05$)]. Similarly, as predicted, the post-hoc tests revealed that the proactive group had significantly lower levels of anxiety than the indifference, anxious and responsive groups mean $M_{diff} = -0.30$ ($p < .05$), $M_{diff} = -.75$ ($p < .001$), and $M_{diff} = -0.45$ ($p < .05$), respectively. Finally, as predicted, the post-hoc tests did not reveal a statistical difference for level of anxiety between the indifference and responsive groups, $M_{diff} = -0.15$ (ns). H1 was supported.

Hypothesis 2. H2 predicted that controlling for demographic factors, sexual health and history, past information seeking and the rate of information seeking, the interaction between perceived risk and perceived efficacy would significantly affect amount of information seeking resulting in differences among the four RPA groups; specifically the responsive group would: H2a) visit the most HPV relevant websites at Time 1, H2b) spend the most time looking for HPV information online at Time 1, and H2c) report spending the most time looking for HPV information online in the week after the in-laboratory experiment, followed by the anxious group, and lastly by both the proactive group and indifference group.

H2a: Time 1 number of websites. Of the possible covariates, only the rate of information seeking met all of the assumptions of ANCOVA and was thus retained. An ANCOVA with specified contrast coefficients (see Table 3) was performed and did not indicate a statistically significant effect for the predicted contrast model, $F_{contrast}(3, 480) = .64$, ns , $\eta^2 = .00$, for the number of HPV websites visited. Contrary to the prediction, the anxious group looked at most websites ($M = 1.40$, $SD = 1.97$), followed by the indifference group ($M = 1.26$, $SD = 2.04$), the proactive group ($M = 1.16$, $SD = 1.61$), and finally, the responsive group ($M = 1.24$, $SD = 1.71$). However, as indicated by the

omnibus F_{contrast} statistic, none of the mean differences was statistically significant. H2a was not supported. Information seeking rate accounted for 5% of the variance in state anxiety [$F_{\text{contrast}}(1, 480) = 25.91, p < .001, \eta^2 = .05$]. Means and standard deviations are reported in Table 12.

H2b: Time 1 length of time surfing. Each of the possible covariates for hypothesis 2 violated at least one assumption of ANCOVA and thus, were not retained. An ANOVA with specified contrast coefficients (see Table 3) was performed and did not reveal a statistically significant effect for the predicted contrast model, $F_{\text{contrast}}(3, 481) = 0.21, ns, \eta^2 = .00$, for length of time seeking information. H2b was not supported. Moreover, unlike the prediction, the proactive group spent the most time looking for HPV information ($M = 3.44, SD = 4.95$), followed by the indifference group ($M = 3.23, SD = 5.27$), the responsive group ($M = 3.06, SD = 4.41$), and finally, the anxious group ($M = 3.02, SD = 4.11$). As indicated by the omnibus F -test, none of these differences were statistically significant. H2b was not supported. Means and standard deviations are reported in Table 12.

H2c: Time 2 length of time reported for information seeking. Each of the possible covariates for H2 violated at least one assumption of ANCOVA and thus, were not retained. An ANOVA with specified contrast coefficients (see Table 3) was performed and did not reveal a statistically significant effect for the predicted contrast model, $F_{\text{contrast}}(3, 481) = 0.42, ns, \eta^2 = .00$, for length of time reported for seeking information in the week following the in-laboratory study when controlling for the covariates. Examination of the means shows the proactive group spent the most time looking for HPV information ($M = 0.21, SD = 0.75$), followed by the anxious group ($M =$

0.20, $SD = 0.72$), the responsive group ($M = 0.14$, $SD = 0.76$), and finally, the indifference group ($M = 0.12$, $SD = 0.50$). But, as indicated by the omnibus F -test, none of these differences were statistically significant. H2c was not supported.² Means and standard deviations are reported in Table 12.

Hypothesis 3. H3 predicted that the relationship between RPA group membership and information seeking (at time 1 and 2) would be mediated by anxiety.

Time 1 number of HPV websites. Hierarchical multiple regression was performed to test the relationship between (state) anxiety and the number of HPV sites visited, controlling for demographics, sexual health and history, and past information seeking. The covariates were inputted into the first block and state anxiety was inputted in the second block. The results indicated that the predictors explained 2.9% of the variance [$R^2 = .03$, $F(7, 468) = 1.95$, $p = .05$]. It was found that as state anxiety increased, there was also significant increase in the amount of HPV websites visited ($\beta = .15$, $p < .05$). Change in R^2 and β are reported in Table 13. However, when the hierarchical multiple regression was run for each of the four groups, only the F -statistic for the anxious group was marginally significant [$R^2 = .05$, $F(1, 468) = 3.88$, $p = .05$]; as anxiety increased, the number of HPV websites marginally increased ($\beta = .38$, $p = .05$). Change in R^2 and β for each group are reported in Table 14.

A path analysis to test the mediating effect of anxiety on the relationship between RPA group membership and amount of websites viewed indicated that the model was a good fit ($\chi^2(3, N = 465) = 1.52$, $p = .68$; $RMSEA = .00$; $SRMR = .01$; $CFI = 1.00$). However, the path between the (risk perception and self efficacy) interaction term and anxiety was

² The means for each group are small because the majority of participants ($n = 452$) indicated that they did not seek HPV information online in the week following the in-laboratory study.

not statistically significant ($t = -.50, ns$), but the path between anxiety and number of HPV sites visited was statistically significant ($t = 2.14, p < .05$). The exogenous variables of perceived risk, self-efficacy beliefs and the interaction between perceived risk and self-efficacy explained 9% ($R^2 = .09$) of the variance in anxiety and anxiety explained 1% ($R^2 = .01$) of the variance in the number of HPV websites visited at Time 1. Hypothesis 3a was not supported. The correlation matrix and standard deviations can be found in Table 21. Fit indices are summarized in Table 22. The unstandardized path coefficients and associated t -values can be found in Table 23. The path diagram with standardized path coefficients can be found in Figure 1.

Time 1 length of time information seeking. Hierarchical multiple regression was performed to test the relationship between (state) anxiety and the length of time spent seeking HPV information, controlling for demographics, sexual health and history, and past information seeking. The covariates were inputted into the first block and state anxiety was inputted in the second block. The results indicated that the predictors did not explain a significant portion of the variance ($R^2 = .02, F(8, 468) = 1.25, ns$). Change in R^2 and β are reported in Table 13. However, when the hierarchical multiple regression was run for each of the four groups, the F -statistic for the anxious group was significant ($R^2 = .09, F(1, 76) = 7.63, p = .007$); as anxiety increased, the length of time seeking HPV information increased ($\beta = 1.06, p = .007$). Change in R^2 and β for each group are reported in Table 15.

A path analysis to test the mediating effect of anxiety on the relationship between RPA group membership and length of time spent seeking HPV information indicated that the model demonstrated satisfactory fit ($\chi^2(3, N = 465) = 3.40, p = .33; RMSEA = .02$;

$SRMR = .02$; $CFI = 1.00$). However, the path between the interaction term (risk perception and self efficacy) and anxiety was not statistically significant ($t = -.50, ns$), nor was the path between anxiety and length of time spent seeking HPV information online ($t = 1.57, ns$). The exogenous variables of perceived risk, self-efficacy beliefs and the interaction between perceived risk and self-efficacy explained 9% ($R^2 = .09$) of the variance in anxiety and anxiety explained 1% ($R^2 = .01$) of the variance in the time spent seeking HPV information online at Time 1. Hypothesis 3b was not supported. The correlation matrix and standard deviations can be found in Table 21. Fit indices are summarized in Table 22. The unstandardized path coefficients and associated t -values can be found in Table 23. The path diagram with standardized path coefficients can be found in Figure 2.

Time 2 length of time reported for information seeking Hierarchical multiple regression was performed to test the relationship between (state) anxiety and the length of time reported seeking HPV information in the week following the laboratory experiment, controlling for demographics, sexual health and history, and past information seeking. The covariates were entered into the first block and state anxiety was entered in the second block. The results indicated that the predictors did not explain a significant portion of the variance ($R^2 = .03, F(8, 458) = 1.56, p > .05$). Change in R^2 and β are reported in Table 13. When the hierarchical multiple regression analysis was run for each of the four groups, the F -statistic was not significant for any of the groups. Change in R^2 and β are reported in Table 16.

However, a path analysis to test the mediating effect of anxiety on the relationship between RPA group membership and Time 2 information seeking indicated that the model demonstrated satisfactory fit ($\chi^2(3, N = 465) = 3.15, p = .37$; $RMSEA = .01$; $SRMR$

= .02; CFI = 1.00). However, the path between the (risk perception and self efficacy) interaction term and anxiety was not statistically significant ($t = -.50, ns$), nor was the path between anxiety and the length of time reported for online information seeking in the week following the in-laboratory study ($t = .45, ns$). The exogenous variables of perceived risk, self-efficacy beliefs and the interaction between perceived risk and self-efficacy explained 9% ($R^2 = .09$) of the variance in anxiety and anxiety explained 0% ($R^2 = .00$) of the variance in the number of HPV websites visited at Time 1. Hypothesis 3c was not supported. The correlation matrix and standard deviations can be found in Table 21. Fit indices are summarized in Table 22. The unstandardized path coefficients and associated t -values can be found in Table 23. The path diagram with standardized path coefficients can be found in Figure 3.

Hypothesis 4. H4 predicted that controlling for demographic factors, sexual health and history, past information seeking and the rate of information seeking, the interaction between perceived risk and perceived efficacy would significantly affect amount of knowledge acquisition resulting in differences among the four RPA groups; specifically the anxious group would score significantly lower on the post knowledge measure when taking into account their scores on the prior knowledge measure than the other three groups.

Each of the possible covariates for hypothesis 4 violated at least one assumption of ANCOVA and thus, were not retained. An ANOVA with specified contrast coefficients (see Table 4) was performed and did not reveal a statistically significant effect for the predicted contrast model, $F_{\text{contrast}}(3, 481) = 0.72, ns, \eta^2 = .00$, for knowledge acquisition when controlling for the covariates. The proactive group had the highest score

($M = 2.06$, $SD = 2.75$), followed by the anxious group ($M = 1.80$, $SD = 2.27$), the indifference group ($M = 1.70$, $SD = 2.57$) and finally by the responsive group ($M = 1.66$, $SD = 2.18$). However, the groups did not significantly differ from one another as indicated by the omnibus F -test. H4 was not supported. Means and standard deviations are reported in Table 12.

Hypothesis 5. Hierarchical multiple regression was performed to test the relationship between (state) anxiety and knowledge acquisition, controlling for demographics, sexual health and history, past information seeking, and information seeking rate. The covariates were entered into the first block and state anxiety was entered in the second block. The results indicated that anxiety and the covariates explained 8.3% of the variance ($R^2 = .08$, $F(9, 457) = 4.61$, $p < .001$). Change in R^2 and β are reported in Table 17.

When the hierarchical multiple regression was run for each of the four groups, the F -statistic was significant for the indifference group [$R^2 = .21$, $F(9, 95) = 2.77$, $p < .001$], the proactive group [$R^2 = .16$, $F(9, 118) = 2.43$, $p < .01$], and the responsive group [$R^2 = .13$, $F(9, 139) = 2.29$, $p < .05$], but not for the anxious group ($R^2 = .18$, $F(9, 68) = 1.68$, ns). In the proactive group, as anxiety increased, knowledge acquisition decreased ($\beta = -0.50$, $p = .03$). But, anxiety did not seem to have an effect on knowledge acquisition in the other groups. See table for beta coefficients. Change in R^2 and β for each group are reported in Table 18.

A path analysis to test the mediating effect of anxiety on the relationship between RPA group membership and knowledge acquisition indicated that the model demonstrated satisfactory fit [$\chi^2(3, N = 465) = 4.86$, $p = .18$; $RMSEA = .04$; $SRMR = .02$;

CFI= .98]. However, the path between the (risk perception and self efficacy) interaction term and anxiety was not statistically significant ($t = -.50, ns$), nor was the path between anxiety and knowledge acquisition ($t = -.08, ns$). The exogenous variables of perceived risk, self-efficacy beliefs and the interaction between perceived risk and self-efficacy explained 9% ($R^2 = .09$) of the variance in anxiety and anxiety explained 0% ($R^2 = .00$) of the variance in the number of HPV websites visited at Time 1. Hypothesis 5 was not supported. The correlation matrix and standard deviations can be found in Table 21. Fit indices are summarized in Table 22. The unstandardized path coefficients and associated t -values can be found in Table 23. The path diagram with standardized path coefficients can be found in Figure 4.

Hypothesis 6. H6 predicted that the relationship between type thinking style and level of anxiety would be mediated by health locus of control (LOC) such that H6a) type of thinking style will significantly affect health LOC; specifically participants with a more analytic style of thinking would exhibit higher levels of internal LOC than those with a more holistic style of thinking and H6b) controlling for trait anxiety, health LOC would significantly influence affect level of (state) anxiety; specifically, participants with a higher internal LOC will exhibit lower levels of anxiety than those with a lower internal LOC.

First a hierarchical multiple regression analysis was conducted to test a direct relationship between type of thinking style and level of (state) anxiety, controlling for trait anxiety. The covariate was inputted into the first block and thinking style was inputted in the second block. The results indicated that the two predictors explained 26.6% of the variance [$R^2 = .27, F(2, 466) = 85.92, p < .001$]. It was found that as trait

anxiety increased, there was also significant increase in state anxiety ($\beta = 0.65, p < .001$), however, thinking style did not affect state anxiety ($\beta = -0.05, ns$). There was not a statistically significant difference in the F -statistic between a regression equation with both trait anxiety and thinking style and a regression equation with just thinking style further indicating that type of thinking style did not predict differences in level of anxiety ($\Delta F = 0.22, ns$). Change in R^2 and β are reported in Table 19.

Next, multiple regression was performed to test the relationship between type of thinking style and level of health internal LOC. The results indicated that type of thinking style explained 2.1% of the variance [$R^2 = .02, F(1, 483) = 10.29, p < .001$]. It was found that as thinking style moved more in the direction of holism, there was a significant decrease in internal health LOC ($\beta = -.15, p < .001$). In other words, analytic thinkers had a higher internal health LOC than did holistic thinkers. H6a was supported.

Next, a hierarchical multiple regression was performed to test the relationship between level of internal health LOC and level of (state) anxiety, controlling for level of trait anxiety. The covariate was entered into the first block and state anxiety was entered in the second block. The results indicated that the predictors explained 28.3% of the variance ($R^2 = .28, F[2, 465] = 91.35, p < .001$). It was found that as internal health LOC increased, there was a significant decrease in level of anxiety ($\beta = -.16, p = .002$). H6b was supported. Change in R^2 and β are reported in Table 20.

Finally, a path analysis to test the mediating effect of internal locus of control on the relationship between thinking style and anxiety indicated that the model demonstrated satisfactory fit ($\chi^2(1, N = 465) = .60, p = .44; RMSEA = .00; SRMR = .01; CFI = 1.00$). H6 was supported. Furthermore, the path between the (risk perception and

self efficacy) interaction term and anxiety was statistically significant ($t = -3.07, p < .05$), as was the path between anxiety and knowledge acquisition ($t = -3.88, p < .05$). The correlation matrix and standard deviations can be found in Table 21. Fit indices are summarized in Table 22. The unstandardized path coefficients and associated t -values can be found in Table 23. The path diagram with standardized path coefficients can be found in Figure 5.

Model testing for the RPA framework. Structural equation modeling (SEM) was conducted to test whether the RPA framework is a viable model for explaining information seeking and knowledge acquisition. The SEM indicated that the model demonstrated satisfactory fit ($\chi^2(17, N = 479) = 19.65, p = .29$; $RMSEA = .02$; $SRMR = .03$; $CFI = .99$). The correlation matrix and standard deviations can be found in Table 21. Fit indices are summarized in Table 22.

Based on the hypotheses presented in the main study, perceived risk, self-efficacy beliefs and the interaction between perceived risk and self-efficacy were posited to affect anxiety. Moreover, anxiety was predicted to positively affect information seeking and negatively affect knowledge acquisition.

Nine percent of the variance in anxiety was explained by risk perceptions, self-efficacy beliefs, and the interaction between the two variables ($R^2 = .09$). The path between self-efficacy and anxiety was significant ($t = -2.31, p < .05$). As self-efficacy increased, anxiety decreased. The path between perceived susceptibility and anxiety was also significant ($t = 5.40, p < .05$). As perceived susceptibility increased, anxiety also increased. However, the path between RPA group membership (the perceived risk and self-efficacy beliefs interaction term) and anxiety was not significant with the predicted

contrast coefficients ($t = -.50, ns$). As for the relationship between anxiety and information seeking, the path between anxiety and the number of HPV websites was significant ($t = 2.14, p < .05$) and anxiety predicted 1% of the variance in the number of HPV websites visited ($R^2 = .01$). However, the path between anxiety and time spent seeking HPV information was not significant ($t = 1.57, ns, R^2 = .01$), nor was the path between anxiety and time spent reported for HPV information seeking in the week following the laboratory study ($t = .45, ns, (R^2 = .00)$). Finally, the path between anxiety and knowledge acquisition was also not significant ($t = -.75, ns, R^2 = .00$). The unstandardized path coefficients and associated t -values can be found in Table 24. The path diagram with standardized path coefficients can be found in Figure 6.

Model testing for the extended RPA framework with thinking style and locus of control. SEM was also conducted to test whether the addition of thinking style and internal health locus of control to the RPA framework is a viable model for explaining information seeking and knowledge acquisition. The SEM indicated that the model demonstrated satisfactory fit ($\chi^2(29, N= 479)= 43.65, p < .05; RMSEA= .03; SRMR= .04; CFI= .96$).

Based on the hypotheses presented in the main study, thinking style was predicted to affect internal health locus of control, such that analytic thinkers had a more internal health LOC than did holistic thinkers. Furthermore, internal health locus of control, perceived risk, self-efficacy beliefs and the interaction between perceived risk and self-efficacy were posited to affect anxiety. Finally, anxiety was predicted to positively affect information seeking and negatively affect knowledge acquisition.

Thinking style predicted 2% of the variation in internal health locus of control (t

= -3.19, $p < .05$, $R^2 = .02$). Analytic thinkers had a more internal health LOC and holistic thinkers had a more external LOC. Twelve percent of the variance in anxiety was explained by internal health locus of control, risk perceptions, self-efficacy beliefs, and the interaction perceived risk and self-efficacy beliefs ($R^2 = .15$). The path between internal health LOC and anxiety was significant ($t = -3.83$, $p < .05$). Participants with a more internal health LOC had lower levels of anxiety. The path between self-efficacy and anxiety was significant ($t = -2.11$, $p < .05$). As self-efficacy increased, anxiety decreased. The path between perceived susceptibility and anxiety was also significant ($t = 5.53$, $p < .05$). As perceived susceptibility increased, anxiety also increased. However, the path between RPA group membership (the perceived risk and self-efficacy beliefs interaction term) and anxiety ($t = -.33$, ns) was not statistically significant. As for the relationship between anxiety and information seeking, the path between anxiety and the number of HPV websites was significant ($t = 2.13$, $p < .05$) and anxiety predicted 1% of the variance in the number of HPV websites visited ($R^2 = .01$). However, the path between anxiety and time spent seeking HPV information was not significant ($t = 1.57$, ns , $R^2 = .00$), nor was the path between anxiety and time spent reported for HPV information seeking in the week following the laboratory study ($t = .45$, ns , $R^2 = .00$). Finally, the path between anxiety and knowledge acquisition was also not significant ($t = -.75$, ns , $R^2 = .00$). The correlation matrix and standard deviations can be found in Table 21. Fit indices are summarized in Table 22. The unstandardized path coefficients and associated t -values can be found in Table 25. The path diagram with standardized path coefficients can be found in Figure 7.

Research Question 1. RQ1 inquired about the types of information participants

would seek given varying risk and efficacy messages. Specifically, RQ1 asked if the search terms and webpage descriptions in the search engine that participants were using were RQ1a) relevant to health, RQ1b) relevant to HPV, RQ1c) congruent with or contradicted their level risk perceptions, RQ1d) congruent with or contradicted their self-efficacy beliefs.

Health relevance. Of the 218 participants who conducted at least one search in a search engine, 83% ($N = 181$) used a health relevant search term when conducting their first search. A Chi-square test revealed that the percentage of participants that used a health relevant search term did not differ by RPA group membership, $\chi^2(3, N = 218) = 1.54, ns$.

Of the 218 participants who clicked on at least one website from a search in a search engine, 80% ($N = 161$) chose a health relevant description as their first website to visit. A Chi-square test revealed that there was a marginal statistical difference between the RPA groups for the percentage of participants that chose a health relevant description as their first website to visit, $\chi^2(3, N = 218) = 7.77, p = .05$. The proactive group (80%, $n = 43$), responsive group (78%, $n = 60$) and the anxious groups (77%, $n = 43$) had higher percentages of participants that chose a health relevant description as their first website to visit than the indifference group (58%, $n = 28$).

Of the 217 participants who clicked on at least one website from a search in a search engine, 80% ($N = 161$) chose a health relevant description as their longest website to visit. A Chi-square test revealed that there was a statistical difference between the RPA groups for the percentage of participants that chose a health relevant description as their longest website to visit, $\chi^2(3, N = 217) = 9.02, p = .03$. The responsive group (72%, $n =$

55), anxious group (71%, $n = 27$) and the proactive groups (69%, $n = 43$) had higher percentages of participants that chose a health relevant description as their longest website to visit than the indifference group (48%, $n = 23$).

HPV relevance. Of the 218 participants who conducted at least one search in a search engine, 83% ($N = 180$) used an HPV relevant search term when conducting their first search. A Chi-square test revealed that the percentage of participants that used an HPV relevant search term did not differ by RPA group membership, $\chi^2(3, N = 218) = 1.70, ns$.

Of the 218 participants who clicked on at least one website from a search in a search engine, 83% ($N = 180$) chose an HPV relevant description as their first website to visit. A Chi-square test revealed that there was a no statistical difference between the RPA groups for the percentage of participants that chose an HPV relevant description as their first website to visit, $\chi^2(3, N = 218) = 1.70, ns$. Although the difference between the groups was not statistically significant, the responsive had the highest percentage of participants that chose an HPV relevant description as their first website to visit (78%, $n = 60$), followed by the proactive group (78%, $n = 42$), the anxious group (77%, $n = 30$) and finally by the indifference group (58%, $n = 28$).

Of the 217 participants who clicked on at least one website from a search in a search engine, 65% ($N = 142$) chose an HPV relevant description as their longest website to visit. A Chi-square test revealed that there was a statistical difference between the RPA groups for the percentage of participants that chose an HPV relevant description as their longest website to visit, $\chi^2(3, N = 217) = 8.74, p = .03$. The responsive group (72%, $n = 55$), anxious group (71%, $n = 27$) and the proactive groups (67%, $n = 37$) had higher

percentages of participants that chose a HPV relevant description as their longest website to visit than the indifference group (48%, $n = 23$).

Susceptibility information. Of the 218 participants who conducted at least one search in a search engine, 8% ($N = 17$) used a susceptibility relevant search term when conducting their first search. A Chi-square test revealed that the percentage of participants that used a susceptibility relevant search term did not differ by RPA group membership, $\chi^2(3, N = 218) = 2.59, ns$. Although the difference between the groups was not statistically significant, the responsive had the highest percentage of participants that used a susceptibility relevant term (12%, $n = 9$), followed by the proactive group (7%, $n = 4$), and then by the anxious (5%, $n = 9$) and indifference groups (5%, $n = 9$).

Of the 217 participants who clicked on at least one website from a search in a search engine, 28% ($N = 61$) chose a susceptibility relevant description as their first website to visit. A Chi-square test revealed that there was a no statistical difference between the RPA groups for the percentage of participants that chose a susceptibility relevant description as their first website to visit, $\chi^2(3, N = 217) = 1.71, ns$. Although the difference between the groups was not statistically significant, the proactive group had the highest percentage of participants that chose a susceptibility relevant description as their first website to visit (32%, $n = 17$), followed by the anxious group (31%, $n = 12$), the responsive (31%, $n = 12$), and finally the indifference groups (21%, $n = 10$).

Of the 217 participants who clicked on at least one website from a search in a search engine, 26% ($N = 56$) chose a susceptibility relevant description as their longest website to visit. A Chi-square test revealed that there was a no statistical difference between the RPA groups for the percentage of participants that chose a susceptibility

relevant description as their longest website to visit, $\chi^2(3, N = 217) = 5.48, ns$. Although the difference between the groups was not statistically significant, the responsive had the highest percentage of participants that chose a susceptibility relevant description as their longest website to visit (33%, $n = 25$), followed by the proactive group (29%, $n = 16$), the anxious group (18%, $n = 7$), and finally the indifference groups (17%, $n = 8$).

Severity information. Of the 218 participants who conducted at least one search in a search engine, 1% ($N = 3$) used a severity relevant search term when conducting their first search. A Chi-square test revealed that the percentage of participants that used a severity relevant search term did not differ by RPA group membership, $\chi^2(3, N = 218) = 1.45, ns$. Although the difference between the groups was not statistically significant, the indifference, the anxious and the responsive groups all had 1 participant in each group use a severity relevant term, and the proactive group did not have any participants that searched for a severity relevant term.

Of the 218 participants who clicked on at least one website from a search in a search engine, 17% ($N = 38$) chose a severity relevant description as their first website to visit. A Chi-square test revealed that there was a no statistical difference between the RPA groups for the percentage of participants that chose a severity relevant description as their first website to visit, $\chi^2(3, N = 218) = .95, ns$. Although the difference between the groups was not statistically significant, the proactive group had the highest percentage of participants that chose a severity relevant description as their first website to visit (20%, $n = 11$), followed by the responsive group (18%, $n = 14$), the indifference (17%, $n = 8$), and finally the anxious groups (13%, $n = 5$).

Of the 217 participants who clicked on at least one website from a search in a

search engine, 18% ($N = 39$) chose a severity relevant description as their longest website to visit. A Chi-square test revealed that there was a no statistical difference between the RPA groups for the percentage of participants that chose a severity relevant description as their longest website to visit, $\chi^2(3, N = 217) = 2.10, ns$. Although the difference between the groups was not statistically significant, the responsive had the highest percentage of participants that chose a severity relevant description as their longest website to visit (22%, $n = 17$), followed by the proactive group (18%, $n = 10$), the anxious group (16%, $n = 6$), and finally the indifference groups (13%, $n = 6$).

Self-efficacy information. Of the 217 participants who conducted at least one search in a search engine, 12% ($N = 25$) used a self-efficacy relevant search term when conducting their first search. A Chi-square test revealed that the percentage of participants that used a self-efficacy relevant search term did not differ by RPA group membership, $\chi^2(3, N = 217) = 5.81, ns$. Although the difference between the groups was not statistically significant, the anxious had the highest percentage of participants that used a susceptibility relevant term (23%, $n = 9$), followed by the indifference group (10%, $n = 4$), and then by the responsive (9%, $n = 7$) and proactive groups (9%, $n = 5$).

Of the 217 participants who clicked on at least one website from a search in a search engine, 12% ($N = 25$) chose a self-efficacy relevant description as their first website to visit. A Chi-square test revealed that there was a no statistical difference between the RPA groups for the percentage of participants that chose a self-efficacy relevant description as their first website to visit, $\chi^2(3, N = 218) = .95, ns$. Although the difference between the groups was not statistically significant, the responsive group had the highest percentage of participants that chose a self-efficacy relevant description as

their first website to visit (31%, $n = 24$), followed by the proactive group (30%, $n = 16$), the anxious (26%, $n = 10$), and finally the indifference groups (21%, $n = 10$).

Of the 217 participants who clicked on at least one website from a search in a search engine, 26% ($N = 56$) chose a self-efficacy relevant description as their longest website to visit. A Chi-square test revealed that there was a no statistical difference between the RPA groups for the percentage of participants that chose a self-efficacy relevant description as their longest website to visit, $\chi^2(3, N = 217) = 3.87, ns$. Although the difference between the groups was not statistically significant, the anxious had the highest percentage of participants that chose a self-efficacy relevant description as their longest website to visit (38%, $n = 14$), followed by the responsive group (26%, $n = 20$), the proactive group (25%, $n = 13$), and finally the indifference groups (19%, $n = 9$).

Chapter 5: Discussion

The RPA framework predicts that risk perceptions and efficacy beliefs are causally antecedent to information seeking behavior and knowledge acquisition stemming from that information seeking behavior. Based on perceived risk and efficacy beliefs, four audience segments can be formed (see Table 1): indifference, anxious, proactive, and responsive. The RPA framework further theorizes that differences in information seeking and knowledge acquisition can be attributed to varying levels of anxiety between the four segments. Although the RPA framework model posits a mediating effect of anxiety on the relationship between RPA group membership and information seeking and knowledge acquisition, prior RPA studies have not statistically examined anxiety as a mediator. Furthermore, the individual relationships that the RPA framework hypothesizes have been tested, but the entire framework has not been tested as a viable structural model for explaining differences in information seek and knowledge acquisition. As Turner et al. (2011) noted, it is not only important to understand the effects of risk perceptions, efficacy beliefs, and anxiety on information seeking and knowledge acquisition, but also to uncover whether individuals seek information that compensates for or reinforces their risk perceptions and efficacy beliefs. Finally, although anxiety levels differed between the RPA groups in previous studies, the effect sizes for these differences were small, leading one to question whether other factors, such as cognitive processing of information within the messages, could further lead to variance in anxiety.

This dissertation extended RPA research in several important ways: it bridged the gap between the way the RPA framework has been theorized and how it has been

statistically tested; it tested the RPA framework as a model for the first time; it examined the type of information individuals seek, as well as the amount of information they seek; and it extended the RPA framework model by incorporating thinking styles and locus of control to increase its predictive power. In this final chapter, the results of the main study will be summarized, implications and practical applications of the RPA framework will be discussed, limitations will be presented, and future research possibilities will be explored.

Summary of Results

Hypothesis 1 predicted that controlling for demographic factors and trait anxiety, the interaction between perceived risk and perceived efficacy would significantly affect level of anxiety resulting in differences among the four RPA groups, specifically that the anxious group would have significantly higher levels of anxiety than the other groups, that the proactive groups would have significantly lower levels of anxiety than the other groups, and that although the indifference group and responsive group would statistically differ from the other two groups, they would not statistically differ from each other. These data were consistent with that prediction. The anxious group experienced statistically higher levels of anxiety than the three other groups and, the proactive group had significantly lower levels of anxiety than the three other groups. Also, as predicted, the indifference and responsive groups did not differ from one another. Hypothesis 1 was supported. However, only 8% of the variance in anxiety was explained by the interaction between perceived risk and self-efficacy beliefs.

Hypothesis 2 predicted that the interaction between perceived risk and perceived efficacy would significantly affect amount of information seeking resulting in differences

among the four RPA groups (controlling for various factors); specifically the responsive group would (H2a) visit the most HPV relevant websites at Time 1, (H2b) spend the most time looking for HPV information online at Time 1, and (H2c) report spending the most time looking for HPV information online in the week after the in-lab experiment, followed by the anxious group, and lastly by both the proactive group and indifference group. No significant differences emerged between the groups with regards to the number of HPV websites visited, the length of time spent seeking HPV information at Time 1, nor self-reported information seeking behavior at Time 2. Hypothesis 2 was not supported.

Hypothesis 3 predicted that the relationship between RPA group membership and information seeking would be mediated by anxiety, specifically that participants with a higher level of state anxiety would visit more HPV relevant websites at Time 1, spend more time looking for HPV information online at Time 1, and report spending more time looking for HPV information online in the week after the in-lab experiment. The data indicated that overall as state anxiety increased there was also significant increase in the number of HPV websites visited, however only 1% of the variance was explained by level of anxiety. When the relationship between anxiety and number of HPV websites was tested for each of the RPA groups, the anxious group was the only one in which the amount of websites increased as anxiety increased. Anxiety did not seem to predict a change in the amount of time spent seeking information or a change in the amount of time spent reported for information seeking in the week following the study. A path analysis indicated that the relationship between RPA group membership and information seeking was not mediated by anxiety. Thus, hypothesis 3 was not supported.

Hypothesis 4 predicted that controlling for demographic factors, sexual health and history, past information seeking, and the rate of information seeking, the interaction between perceived risk and perceived efficacy would significantly affect amount of knowledge acquisition resulting in differences among the four RPA groups; specifically the anxious group would score significantly lower on the post-knowledge measure when taking into account their scores on the prior knowledge measure when compared to the other three groups. Although the anxious group had the lowest score as predicted, it did not significantly differ from the other groups. Hypothesis 4 was not supported.

Hypothesis 5 predicted that the relationship between RPA group membership and information seeking would be mediated by anxiety and that participants with a higher level of state anxiety would score significantly lower on the post knowledge measure when taking into account their scores on the prior knowledge measure. However, the data indicated that anxiety did not seem to have an effect on knowledge acquisition. When the relationship between anxiety and knowledge acquisition was tested for each of the four RPA groups, only the data from the proactive group indicated that as anxiety increased, knowledge acquisition decreased. An SEM indicated that the relationship between RPA group membership and knowledge acquisition was not mediated by anxiety. Therefore, Hypothesis 5 was not supported by these data.

Hypothesis 6 predicted that the relationship between thinking style and anxiety would be mediated by health locus of control. First it was predicted that type of thinking style would significantly affect health locus of control; specifically participants with a more analytic style of thinking would exhibit higher levels of internal locus of control than those with a more holistic style of thinking. The data supported this hypothesis.

Next, it was predicted that controlling for trait anxiety, health locus of control would significantly influence affect level of (state) anxiety; specifically, participants with a more internal locus of control will exhibit lower levels of anxiety than those with a lower internal locus of control. The data also supported this hypothesis. Finally, the data indicated that the relationship between thinking styles and anxiety was mediated by health locus of control. Hypothesis 6 was supported.

The RPA framework model was tested and the data indicated that it was a viable model for explaining differences in amount of information seeking and knowledge acquisition. However, only 9% of the variance in anxiety can be explained by perceived risk, self-efficacy beliefs, and the interaction effect between the two; and, only 1% of the variance in the number of HPV websites visited at time 1 was explained by differences in level of anxiety. Anxiety did not predict any variance in the amount of time spent seeking HPV information at time 1, for the amount of time reported for HPV information seeking at time 2, or for knowledge acquisition.

The data also indicated that a model of the RPA framework that included thinking style and health locus of control had marginally more predictive power than just the RPA framework model. In the extended model of the RPA, 2% of the variance in internal health locus of control was explained by differences in thinking style. Twelve percent of the variance in anxiety can be explained by internal locus of control, perceived risk, self-efficacy beliefs and the interaction effect between the perceived risk and self-efficacy beliefs. The percentage of variance explained in the three endogenous information seeking variables, as well as in knowledge acquisition, were the same as the RPA framework model.

Finally, research question 1 asked if the search terms and webpage descriptions in the search engine that participants used were relevant to health, relevant to HPV, were indicative of perceived risk, and were indicative of self-efficacy beliefs. The data indicated that most participants did use search terms and webpage descriptions in the search engine that were relevant to health and specifically to HPV. However, it seemed that participants did not use search terms and webpage descriptions in the search engine that were specific to risk perceptions or self-efficacy beliefs.

Implications and Application of the RPA Framework

Theorists (e.g., Lazarus, 1982) argue that affect is post-cognitive. Specifically, affect is considered to be elicited only after a certain amount of cognitive processing of information has taken place. The findings seem to support this theory and indicate that cognitive processing (e.g. thinking style) influences emotion, namely anxiety, a key component of the RPA framework. Theoretically, high risk and low efficacy induce anxiety, which can have both positive and negative outcomes. Whereas anxiety motivates individuals to carry out self-protective behaviors, such as information seeking, it also hinders systematic information processing and so individuals who perceive high risk and low efficacy may not retain much of the information they sought, providing further evidence for the affective interference hypothesis proposed in previous RPA research (Turner et al., 2006). These data were not able to support this claim.

The practical implication of the RPA framework pertains to situations in which healthcare professionals must inform their patients that they are at high risk for a threatening illness or disease. Results from this dissertation, as well as other RPA studies, suggest that it is imperative to communicate efficacy-building information along with

risk information. Furthermore, individuals' concerns and anxiety should be addressed within the medical interview before information on treatment options and adherence are discussed. Physicians may fail to recognize that risk-reducing information delivered after informing patients that their risk is high may not be processed or remembered by patients who are cognitively debilitated by anxiety, potentially leading to other adverse consequences. This dissertation also indicates that individuals process information in different ways, which in turn affects how much control they perceive over a given situation and also increases anxiety. Thus, it may be a beneficial strategy for healthcare providers to provide emotional counseling after presenting risk factors and efficacy information and then offering risk-reducing material. Physicians may also consider providing the risk-reducing information on paper so that patients can read it after they have first had the opportunity to reduce their anxiety and so that they are not responsible for remembering information conveyed while they were experiencing a high anxiety state. Furthermore, with the amount of health information that individuals seem to be seeking online, it may be practical for healthcare professionals to direct patients to websites that contain accurate and efficacious information. Finally, health and risk communication practitioners should also consider the potential maladaptive outcomes that can result from campaigns that increase anxiety without providing efficacy.

Limitations

The effect sizes of the predicted relationships were of utmost concern in this dissertation. Historically, the RPA framework has yielded inconsistent effect sizes from the experimental data. The data from Turner et al. (2006) indicated that the interaction between perceived risk and self-efficacy beliefs explained 12% ($\eta^2 = .12$) of the variance

in anxiety and the data from Turner et al. (2011) indicated that the interaction between perceived risk and self-efficacy beliefs explained 11% ($\eta^2 = .11$) of the variance in anxiety for tanners, but did not seem to have an effect on anxiety for non-tanners. In this dissertation, 8% ($\eta^2 = .08$) of the variance in anxiety was explained by the interaction effect. Cohen (1988) offers a conversion table for eta squared (η^2) where 0.0099 constitutes a small effect, 0.0588 a medium effect and 0.1379 a large effect. According to Cohen (1988), this is a medium to large effect size. Past experimental RPA studies tested the direct effect of RPA group membership on information seeking and knowledge acquisition. None of the variance in the number of websites visited was explained by the interaction between perceived risk and self-efficacy beliefs in the Turner et al. (2006) study, although 15% of the variance in time spent seeking was explained by the interaction effect in Study 1 and 1% of the variance in time spent seeking was explained by the interaction effect in Study 2. Similar, to this dissertation, Turner et al. (2011) did not find a significant interaction effect between perceived risk and efficacy beliefs. However, even when the relationship between anxiety and information seeking was examined in this dissertation, only 1% of the variance in the # of websites viewed was explained by anxiety. Finally, 3% and 12% of the variance in knowledge acquisition was explained by RPA group membership in Turner et al.'s (2006) Study 1 and for tanner in the Turner et al. (2011) studies respectively, whereas 0% of the variance was explained in this dissertation.

One reason for small effect sizes may be attributed to sampling. This dissertation, along with the other experimental RPA framework studies, lacks a random sample from the general population. The participants in the experimental RPA framework

studies have been college students who were highly educated, predominantly Caucasian, and mostly between the ages of 18 and 22. Although the RPA framework has been tested using correlational data in other countries (e.g. Malawi), it has not been experimentally tested in a sample outside of this demographic makeup. Socio-economic status, education level, and/or maturity level may affect the amount and type of information seeking, as well as knowledge acquisition. Therefore, the results of this study cannot be generalized to the population. Future studies should seek to obtain the resources necessary to recruit a probability sample.

It is important to note that using a single topic limits the generalizability of this study (Jackson, 1992). As previously discussed, HPV was chosen as the topic for the messages because pilot testing demonstrated it resonated with the target population in terms of severity and susceptibility. Whereas it made an appropriate topic for this study, testing the RPA framework in other contexts is imperative for future research. It is possible that a different topic, especially an impersonal risk like climate change, could elicit different results within this theoretical framework. The effect sizes of the hypothesized relationships may also be affected by topics that elicit varying levels of risk and efficacy.

The nature of experimental research limits the ecological validity of this dissertation. Although this RPA study is unique in that it measured information seeking by actually allowing participants to seek real information online, the information seeking occurred in a laboratory setting. Participants may have felt their privacy was compromised and were reticent to search for sexual health information on a public computer with a researcher in the room. It is therefore important to consider that information seeking

behavior, especially for sensitive topics, could differ in the real world. This dissertation likely represents a conservative test of information seeking behavior.

A fundamental limitation of this study is the lack of variance in much of the data. The homogeneity of the sample, the controlled nature of the study, and the measurement used all likely contributed to an overall lack of variance needed when testing a theoretical framework. It could be argued that using scales that do not limit variance would have been more effective. The foundation of this dissertation, however, is made up of previously published RPA studies and prior validated scales, and it is therefore reasonable to use similar measurements to build upon their results. That said, using measures that allow for more variance in future studies may allow for a more complete test of the RPA framework.

Future Research

As previously stated, this dissertation advances research on the RPA framework in important ways; that said, the findings and limitations of the study necessitate further examination of the framework. First, it is important to test the causal model with different types of risk messages using a probability sample. The long-term viability of the model depends on the results of these investigations.

Additionally, the scope and understanding of information-seeking behavior as an outcome of the RPA framework is highly desirable. This dissertation is the first RPA framework study to examine the type of information that individuals seek. Although the research indicated that most participants who looked for HPV information used a general HPV search term and description to then visit HPV websites, this finding seems likely and not very interesting. It would have been helpful to be able to find evidence for either

the compensation or the resonance hypotheses, however the results did not indicate support for either one. This could be attributed to using software such as SpectorPro, that collects data on internet usage activity like search words, amount of time spent on the internet and which websites are visited, but, does not indicate where on a webpage an individual spends the most time looking. Eye tracking studies allow researchers to examine where on a website a person looks, what order they look at information, and how long they spend on any given section of the website. A future examination of the RPA that integrates eye-tracking measures would likely shed light on the types of information that resonate with individuals seeking to reduce anxiety.

This dissertation only began to look at whether cognition affects the RPA. Future studies should examine how individuals process risk and efficacy messages and how information processing affects information seeking behaviors. Finally, this dissertation also indicates that cultural differences in how individuals process information may affect level of anxiety, which then affects information seeking. The RPA has been studied in other countries, such as Malawi and although secondary indicators of culture such as race have been controlled for, there have not been any cross-cultural studies done using the RPA.

Finally, although the results of this study support Lazarus' (1982) theory that affect is post-cognitive, some scholars (e.g., Lerner and Keltner 2000) believe that affect can be both pre- and post-cognitive, with thoughts being shaped by initial emotional responses, and additional affect being created by these thoughts. Future studies may want to examine how anxiety is affected after participants have had the opportunity to seek information.

Communication researchers should not underestimate the importance of understanding how and why individuals seek out health information and the outcomes of this behavior (Brashers et al., 2002). This dissertation contributes in a modest way to a growing body of literature that seeks to provide theoretical foundations for understanding a process central to the health and well-being of individuals.

Table 1

Risk Perception Attitude (RPA) framework by group

Efficacy Beliefs	Perceived Risk	
	Low	High
Low	Indifference	Anxious
High	Proactive	Responsive

Table 2

Risk perception attitude framework clusters and expected contrast coefficients (in parentheses) for anxiety.

Efficacy Beliefs	Perceived Risk	
	Low	High
Low	Indifference (0)	Anxious (1)
High	Proactive (-1)	Responsive (0)

Table 3

Risk perception attitude framework clusters and expected contrast coefficients (in parentheses) for information seeking

Efficacy Beliefs	Perceived Risk	
	Low	High
Low	Indifference (-1)	Anxious (0)
High	Proactive (-1)	Responsive (2)

Table 4

Risk perception attitude framework clusters and expected contrast coefficients (in parentheses) for knowledge acquisition

Efficacy Beliefs	Perceived Risk	
	Low	High
Low	Indifference (1)	Anxious (-3)
High	Proactive (1)	Responsive (1)

Table 5

Pilot 1 Means, Standard Deviations, and Variance for Concern, Attitude About Risk, and Attitude About Knowledge (N = 57)

Topic	Concern			Attitude about risk			Attitude about knowledge		
	<i>M</i>	<i>SD</i>	Variance	<i>M</i>	<i>SD</i>	Variance	<i>M</i>	<i>SD</i>	Variance
Alcohol	3.18	1.65	2.71	3.91	1.47	2.16	5.61 ^a	1.57	2.46
Smoking	3.42	2.03	4.14	4.60	1.86	3.47	5.40 ^a	1.56	2.43
Drugs	3.42	2.23	4.95	5.40 ^a	1.68	2.84	4.95 ^a	1.84	3.39
Obesity	3.13	2.00	4.00	4.76	1.73	3.00	4.94	1.73	3.00
Chlamydia	3.55	2.08	4.32	4.96	1.72	2.92	3.78 ^b	1.77	3.13
Gonorrhea	3.53	2.11	4.44	4.91	1.83	3.34	3.84 ^b	1.73	2.99
Herpes	3.83 ^a	2.15	4.61	5.22	1.81	3.29	4.15	1.85	3.41
HIV	4.09 ^a	2.32	5.38	5.80 ^a	1.78	3.16	4.69	1.67	2.77
HPV	4.07 ^a	2.17	4.70	5.47 ^a	1.73	3.00	4.05	2.04	4.16
Syphilis	3.63	2.20	4.83	5.18	1.87	3.49	3.58 ^b	1.77	3.14

^aTop 3 means

^bBottom 3 means

Table 6

Pilot 1 Means, Standard Deviations, and Cronbach's alpha for Severity and Susceptibility Scale (N = 57)

Item ^a	Severity Scale			Susceptibility Scale		
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α
Alcohol	5.17	1.13	.85	3.85 ^b	1.72	.93
Smoking	5.55	1.09	.88	2.74 ^b	1.52	.93
Drugs	5.71	1.09	.88	2.53	1.45	.92
Obesity	5.65	.94	.83	2.37	1.31	.92
Chlamydia	5.68	.87	.84	2.46	1.22	.91
Gonorrhea	5.70	.86	.83	2.50	1.23	.91
Herpes	5.76	.86	.84	2.54	1.21	.91
HIV	6.04 ^b	.77	.79	2.42	1.23	.91
HPV	5.87 ^b	.84	.83	2.69 ^b	1.38	.92
Syphilis	5.77 ^b	.81	.83	2.45	1.22	.91

^aNumber of items = 7

^bTop 3 means

Table 7

Pilot 2 and 3 Scale Means, Standard Deviations, Cronbach's alpha, and Fit Indices (N = 50)

Scale	<i>N</i> of items retained	<i>M</i>	<i>SD</i>	α	<i>RMSEA</i>	<i>SRMR</i>	<i>CFI</i>	Items dropped
Severity	8	6.15	.63	.88	.08	.04	.97	2
Susceptibility	7	3.62	1.66	.95	.07	.04	.97	0
Self-efficacy	10	5.63	.86	.82	.04	.04	.98	0

Note. *RMSEA* = Root Mean Square Error of Approximation; *SRMR* = Standardized Root Mean Square Residual; *CFI* = Comparative Fit Index

Table 8

Pilot 2 and 3 Means, Standard Deviations for Perceived Risk and Self-efficacy Beliefs for Each Condition (N =100)

Condition ^a	Perceived Severity		Perceived Susceptibility		Self-efficacy beliefs	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Low Risk	5.39	.68	3.17	1.48		
High Risk	6.30	.55	4.01	1.73		
Low Self-efficacy					5.39	1.05
High Self-efficacy					5.90	.47

^a*n* per condition is 25

Table 9

Main Study: Correlation Matrix and Standard Deviations for Covariates and Dependent Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	1.00														
2. Sex	-.02	1.00													
3. Race	.01	.15*	1.00												
4. Year in College	.76*	-.05	.07	1.00											
5. Trait Anxiety	-.07	.10*	.13*	-.02	1.00										
6. HPV Diagnosis	.10*	-.01	-.06	.14*	-.07	1.00									
7. Relevant Cancer Diagnosis	.02	-.04	-.01	-.01	-.06	.65*	1.00								
8. Sexually Active	.14*	-.06	.07	.14*	-.08	.09*	.03	1.00							
9. Past Information Seeking	.06	.14*	-.04	.12*	.02	.12*	-.02	.13*	1.00						
10. Information Seeking Rate	-.02	.01	-.04	.00	.00	.04	-.01	-.03	.01	1.00					
11. State Anxiety	-.09	.06	.02	-.06	.52*	-.09*	-.06	.03	.03	.02	1.00				
12. # of HPV sites visited at Time 1	-.01	.08	-.04	.03	.06	.01	-.03	.07	.08	.28*	-.10*	1.00			
13. Length of Time Spent Seeking HPV Information at Time 1	-.02	.07	-.02	-.01	.02	-.05	-.03	.05	.05	-.08	.08	.72*	1.00		
14. Length of Time Report for Information Seeking at Time 2	.08	-.03	.04	.11*	.02	.00	-.01	.08	.09*	-.07	.02	.03	.00	1.00	
15. Knowledge Acquisition	-.06	-.18*	.01	-.07	.02	-.08	-.03	-.00	-.18	.09	-.04	.05	-.01	-.02	1.00

p < .05

Table 10

Main Study Means, Standard Deviations for Manipulation Checks (N =488)

Condition ^a	Perceived Risk		<i>Self-efficacy beliefs</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Low Risk	2.99	1.42		
High Risk	3.63	1.56		
Low Self-efficacy			5.29	1.06
High Self-efficacy			5.46	1.01

^a*n* per condition is 244

Table 11

Main Study Means and Standard Deviations by RPA group

Condition	<i>n</i>	Susceptibility		Behavior Specific Self-efficacy beliefs	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Indifference (Low risk, low self-efficacy)	105	4.06	.45	5.13	.47
Proactive (Low risk, high self-efficacy)	144	3.99	.46	6.44	.39
Anxious (High risk, low self-efficacy)	105	5.65	.61	4.21	.62
Responsive (High risk, high self-efficacy)	131	5.29	.45	5.79	.46

Table 12

Main Study: ANCOVA Means and Standard Deviations by RPA group for Hypotheses 1, 2, and 4

Condition	Anxiety		Time 1 Information seeking (No. of sites)		Time 1 Information seeking (Length of time)		Time 2		Knowledge Acquisition	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Indifference (Low risk, low self-efficacy)	2.90	1.05	1.26	2.04	3.23	5.27	.12	.50	1.70	2.57
Proactive (Low risk, high self-efficacy)	2.45	1.04	1.16	1.61	3.44	4.95	.21	.75	2.06	2.75
Anxious (High risk, low self-efficacy)	3.20	1.14	1.40	1.97	3.02	4.11	.20	.72	1.80	2.27
Responsive (High risk, high self-efficacy)	2.75	1.04	1.24	1.71	3.06	4.41	.14	.76	1.66	2.18

Table 13

Main Study: Hierarchical Multiple Regression Analyses Predicting Information Seeking (Hypothesis 3)

Predictor	Time 1 Number of HPV sites visited		Time 1 Time spent seeking HPV information		Time 2	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1 Control variables ^a	.02		.02		.03	
Step 2 State anxiety	.01*	.15*	.00	.32	.00	.01
Total R^2	.03		.02		.03	
<i>n</i>	467		467		467	

^aControl variables included age, sex, race, year in college, sexual activity, past information seeking

* $p < .05$

Table 14

Main Study: Hierarchical Multiple Regression Analyses Predicting Time 1 Information Seeking (Number of HPV Sites Visited) by RPA group (Hypothesis 3)

Predictor	Indifference (low risk; low self-efficacy)		Proactive (low risk; high self-efficacy)		Anxious (high risk; low self-efficacy)		Responsive (high risk; high self-efficacy)	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.08		.03		.03		.06	
Control variables ^a								
Step 2	.00	.00	.01	.04	.06*	.43*	.00	.07
State anxiety								
Total R^2	.08		.04		.09		.07	
n	106		128		78		150	

^aControl variables included age, sex, race, year in college, sexual activity, past information seeking

* $p < .05$

Table 15

Main Study: Hierarchical Multiple Regression Analyses Predicting Time 1 Information Seeking (Length of Time Spent Seeking HPV Information) by RPA group (Hypothesis 3)

Predictor	Indifference (low risk; low self-efficacy)		Proactive (low risk; high self-efficacy)		Anxious (high risk; low self-efficacy)		Responsive (high risk; high self-efficacy)	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.05		.02		.06		.05	
Control variables ^a								
Step 2	.00	-.07	.01	.45	.08*	1.08*	.00	.21
State anxiety								
Total R^2	.05		.02		.15		.06	
n	105		128		78		149	

^aControl variables included age, sex, race, year in college, sexual activity, past information seeking

* $p < .05$

Table 16

Main Study: Hierarchical Multiple Regression Analyses Predicting Time 2 Information Seeking (Length of Time Reported Spent Seeking HPV Information) by RPA group (Hypothesis 3)

Predictor	Indifference (low risk; low self-efficacy)		Proactive (low risk; high self-efficacy)		Anxious (high risk; low self-efficacy)		Responsive (high risk; high self-efficacy)	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.03		.03		.10		.08	
Control variables ^a								
Step 2	.00	.00	.00	.02	.00	-.01	.01	.06
State anxiety								
Total R^2	.03		.03		.10		.09	
n	105		128		78		149	

^aControl variables included age, sex, race, year in college, sexual activity, past information seeking

* $p < .05$

Table 17

Main Study: Hierarchical Multiple Regression Analyses Predicting Knowledge Acquisition (Hypothesis 5)

Predictor	Knowledge Acquisition	
	ΔR^2	β
Step 1	.08	
Covariates ^a		
Step 2	.00	-.02
State Anxiety		
Total R^2	.08	
n	467	

^aControl variables included age, sex, race, year in college, sexual activity, past information seeking, information seeking rate

* $p < .01$

Table 18

Main Study: Hierarchical Multiple Regression Analyses Predicting Knowledge Acquisition by RPA group (Hypothesis 5)

Predictor	Total		Indifference (low risk; low self- efficacy)		Proactive (low risk; high self- efficacy)		Anxious (high risk; low self- efficacy)		Responsive (high risk; high self- efficacy)	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1 Control variables ^a	.08		.19		.12		.18		.13	
Step 2 State anxiety	.00	-.05	.02	.44	.03*	-.50*	.00	.06	.00	-.03
Total R^2	.08		.21		.15		.18		.13	
<i>n</i>	467		105		128		78		149	

^aControl variables included age, sex, race, year in college, sexual activity, past information seeking, and rate of information seeking

* $p < .05$

Table 19

Main Study: Hierarchical Multiple Regression Analyses Predicting Anxiety (Hypothesis 6)

Predictor	State anxiety	
	ΔR^2	β
Step 1	.30	
Trait anxiety		
Step 2	.00	.03
Thinking style		
Total R^2	.30	
n	467	

* $p < .01$

Table 20

Main Study: Hierarchical Multiple Regression Analyses Predicting Anxiety (Hypothesis 6)

Predictor	State anxiety	
	ΔR^2	β
Step 1	.27	
Trait anxiety		
Step 2	.02*	-.16*
Internal health LOC		
Total R^2	.28	
n	466	

* $p < .01$

Table 21 *Main Study: Correlation Matrix and Standard Deviations for Path Analyses*

	1	2	3	4	5	6	7	8	9	10
1. Susceptibility Perceptions	1.00									
2. Self-efficacy beliefs	-.28**	1.00								
3. Risk x Self-efficacy	.02	.12**	1.00							
4. A-H POC	.03	.00	.03	1.00						
5. Internal Health LOC	-.00	.07	.06	-.15**	1.00					
6. State Anxiety	.28**	-.18**	-.03	.06	-.18**	1.00				
7. Info Seek Time 1a	.06	.02	.01	-.01	.09*	.10*	1.00			
8. Info Seek Time 1b	-.02	.07	.01	-.01	.09*	.07	.74**	1.00		
9. Info Seek Time 2	.07	.01	.05	-.13**	.06	.02	.03	.00	1.00	
10. Knowledge Acquisition	.06	-.03	.06	-.09	-.04	-.04	.05	-.01	-.02	1.00
Mean	3.31	5.37	.01	4.62	5.12	2.80	1.24	3.20	.17	1.80
SD	1.52	1.04	.25	.85	.83	1.09	1.71	4.69	.70	2.47

Table 22

Main Study Model Fit Statistics for Path Analyses

Scale	χ^2	<i>RMSEA</i>	<i>SRMR</i>	<i>CFI</i>
Hypothesis 3 RPA group → anxiety → IS1 _a	1.52	.00	.01	1.00
Hypothesis 3 RPA group → anxiety → IS1 _b	3.40	.02	.02	1.00
Hypothesis 3 RPA group → anxiety → IS2	3.15	.01	.02	1.00
Hypothesis 5 RPA group → anxiety → KnowAcq	4.86	.04	.02	.99
Hypothesis 6 AH → internal LOC → anxiety	.06	.00	.01	1.00
RPA Framework	19.95	.02	.03	.99
Extended RPA Framework	43.81*	.03	.04	.96

Note. *RMSEA* = Root Mean Square Error of Approximation; *SRMR* = Standardized Root Mean Square Residual; *CFI* = Comparative Fit Index

$p < .05$

Table 23

Unstandardized Loadings and Associated t-values for Path Model of Hypotheses 3, 5, and 6

Path	Unstandardized Loadings (SE)	t-values
RPA group→Anxiety ^{a,b,c,d}	-.10(.20)	-.50
Anxiety→Information seeking Time 1 ^a	.16(.07)	2.14*
Anxiety→Information seeking Time 1 ^b	.31(.20)	1.57
Anxiety→Information seeking Time 2 ^c	.01(.03)	.45
Anxiety→Knowledge Acquisition ^d	-.08(.11)	-.75
Thinking Style→Internal Health LOC ^e	-.13(.04)	-3.07*
Internal Health LOC→Anxiety ^e	-.23(.06)	-3.88*

* $p < .05$ ^a Path for Hypothesis 3a^b Path for Hypothesis 3b^c Path for Hypothesis 3c^d Path for Hypothesis 5^e Path for Hypothesis 6

Table 24

Unstandardized Loadings and Associated t-values for Path Model of RPA Framework

Path	Unstandardized Loadings(<i>SE</i>)	<i>t-values</i>
Risk→Anxiety	.18(.03)	5.40*
Self-efficacy→Anxiety	-.11(.04)	-2.31*
Risk x Self-Efficacy→Anxiety	-.10(.20)	-.50
Anxiety→Information Seeking Time 1a	.16(.07)	2.14*
Anxiety→Information Seeking Time 1b	.31(.20)	1.57
Anxiety→Information Seeking Time 2	.01(.03)	.45
Anxiety→Knowledge Acquisition	-.08(.11)	-.75

p < .05

Table 25

*Unstandardized Loadings and Associated t-values for Path Model of Extended RPA**Framework*

Path	Unstandardized Loadings(<i>SE</i>)	<i>t-values</i>
Thinking style→Internal Health LOC	-.15(.05)	-3.19*
Internal Health LOC→Anxiety	-.22(.06)	-3.83*
Risk→Anxiety	.18(.03)	5.53*
Self-efficacy→Anxiety	-.10(.05)	-2.11*
Risk x Self-Efficacy→Anxiety	-.06(.19)	-0.33
Anxiety→Information Seeking Time 1a	.16(.07)	2.13*
Anxiety→Information Seeking Time 1b	.31(.20)	1.57
Anxiety→Information Seeking Time 2	.01(.03)	.45
Anxiety→Knowledge Acquisition	-.08(.11)	-.75

p < .05

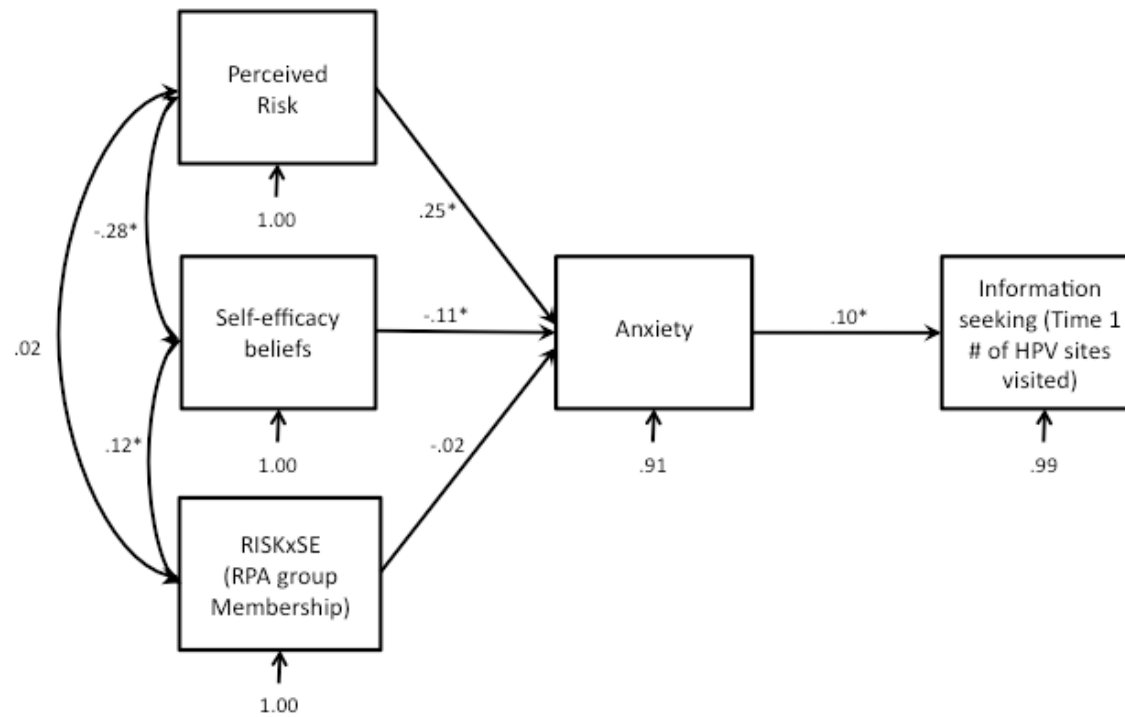


Figure 1. Structural model with standardized path coefficients for anxiety as a mediator between RPA group membership and information seeking (amount of HPV websites visited)

* $p < .05$

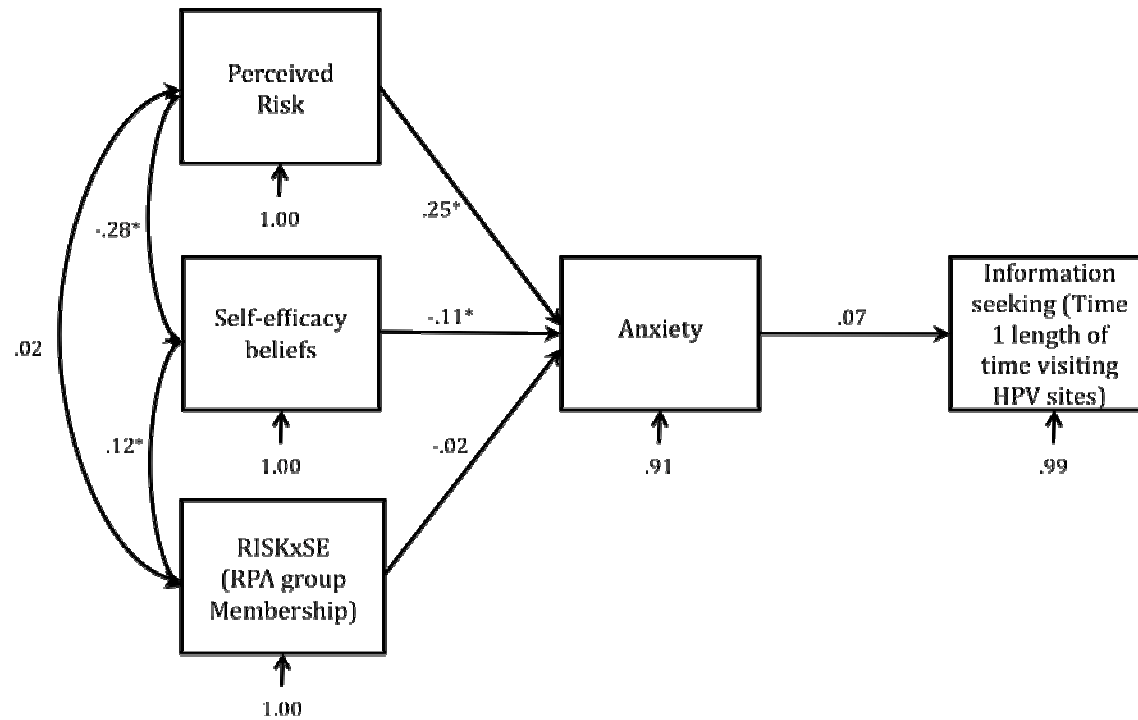


Figure 2. Structural model with standardized path coefficients for anxiety as a mediator between RPA group membership and information seeking (length of time spent seeking HPV information)

* $p < .05$

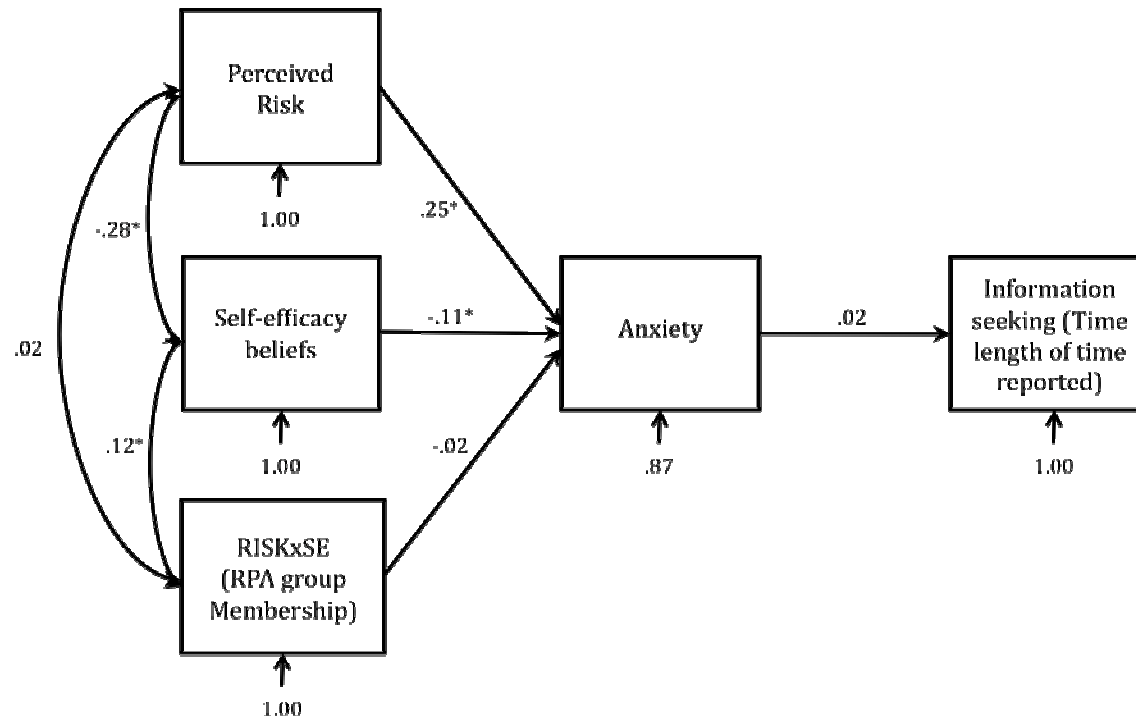


Figure 3. Structural model with standardized path coefficients for anxiety as a mediator between RPA group membership and information seeking (Time 2 time spent reported on HPV information seeking)

* $p < .05$

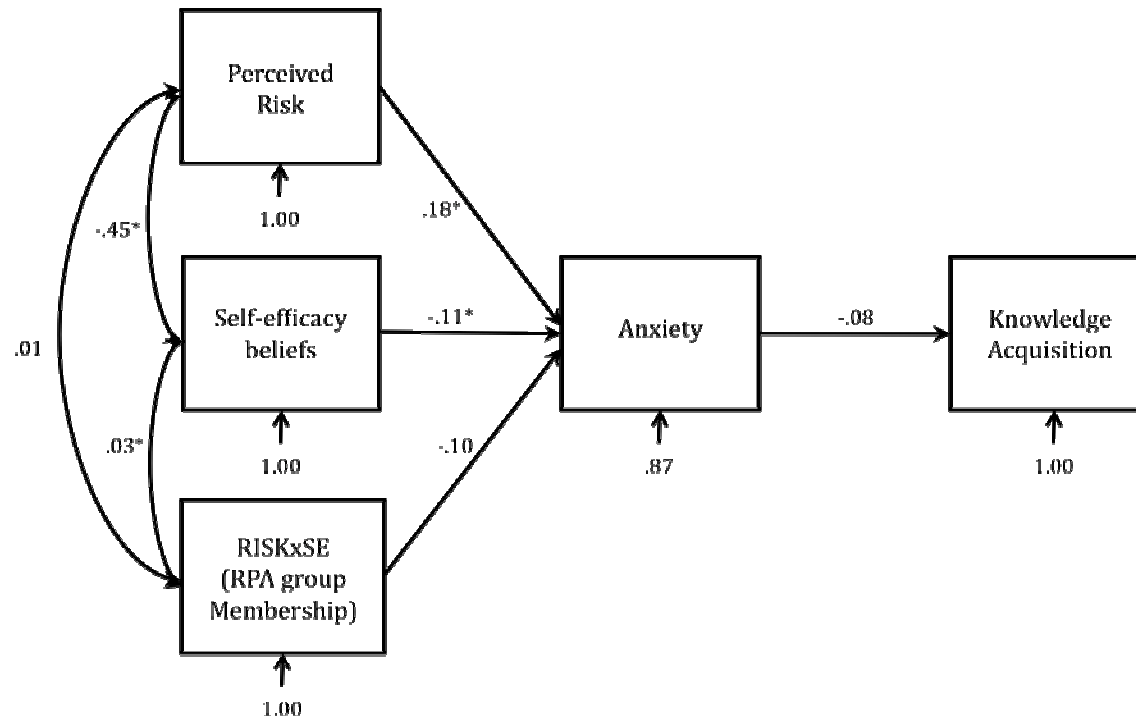


Figure 4. Structural model with standardized path coefficients for anxiety as a mediator between RPA group membership and knowledge acquisition

* $p < .05$

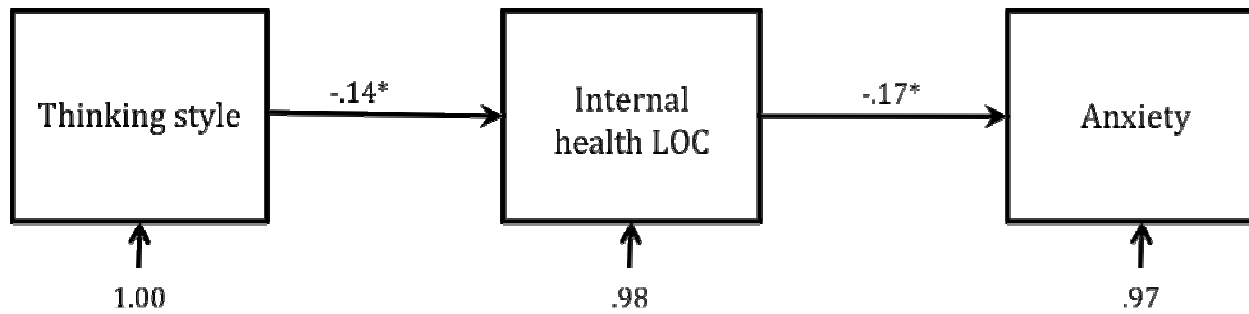


Figure 5. Structural model with standardized path coefficients for health LOC as a mediator between thinking style and anxiety

* $p < .05$

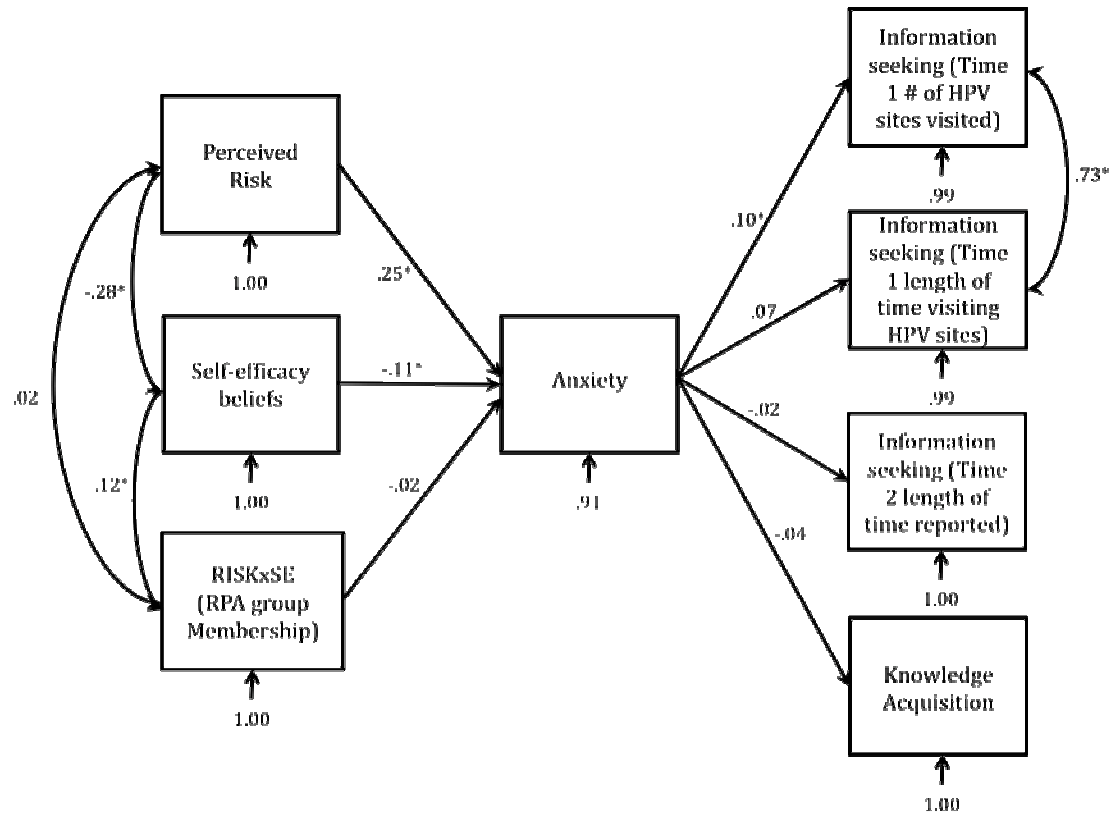


Figure 6. Structural model with standardized path coefficients for the RPA Framework
 * $p < .05$

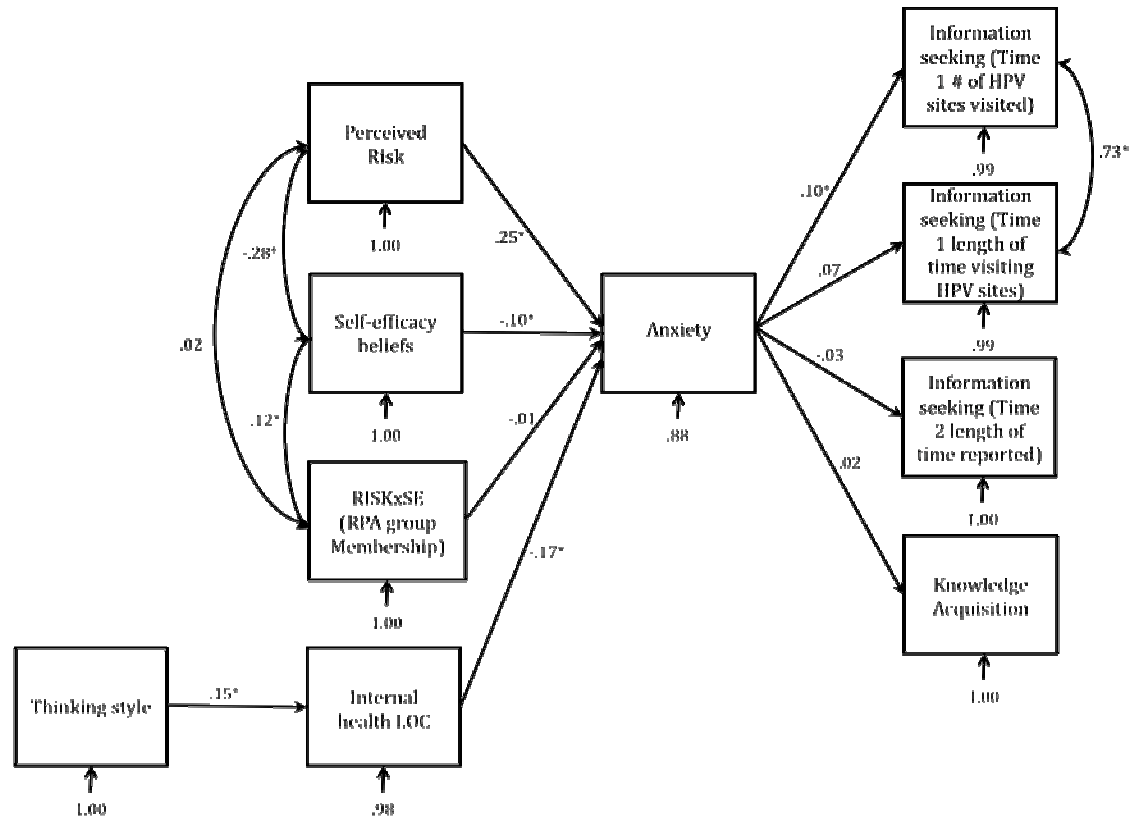


Figure 7. Structural model with standardized path coefficients for the extension of the RPA Framework
* $p < .05$

Appendix A

Pilot Study 1 Measurement Instruments

1. My age is _____ years.

2. I am MALE FEMALE

3. Please indicate your ethnicity:

CAUCASIAN AFRICAN AMERICAN LATIN AMERICAN

NATIVE AMERICAN PACIFIC ISLANDER ASIAN

MIDDLE EASTERN OTHER_____

4. Please indicate what year you are in college:

FRESHMAN SOPHOMORE JUNIOR SENIOR GRAD

OTHER_____

OPEN ENDED RESPONSE

Please list the top 3 health concerns that you have:

1.

2.

3.

Please list the top 3 health concerns that the average students at the University of

Maryland has:

1.

2.

3.

The health topics included in this study were taken from the CDC's 2009 Youth Risk Behavior Surveillance Report (<http://www.cdc.gov/mmwr/pdf/ss/ss5905.pdf> from <http://www.cdc.gov/healthyyouth/yrbs/index.htm>). They are:

Alcohol consumption

Smoking

Drug Use

Obesity

Sexually Transmitted Diseases: Chlamydia, Gonorrhea, Herpes: HIV (Human Immunodeficiency Virus), HPV (Human Papillomavirus), and Syphilis:

GENERAL ATTITUDES

Please answer on a 1 to 7 scale, where 0 means "not at all" and 7 means "extremely."

ATT 1. How concerned are you about _____.

Alcohol consumption:	0	1	2	3	4	5	6
Smoking:	0	1	2	3	4	5	6
Drug Use:	0	1	2	3	4	5	6
Obesity:	0	1	2	3	4	5	6
Chlamydia:	0	1	2	3	4	5	6
Gonorrhea:	0	1	2	3	4	5	6
Herpes:	0	1	2	3	4	5	6

HIV:	0	1	2	3	4	5	6
------	---	---	---	---	---	---	---

HPV:	0	1	2	3	4	5	6
------	---	---	---	---	---	---	---

Syphilis:	0	1	2	3	4	5	6
-----------	---	---	---	---	---	---	---

ATT 2. How risky is _____.

Alcohol consumption:	0	1	2	3	4	5	6
----------------------	---	---	---	---	---	---	---

Smoking:	0	1	2	3	4	5	6
----------	---	---	---	---	---	---	---

Drug Use:	0	1	2	3	4	5	6
-----------	---	---	---	---	---	---	---

Obesity:	0	1	2	3	4	5	6
----------	---	---	---	---	---	---	---

Chlamydia:	0	1	2	3	4	5	6
------------	---	---	---	---	---	---	---

Gonorrhea:	0	1	2	3	4	5	6
------------	---	---	---	---	---	---	---

Herpes:	0	1	2	3	4	5	6
---------	---	---	---	---	---	---	---

HIV:	0	1	2	3	4	5	6
------	---	---	---	---	---	---	---

HPV:	0	1	2	3	4	5	6
------	---	---	---	---	---	---	---

Syphilis:	0	1	2	3	4	5	6
-----------	---	---	---	---	---	---	---

ATT 3. How knowledgeable are you about _____.

Alcohol consumption:	0	1	2	3	4	5	6
----------------------	---	---	---	---	---	---	---

Smoking:	0	1	2	3	4	5	6
----------	---	---	---	---	---	---	---

Drug Use:	0	1	2	3	4	5	6
-----------	---	---	---	---	---	---	---

Obesity:	0	1	2	3	4	5	6
----------	---	---	---	---	---	---	---

Chlamydia:	0	1	2	3	4	5	6
------------	---	---	---	---	---	---	---

Gonorrhea:	0	1	2	3	4	5	6
------------	---	---	---	---	---	---	---

Herpes:	0	1	2	3	4	5	6
---------	---	---	---	---	---	---	---

HIV:	0	1	2	3	4	5	6
------	---	---	---	---	---	---	---

HPV:	0	1	2	3	4	5	6
Syphilis:	0	1	2	3	4	5	6

SEVERITY:

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "totally agree."

SEV 1a. I believe that the risks associated with _____ are a severe threat to me.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SEV 1b. I believe that the risks associated with _____ are a severe threat to the average college student.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7

Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SEV 2. I believe that _____ can have serious negative consequences.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SEV 3. I believe that _____ is extremely harmful.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7

Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SEV 4. The risks associated with _____ are serious enough to ruin your life.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SEV 5. The risks associated with _____ are things that everyone should

watch out for.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7

Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SEV 6. _____ is a more serious topic than most people realize.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

***SEV. 7. The risks associated with _____ are not really that important.**

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7

Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

***SEV. 8. Researchers exaggerate the risks associated with**

_____.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

***SEV 9. We should concentrate more on other, more serious issues and worry less**

about the risks associated with _____.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7

Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SUSCEPTIBILITY:

Please answer on a 1 to 7 scale, where 0 means "Not at all likely" and 6 means "Extremely likely."

SUSCEP 1. How likely are you to experience any of the risks associated with _____ in the next year or so?

Alcohol consumption:	0	1	2	3	4	5	6
Smoking:	0	1	2	3	4	5	6
Drug Use:	0	1	2	3	4	5	6
Obesity:	0	1	2	3	4	5	6
Chlamydia:	0	1	2	3	4	5	6
Gonorrhea:	0	1	2	3	4	5	6
Herpes:	0	1	2	3	4	5	6
HIV:	0	1	2	3	4	5	6
HPV:	0	1	2	3	4	5	6
Syphilis:	0	1	2	3	4	5	6

SUSCEP 2. How likely are you to experience any of the risks associated with _____ in the next five years or so?

Alcohol consumption:	0	1	2	3	4	5	6
----------------------	---	---	---	---	---	---	---

Smoking:	0	1	2	3	4	5	6
Drug Use:	0	1	2	3	4	5	6
Obesity:	0	1	2	3	4	5	6
Chlamydia:	0	1	2	3	4	5	6
Gonorrhea:	0	1	2	3	4	5	6
Herpes:	0	1	2	3	4	5	6
HIV:	0	1	2	3	4	5	6
HPV:	0	1	2	3	4	5	6
Syphilis:	0	1	2	3	4	5	6

SUSCEP 3. How likely are you to experience any of the risks associated with _____ in the next 10 years or so?

Alcohol consumption:	0	1	2	3	4	5	6
Smoking:	0	1	2	3	4	5	6
Drug Use:	0	1	2	3	4	5	6
Obesity:	0	1	2	3	4	5	6
Chlamydia:	0	1	2	3	4	5	6
Gonorrhea:	0	1	2	3	4	5	6
Herpes:	0	1	2	3	4	5	6
HIV:	0	1	2	3	4	5	6
HPV:	0	1	2	3	4	5	6
Syphilis:	0	1	2	3	4	5	6

SUSCEP 4. How likely is it that you will experience any of the risks associated with _____ in your lifetime?

Alcohol consumption:	0	1	2	3	4	5	6
Smoking:	0	1	2	3	4	5	6
Drug Use:	0	1	2	3	4	5	6
Obesity:	0	1	2	3	4	5	6
Chlamydia:	0	1	2	3	4	5	6
Gonorrhea:	0	1	2	3	4	5	6
Herpes:	0	1	2	3	4	5	6
HIV:	0	1	2	3	4	5	6
HPV:	0	1	2	3	4	5	6
Syphilis:	0	1	2	3	4	5	6

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "totally agree."

SUSC 5. It is likely that I will be affected by _____.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SUSC 6. I am at risk for the adverse effects of _____.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

SUSC 7. It is possible that I will be adversely affected by _____.

Alcohol consumption:	1	2	3	4	5	6	7
Smoking:	1	2	3	4	5	6	7
Drug Use:	1	2	3	4	5	6	7
Obesity:	1	2	3	4	5	6	7
Chlamydia	1	2	3	4	5	6	7
Gonorrhea	1	2	3	4	5	6	7
Herpes	1	2	3	4	5	6	7
HIV	1	2	3	4	5	6	7
HPV	1	2	3	4	5	6	7
Syphilis:	1	2	3	4	5	6	7

Appendix B

Risk Inductions for Pilot Study 2 and Main Study

HIGH RISK:**What is genital HPV infection?**

Genital human papillomavirus (also called HPV) is the most common sexually transmitted infection (STI). There are more than 40 HPV types that can infect the genital areas of males and females. These HPV types can also infect the mouth and throat. Most people who become infected with HPV do not even know they have it.

HPV is not the same as herpes or HIV (the virus that causes AIDS). These are all viruses that can be passed on during sex, but they cause different symptoms and health problems. However, HPV can be deadly, just like HIV.

What are the signs, symptoms and potential health problems of HPV?

The scary thing about HPV is that most people with HPV do not even realize that they have it. Certain types of HPV can cause genital warts in males and females. These types can also cause warts in the throat -- a condition called *recurrent respiratory papillomatosis* or RRP.

Other HPV types can cause cervical cancer. These types can also cause other, less common but serious cancers, including cancers of the vulva, vagina, penis, anus, and head and neck (tongue, tonsils and throat).

The types of HPV that can cause genital warts are not the same as the types that can cause cancer. There is no way to know which people who get HPV will go on to develop cancer or other health problems. HPV is a big gamble.

How do people get HPV?

It's not that hard to get HPV. HPV is passed on through genital contact, most often during vaginal and anal sex. However, HPV may also be passed on during oral sex and genital-to-genital contact. Regardless of the types of sexual activity, you are at risk for HPV. HPV can be passed on between straight and same-sex partners—even when the infected partner has no signs or symptoms.

A person can have HPV even if years have passed since he or she had sexual contact with an infected person. Most infected persons do not realize they are infected or that they are passing the virus on to a sex partner. It is also possible to get more than one type of HPV.

A pregnant woman with genital HPV can pass HPV to her baby during delivery. In these cases, the child can develop RRP- a respiratory disorder.

How does HPV cause genital warts and cancer?

HPV can cause normal cells on infected skin to turn abnormal. What's scary is that most of the time, you cannot see or feel these cell changes. HPV can cause visible changes in the form of genital warts or cancer. Warts may appear within weeks or months after getting HPV. Cancer often takes years to develop after getting HPV and is usually discovered when it is in the advanced stages.

In sum, the health risks associated with HPV are:

- cervical cancer
- vulval cancer
- vaginal cancer
- penile cancer
- anal cancer
- genital warts
- recurrent respiratory papillomatosis (RRP)

Mentally check off the items that put you at risk if:

- you have had at least one sexual partner in your life
- you have engaged in oral sex (even if it's been occasionally)
- you have engaged in penile-vaginal sex (even if it's been occasionally)
- you have engaged in anal sex (even if it's been occasionally)
- the person/people you have had sex with has had other partners
- you cannot be 100% certain of your partners' sexual history
- you didn't use a condom at least one time
- you have not asked your doctor if you are at risk for HPV
- you have not gotten tested for HPV

you have not gotten the vaccine for HPV

Checking 3 or more of these items puts you in the top tier of individuals who are at high risk.

As a high-risk person you are more likely to experience the dangers associated with contracting HPV (recurrent respiratory papillomatosis (RRP), genital warts, cancer of the cervix, vulva, vagina, penis, and anus).

LOW RISK:

What is genital HPV infection?

Genital human papillomavirus (also called HPV) is a type of sexually transmitted infection (STI). There are more than 40 HPV types. These HPV types may infect the genitals, mouth and throat. Sometimes people who become infected with HPV do not know they have it.

HPV is not the same as herpes or HIV (the virus that causes AIDS). These are all viruses that may be passed on during sex, but they cause different symptoms and health problems.

What are the signs, symptoms and potential health problems of HPV?

Most people with HPV do not develop symptoms or health problems from it. In 90% of cases, the body's immune system clears HPV naturally within two years. But sometimes, certain types of HPV can cause genital warts in males and females. Rarely, these types can also cause warts in the throat. Other HPV types can cause various types of cancer.

The types of HPV that can cause genital warts are not the same as the types that can cause cancer. There is no way to know which people who get HPV will go on to develop cancer or other health problems.

How do people get HPV?

HPV is passed on through genital contact, during oral, vaginal and anal sex. HPV can be passed on between straight and same-sex partners.

A person can have HPV even if years have passed since he or she had sexual contact with an infected person. Most infected persons do not realize they are infected or that they are passing the virus on to a sex partner. It is also possible to get more than one type of HPV.

Very rarely, a pregnant woman with genital HPV can pass HPV to her baby during delivery.

How does HPV cause genital warts and cancer?

HPV can cause normal cells on infected skin to turn abnormal. Most of the time, you cannot see or feel these cell changes. In most cases, the body fights off HPV naturally and the infected cells then go back to normal. But if the body does not fight off HPV, HPV can cause visible changes in the form of genital warts or cancer. Warts can appear within weeks or months after getting HPV. Cancer often takes years to develop after getting HPV.

In sum, the health risks associated with HPV are:

- certain types of cancer
- genital warts

Mentally check off the items that put you at risk:

- you have sex with lots of people
- you are usually unsure about the sexual history of your partner
- you never use a condom when you have sex
- you never visit a doctor for a check up
- you will not consider getting a tested for HPV
- you will not consider getting a vaccine for HPV

If you checked less than 3 of these items, you are at low risk for dangers associated with getting HPV.

Appendix C

Self Efficacy Inductions for Pilot Study 2 and Main Study

LOW SELF EFFICACY

Preventing the dangers associated with contracting HPV is DIFFICULT—but there are *some* things you can do.

The best way to avoid these dangers is practice abstinence and to avoid all sexual activity with others.

- You can still masturbate but that may not fulfill your need to be with someone else.

You can use a condom

- Although condoms can be expensive and inconvenient, they need to be used every time you have sex. To be most effective, they should be used with every sex act, from start to finish. But HPV can infect areas that are not covered by a condom - so condoms may not *fully* protect against HPV.

Be in a monogamous, committed relationship

- People can also lower their chances of getting HPV by being in a faithful relationship with one partner; limiting their number of sex partners; and choosing a partner who has had no or few prior sex partners. But even people with only one lifetime sex partner can get HPV. And it may not be possible to determine if a partner who has been sexually active in the past is currently infected.

Get an HPV vaccination

- Vaccines can protect males and females against some, but not all of the most common types of HPV. These vaccines are given in three shots. It is important to

get all three doses to get the best protection. The vaccines are most effective when given before a person's first sexual contact, when he or she could be exposed to HPV. There are only two vaccines available for females and only one vaccine available for males. The vaccination is expensive and is not covered by most insurance companies.

Remember—even if you do these things you don't have the ability to reduce your *personal risk factors* (example: age, attending a college, engaging at sex during some part of your life, etc.) so you'll still be at risk.

HIGH SELF EFFICACY

**Preventing the dangers associated with contracting HPV is EASY—
there's a lot you can do!**

The best way to avoid these dangers is to avoid sexual activity. But, if you must have sex, then use a condom.

- **Condoms are easy to use** and can be relatively inexpensive. You can even get free condoms at health fairs!

Be selective about who you have sex with

- **It's as easy as looking around:** You and your time are worth a lot.

Ask you partner about their sexual history

- **It's easier than you think** –make a game out of it!

Get the HPV vaccination

- **It's as easy as asking your doctor.** In only three visits to the doctor's office, you'll be guarded against some types of HPV for the rest of your life.

Remember—you have the ability to prevent getting HPV by following these easy steps.

Appendix D

Pilot Study 2 Measurement Instruments

Severity Measures (modified from Rimal & Real, 2003; Turner et al., 2006; Turner et al. 2011)

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "strongly agree."
Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item.
This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

SEV 1a. I believe that the risks associated with HPV are a severe threat to me.

1 2 3 4 5 6 7

SEV 1b. I believe that the risks associated with HPV are a severe threat to the average college student.

1 2 3 4 5 6 7

SEV 2. I believe that HPV can have serious negative consequences.

1 2 3 4 5 6 7

SEV 3. I believe that HPV is extremely harmful.

1 2 3 4 5 6 7

SEV 4. The risks associated with HPV are serious enough to ruin a person's life.

1 2 3 4 5 6 7

SEV 5. The risks associated with HPV are things that everyone should watch out for.

1 2 3 4 5 6 7

SEV 6. HPV is a more serious topic than most people realize.

1 2 3 4 5 6 7

*SEV. 7. The risks associated with HPV are not really that important.

1 2 3 4 5 6 7

*SEV. 8. Researchers exaggerate the risks associated with HPV.

1 2 3 4 5 6 7

*SEV 9. We should concentrate on other, more serious issues and worry less about the risks associated with HPV.

1 2 3 4 5 6 7

Susceptibility Measures (modified from Rimal & Real, 2003; Turner et al., 2006; Turner et al. 2011)

Part 9. Please answer on a 1 to 7 scale, where 1 means "Not at all likely" and 7 means "Extremely likely." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Not at all Likely	Somewhat Unlikely	Slightly Unlikely	Neutral	Slightly Likely	Somewhat Likely	Extremely Likely

SUSCEP 1. How likely are you to experience any of the risks associated with HPV in the next year or so?

1 2 3 4 5 6 7

SUSCEP 2. How likely are you to experience any of the risks associated with HPV in the next five years or so?

1 2 3 4 5 6 7

SUSCEP 3. How likely are you to experience any of the risks associated with HPV in the next 10 years or so?

1 2 3 4 5 6 7

SUSCEP 4. How likely is it that you will experience any of the risks associated with HPV in your lifetime?

1 2 3 4 5 6 7

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "totally agree."

1 2 3 4 5 6 7

SUSC 5. It is likely that I will be affected by HPV.

1 2 3 4 5 6 7

SUSC 6. I am at risk for the adverse effects of HPV.

1 2 3 4 5 6 7

SUSC 7. It is possible that I will be adversely affected by HPV.

1 2 3 4 5 6 7

Self-efficacy Measures (modified from Rimal & Real, 2003; Turner et al., 2006; Turner et al. 2011)

Part10. Please answer on a 1 to 7 scale, where 1 means "not at all confident" and 7 means "extremely confident." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Not at all Confident	Somewhat Unconfident	Slightly Unconfident	Neutral	Slightly Confident	Somewhat Confident	Extremely Confident

SEFF_1. How confident do you feel in your ability to avoid contracting HPV?

1 2 3 4 5 6 7

SEFF_2. How confident do you feel in your ability to use a condom during sex?

1 2 3 4 5 6 7

SEFF_3. How confident do you feel in your ability to get screened for HPV?

1 2 3 4 5 6 7

SEFF_4. How confident do you feel in your ability to get the HPV vaccination?

1 2 3 4 5 6 7

SEFF_5. How confident do you feel in your ability to refrain from engaging in vaginal sex with minimal frequency?

1 2 3 4 5 6 7

SEFF_6. How confident do you feel in your ability to refrain from engaging in oral sex with minimal frequency?

1 2 3 4 5 6 7

SEFF_7. How confident do you feel in your ability to refrain from engaging in anal sex with minimal frequency?

1 2 3 4 5 6 7

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "strongly agree." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

SEFF_8. I am able to protect myself against the risks associated with HPV.

1 2 3 4 5 6 7

SEFF_9. It is easy to protect myself against the risks associated with HPV.

1 2 3 4 5 6 7

SEFF_10. Even when faced with obstacles, I am able to protect myself against the risks associated with HPV.

1 2 3 4 5 6 7

* indicates an item that was reverse coded.

Appendix E
Pilot Study 3 HPV Information Message

From <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001889/> (first website that appears when search term 'HPV' is used in Google):

Human Papillomavirus (HPV)

The virus that causes genital warts is called human papillomavirus (HPV). More than 70 different types of HPV exist. Certain types of HPV can lead to precancerous changes in the cervix, cervical cancer, or anal cancer. These are called high-risk types of HPV.

Not all types of HPV cause genital warts. Other types of HPV cause warts on other parts of the skin, such as the hands. HPV is the most commonly found sexually transmitted disease (STD).

HPV infection around the genitals is common. Most people have no symptoms. In women, HPV can spread to areas inside, on the walls of the vagina and cervix. They are not easy to see without special procedures.

Important facts about HPV:

HPV infection spreads from one person to another through sexual contact involving the anus, mouth, or vagina. You can spread the warts even if you do not see them.

You may not see warts for 6 weeks to 6 months after becoming infected. You may not notice them for years.

Not everyone who has come into contact with the HPV virus and genital warts will develop them.

HPV is prevalent in heterosexuals and homosexuals.

You are more likely to get genital warts and spread them more quickly if you:

Have multiple sexual partners

Do not know if you had sex with someone who had STIs

Are sexually active at an early age

Use tobacco and alcohol

Have a viral infection such as herpes and are stressed at the same time

Are pregnant

Have a weakened immune system due to an illness or medication

If a child has genital warts, you should suspect sexual abuse as a possible cause.

Symptoms

Genital warts can be so tiny, you cannot see them.

The warts can look like:

- Flesh-colored spots that are raised or flat

- Growths that look like the top of a cauliflower

In females, genital warts can be found:

- Inside the vagina or anus

- Outside the vagina or anus, or on nearby skin

- On the cervix inside the body

In males, genital warts can be found on the:

- Penis

- Scrotum

- Groin area

- Thighs

- Inside or around the anus

Genital warts can also occur on the

- Lips

- Mouth

- Tongue

- Throat

Other symptoms are rare, but can include:

- Increased dampness in the genital area near the warts

- Increased vaginal discharge

- Genital itching

- Vaginal bleeding during or after sex

Signs and tests

The health care provider will perform a physical exam.

In women, this will include a pelvic examination. Magnification (colposcopy) is used to spot warts that cannot be seen with the naked eye. Your doctor may place watered-down vinegar (acetic acid) on the area. This helps better see any warts.

The virus that causes genital warts can cause abnormal results on a Pap smear. If you have these types of changes, you will probably need more frequent Pap smears for a while.

An HPV DNA test can tell if you have a high-risk type of HPV known to cause cervical cancer. This test may be done:

- As a screening test for women over age 30

- In women of any age who have a slightly abnormal Pap test result

Expectations (prognosis)

Many sexually active young women become infected with HPV. There is no known cure for HPV. The peak age group in which HPV is prevalent in women is 20-30.

Most men who become infected with HPV never develop any symptoms or problems from the infection. However, they can pass it on to current and sometimes future sexual partners.

Even after you have been treated for genital warts, you may still infect others.

Complications

Some types of HPV have been found to cause cancer of the cervix and vulva. They are the main cause of cervical cancer.

The types of HPV that can cause genital warts are not the same as the types that can cause penile or anal cancer.

The warts may become numerous and quite large, requiring more extensive treatment and follow-up procedures.

Calling your health care provider

Call your doctor if:

- A current or past sexual partner has genital warts

- You have visible warts on your external genitals, itching, discharge, or abnormal vaginal bleeding. Keep in mind that genital warts may not appear for months to years after having sexual contact with an infected person.

- You think a young child might have genital warts

Women should begin having Pap smears at age 21.

Prevention

Not having sexual contact is the only way to avoid genital warts and other STIs. You can also decrease your chance of getting an STI by having a sexual relationship with only one partner who you know is disease-free.

Male and female condoms cannot fully protect you. This is because the virus or warts can be on nearby skin. Condoms reduce your risk and you should still use them at all times. HPV can be passed from person to person even when there are no visible warts or other symptoms. Practicing safer sex can help prevent you from getting HPV.

Two vaccines are available that protect against four of the HPV types that cause most cervical cancers in women. The vaccine is given as a series of three shots. It is recommended for girls and women ages 9 to 26.

One of the two vaccines protects against genital and anal warts in boys and men. The vaccine is given as a series of three shots. It is recommended for boys and men ages 9 to 26.

Ask your health care provider whether the HPV vaccine is right for you.

Appendix F
Pilot Study 3 Measurement Instruments

Prior Knowledge Test

PK_1. What is the most commonly diagnosed sexually transmitted disease?

- a. HIV (0)
- b. Herpes (0)
- c. HPV (1)**
- d. Chlamydia (0)
- e. I don't know (0)

PK_2. Cervical cancer can be prevented.

- a. True (1)**
- b. False (0)
- c. I don't know (0)

PK_3. What does HPV stand for?

- a. Hallax Perinatal Virus (0)
- b. Human Papillomavirus (1)**
- c. Haemophilus Pachyderma Virus (0)
- d. Histiocystic Paleostriatum Virus (0)
- e. I don't know (0)

PK_4. Condoms provide 100% protection against HPV.

- a. True (0)
- b. False (1)**
- c. I don't know (0)

PK_5. What is the peak age group in which HPV is prevalent in women?

- a. 10-20 (0)
- b. 20-30 (1)**
- c. 30-40 (0)
- d. 40-50 (0)
- e. I don't know (0)

PK_6. HPV is only transmitted only through vaginal sex and anal sex.

- a. True (0)
- b. False (1)**
- c. I don't know (0)

PK_7. 1. Which of the following statements are true of HPV?

- a. Not all cases of HPV have symptoms (0)
- b. HPV symptoms only surface if another problem is present (0)
- c. HPV is infectious (0)
- d. All of the above (1)**
- e. I don't know (0)

PK_8. Genital warts are a symptom of cervical cancer.

- a. True (0)
- b. False (1)**
- c. I don't know (0)

PK_9. How does genital HPV spread?

- a. **Through skin-to-skin contact (1)**
- b. Through an exchange of bodily fluid (0)
- c. Through contact with the objects of an infected person (0)
- d. All of the above (0)
- e. I don't know (0)

PK_10. There is no cure for HPV.

- a. **True (1)**
- b. False (0)
- c. I don't know (0)

PK_11. What are genital warts?

- a. **Soft, cauliflower like clusters that can appear on the vulva, vagina, penis, scrotum and thighs (1)**
- b. Types of malignant tumors (0)
- c. They are rough-to-the-touch (0)
- d. All of the above (0)
- e. I don't know (0)

PK_12. People who are no longer sexually active should continue to be screened for cervical cancer.

- a. **True (1)**
- b. False (0)
- c. I don't know (0)

PK_13. Genital warts are diagnosed by:

a. Irritating bumps or lesions on the genitals (1)

- b. Redness on the spot (0)
- c. Severe pain of the genital (0)
- d. All of the above (0)
- e. I don't know (0)

PK_14. Only homosexuals can contract and transmit HPV.

a. True (0)

b. False (1)

c. I don't know (0)

Post Knowledge Test

Post_1. HPV is the most commonly diagnosed sexually transmitted disease.

a. **True (1)**

b. False (0)

Post_2. _____ can be prevented by vaccination.

a. Sickle cell anemia (0)

b. Parkinson's disease (0)

c. Herpes (0)

d. Cervical cancer (1)

Post_3. HPV stands for Histiocystic Paleostriatum Virus.

a. True (0)

b. False (1)

Post_4. What provides 100% protection against HPV.

a. Condoms (0)

b. Abstinence (1)

c. Birth control pills (0)

d. Nothing (0)

Post_5. The peak age group of HPV prevalence in women is 20-30.

a. True (1)

b. False (0)

Post_6. How is HPV transmitted?

a. Through vaginal sex (0)

b. Through anal sex (0)

c. Through oral sex (0)

d. All of the above (1)

Post_7. HPV symptoms only surface if another problem is present.

a. True (1)

b. False (0)

Post_8. Which of the following is NOT a symptom of cervical cancer?

a. Bleeding after sexual intercourse (0)

b. Pelvic pain (0)

c. Heavy discharge (0)

d. Genital warts (1)

Post_9. Genital HPV spreads through an exchange of bodily fluid.

a. True (0)

b. False (1)

Post_10. Which of the following does NOT have a cure?

a. HPV (1)

b. Cervical cancer (0)

c. Genital warts (0)

d. Anal cancer (0)

Post_11. Genital warts are soft, cauliflower like clusters that can appear on the vulva, vagina, penis, scrotum and thighs.

a. True (1)

b. False (0)

Post_12. Which of the following groups of people do not need to be screened for cervical cancer?

a. Sexually active married women (0)

b. Sexually active men (1)

c. Sexually active adolescent girls (0)

d. Women who are no longer sexually active (0)

Post_13. Genital warts are often diagnosed by severe pain in the genitals.

a. True (0)

b. False (1)

Post_14. Who can contract and transmit HPV?

a. only heterosexual women (0)

b. only heterosexual men (0)

c. homosexual men and women (0)

d. All of the above (1)

Appendix G

Main Study Measurement Instruments for Time 1

This appendix contains all the measures and scales used to collect data in the order in which they were presented to participants during the in-laboratory portion of the experiment. Items that were reverse coded are delineated with an asterisk (*).

State-Trait Anxiety Inventory (STAI) (Spielberger, 1970; 1983): Trait Scale

Part 1. A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel.

	1	2	3	4	5	6	7		
	Never	Almost Never	Sometimes	Neutral	Often	Almost Always	Always		
*TA1. I feel pleasant:	1	2	3	4	5	6	7		
TA2. I feel nervous and restless:	1	2	3	4	5	6	7		
*TA3. I feel satisfied with myself:			1	2	3	4	5	6	7
TA4. I wish I could be as happy as others seem to be:									
	1	2	3	4	5	6	7		
TA5. I feel like a failure:	1	2	3	4	5	6	7		
*TA6. I feel rested:	1	2	3	4	5	6	7		
*TA7. I am "calm, cool, and collected":	1	2	3	4	5	6	7		
TA8. I feel that difficulties are that I cannot overcome:									
	1	2	3	4	5	6	7		
TA9. I worry too much over something that really doesn't matter:									
	1	2	3	4	5	6	7		
*TA10. I am happy:	1	2	3	4	5	6	7		
TA11. I have disturbing thoughts:			1	2	3	4	5	6	7
TA12. I lack self-confidence:			1	2	3	4	5	6	7
*TA13. I feel secure:	1	2	3	4	5	6	7		

*TA14. I make decisions easily: 1 2 3 4 5 6 7

TA15. I feel inadequate: 1 2 3 4 5 6 7

*TA16. I am content: 1 2 3 4 5 6 7

TA17. Unimportant thoughts run through my mind and bother me:

1 2 3 4 5 6 7

TA18. I take disappointments so keenly that I can't put them out of my mind:

1 2 3 4 5 6 7

*TA19. I am a steady person: 1 2 3 4 5 6 7

TA20. I get in a state of tension or turmoil as I think over my recent concerns and interest:

1 2 3 4 5 6 7

Topic Relevance (Sexual Health and Sexual History) Scale

Part 2. Please answer the following questions honestly. This information is confidential and you will not be judged for your answers.

SH1. Have you been diagnosed with HPV? No (0) Yes (1)

SH2. Have you been diagnosed with any of the following cancers: cervical, vulval, vaginal, penile, anal?

No (0) Yes (1)

SH3. Are you currently sexually active? No (0) Yes (1)

SH4. If you are not currently sexually active, have you ever been sexually active?

No (0) Yes (1)

If your answer is yes to either of the last two questions please continue.

SH5. Do you have sex with men, women or both? Men (1) Women (2) Both(3)

SH6. Are you currently in an intimate relationship? No (0) Yes (1)

SH7. If yes, is your current sexual partner your only sexual partner? No (0) Yes (1)

SH8. Have you had multiple sexual partners in your lifetime? No (0) Yes (1)

SH9. Within the past year, how many partners have you had?

0(0) 1(1) 2-3(2) 4-10(3) more than 10(4)

SH10. Do you use condoms or other protection when having sex? No (0) Yes (1)

SH11. Have you ever been tested for a sexually transmitted disease? No (0) Yes (1)

SH12. Have you ever been treated for a sexually transmitted disease? No (0) Yes (1)

Analysis-Holism Scale (Choi, Koo, and Choi, 2007)

Part 3. Rate each item on the scale ranging from 1 to 7 (1 = strongly disagree, 7 = strongly agree).

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

*AH1. An individual who is currently honest will stay honest in the future.

1 2 3 4 5 6 7

AH2. Any phenomenon has numerous numbers of causes, although some of the causes are not known.

1 2 3 4 5 6 7

AH3. Everything in the universe is somehow related to each other.

1 2 3 4 5 6 7

AH4. We should consider the situation a person is faced with, as well as his/her personality, in order to understand one's behavior.

1 2 3 4 5 6 7

AH5. Nothing is unrelated.

1 2 3 4 5 6 7

*AH6. A person who is currently living a successful life will continue to stay successful.

1 2 3 4 5 6 7

AH7. Any phenomenon entails a numerous number of consequences, although some of them may not be known.

1 2 3 4 5 6 7

AH8. Even a small change in any element of the universe can lead to significant alterations in other elements.

1 2 3 4 5 6 7

AH9. The whole is greater than the sum of its parts.

1 2 3 4 5 6 7

*AH10. Future events are predictable based on present situations.

1 2 3 4 5 6 7

AH11. When disagreement exists among people, they should search for ways to compromise and embrace everyone's opinions.

1 2 3 4 5 6 7

*AH12. Everything in the world is intertwined in a causal relationship.

1 2 3 4 5 6 7

AH13. It is more desirable to take the middle ground than go to extremes.

1 2 3 4 5 6 7

AH14. Current situations can change at any time.

1 2 3 4 5 6 7

AH15. The whole, rather than its parts, should be considered in order to understand a phenomenon.

1 2 3 4 5 6 7

AH16. It is not possible to understand the parts without considering the whole picture.

1 2 3 4 5 6 7

*AH17. If an event is moving toward a certain direction, it will continue to move toward that direction.

1 2 3 4 5 6 7

*AH18. Every phenomenon in the world moves in predictable directions.

1 2 3 4 5 6 7

AH19. It is more important to pay attention to the whole than its parts.

1 2 3 4 5 6 7

AH20. It is more important to pay attention to the whole context rather than the details.

1 2 3 4 5 6 7

AH21. It is desirable to be in harmony, rather than in discord, with others of different opinions than one's own.

1 2 3 4 5 6 7

*AH22. Choosing a middle ground in an argument should be avoided.

1 2 3 4 5 6 7

AH23. It is important to find a point of compromise than to debate who is right/wrong, when one's opinions conflict with other's opinions.

1 2 3 4 5 6 7

AH24. We should avoid going to extremes.

1 2 3 4 5 6 7

Prior Knowledge Assessment Questionnaire

PK_1. What is the most commonly diagnosed sexually transmitted disease?

- a. HIV (0)
- b. Herpes (0)
- c. HPV (1)**
- d. Chlamydia (0)
- e. I don't know (0)

PK_2. Cervical cancer can be prevented.

- a. True (1)**
- b. False (0)
- c. I don't know (0)

PK_3. What does HPV stand for?

- a. Hallax Perinatal Virus (0)
- b. Human Papillomavirus (1)**
- c. Haemophilus Pachyderma Virus (0)
- d. Histiocystic Paleostriatum Virus (0)
- e. I don't know (0)

PK_4. Condoms provide 100% protection against HPV.

- a. True (0)
- b. False (1)**
- c. I don't know (0)

PK_5. What is the peak age group in which HPV is prevalent in women?

- a. 10-20 (0)
- b. 20-30 (1)**
- c. 30-40 (0)
- d. 40-50 (0)
- e. I don't know (0)

PK_6. HPV is only transmitted only through vaginal sex and anal sex.

- a. True (0)
- b. False (1)**
- c. I don't know (0)

PK_7. Which of the following statements are true of HPV?

- a. Not all cases of HPV have symptoms (0)
- b. HPV symptoms only surface if another problem is present (0)
- c. HPV is infectious (0)
- d. All of the above (1)**
- e. I don't know (0)

PK_8. Genital warts are a symptom of cervical cancer.

- a. True (0)
- b. False (1)**
- c. I don't know (0)

PK_9. How does genital HPV spread?

- a. Through skin-to-skin contact (1)**
- b. Through an exchange of bodily fluid (0)
- c. Through contact with the objects of an infected person (0)
- d. All of the above (0)
- e. I don't know (0)

PK_10. There is no cure for HPV.

- a. True (1)**
- b. False (0)
- c. I don't know (0)

PK_11. What are genital warts?

- a. Soft, cauliflower like clusters that can appear on the vulva, vagina, penis, scrotum and thighs (1)**
- b. Types of malignant tumors (0)
- c. They are rough-to-the-touch (0)
- d. All of the above (0)
- e. I don't know (0)

PK_12. People who are no longer sexually active should continue to be screened for cervical cancer.

- a. True (1)**
- b. False (0)
- c. I don't know (0)

PK_13. Genital warts are diagnosed by:

- a. Irritating bumps or lesions on the genitals (1)**
- b. Redness on the spot (0)
- c. Severe pain of the genital (0)
- d. All of the above (0)
- e. I don't know (0)

PK_14. Only homosexuals can contract and transmit HPV.

- a. True (0)
- b. False (1)**
- c. I don't know (0)

State-Trait Anxiety Inventory (STAI) (Spielberger, 1970; 1983): State Scale

Read each statement and select the appropriate response to indicate how you feel right now, that is, at this very moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	1	2	3	4	5	6	7	
	Not at all		A little		Somewhat		Very much so	
*SA1. I feel calm:	1	2	3	4	5	6	7	
*SA2. I feel secure:	1	2	3	4	5	6	7	
SA3. I feel tense:	1	2	3	4	5	6	7	
SA4. I feel strained:	1	2	3	4	5	6	7	
*SA5. I feel at ease:	1	2	3	4	5	6	7	
SA6. I feel upset:	1	2	3	4	5	6	7	
SA7. I am presently worrying over possible misfortunes:								
	1	2	3	4	5	6	7	
*SA8. I feel satisfied:	1	2	3	4	5	6	7	
SA9. I feel frightened:	1	2	3	4	5	6	7	
SA10. I feel uncomfortable:		1	2	3	4	5	6	7
*SA11. I feel self confident:		1	2	3	4	5	6	7
SA12. I feel nervous:	1	2	3	4	5	6	7	
SA13. I feel jittery:	1	2	3	4	5	6	7	
SA14. I feel indecisive:	1	2	3	4	5	6	7	
*SA15. I am relaxed:	1	2	3	4	5	6	7	
*SA16. I feel content:	1	2	3	4	5	6	7	
SA17. I am worried:	1	2	3	4	5	6	7	
SA18. I feel confused:	1	2	3	4	5	6	7	
*SA19. I feel steady:	1	2	3	4	5	6	7	
*SA20. I feel pleasant:	1	2	3	4	5	6	7	

Health Locus of Control (HLC) Scale (Wallston, Wallston, & DeVellis, 1978)

Each item below is a belief statement with which you may agree or disagree. Beside each statement is a scale that ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with that statement. Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

LOC1. If I become sick, I have the power to make myself well again.

1 2 3 4 5 6 7

LOC2. Often I feel that no matter what I do, if I am going to get sick, I will get sick.

1 2 3 4 5 6 7

LOC3. If I see an excellent doctor regularly, I am less likely to have health problems.

1 2 3 4 5 6 7

LOC4. It seems that my health is greatly influenced by accidental happenings.

1 2 3 4 5 6 7

LOC5. I can only maintain my health by consulting health professionals.

1 2 3 4 5 6 7

LOC6. I am directly responsible for my health.

1 2 3 4 5 6 7

LOC7. Other people play a big part in whether I stay healthy or become sick.

1 2 3 4 5 6 7

LOC8. Whatever goes wrong with my health is my own fault.

1 2 3 4 5 6 7

LOC9. When I am sick, I just have to let nature run its course.

1 2 3 4 5 6 7

LOC10. Health professionals keep me healthy.

1 2 3 4 5 6 7

LOC11. When I stay healthy, I'm just plain lucky.

1 2 3 4 5 6 7

LOC12. My physical well-being depends on how well I take care of myself.

1 2 3 4 5 6 7

LOC13. When I feel ill, I know it is because I have not been taking care of myself properly.

1 2 3 4 5 6 7

LOC14. The type of care I receive from other people is what is responsible for how well I recover from an illness.

1 2 3 4 5 6 7

LOC15. Even when I take care of myself, it's easy to get sick.

1 2 3 4 5 6 7

LOC16. When I become ill, it's a matter of fate.

1 2 3 4 5 6 7

LOC17. I can pretty much stay healthy by taking good care of myself.

1 2 3 4 5 6 7

LOC18. Following doctor's orders to the letter is the best way for me to stay healthy.

1 2 3 4 5 6 7

Severity Measures (modified from Rimal & Real, 2003; Turner et al., 2006; Turner et al. 2011)

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "strongly agree." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

SEV 1a. I believe that the risks associated with HPV are a severe threat to me.

1 2 3 4 5 6 7

SEV 1b. I believe that the risks associated with HPV are a severe threat to the average college student.

1 2 3 4 5 6 7

SEV 2. I believe that HPV can have serious negative consequences.

1 2 3 4 5 6 7

SEV 3. I believe that HPV is extremely harmful.

1 2 3 4 5 6 7

SEV 4. The risks associated with HPV are serious enough to ruin a person's life.

1 2 3 4 5 6 7

SEV 5. The risks associated with HPV are things that everyone should watch out for.

1 2 3 4 5 6 7

SEV 6. HPV is a more serious topic than most people realize.

1 2 3 4 5 6 7

*SEV. 7. The risks associated with HPV are not really that important.

1 2 3 4 5 6 7

*SEV. 8. Researchers exaggerate the risks associated with HPV.

1 2 3 4 5 6 7

*SEV 9. We should concentrate on other, more serious issues and worry less about the risks associated with HPV.

1 2 3 4 5 6 7

Susceptibility Measures (modified from Rimal & Real, 2003; Turner et al., 2006; Turner et al. 2011)

Part 9. Please answer on a 1 to 7 scale, where 1 means "Not at all likely" and 7 means "Extremely likely." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Not at all Likely	Somewhat Unlikely	Slightly Unlikely	Neutral	Slightly Likely	Somewhat Likely	Extremely Likely

SUSCEP 1. How likely are you to experience any of the risks associated with HPV in the next year or so?

1 2 3 4 5 6 7

SUSCEP 2. How likely are you to experience any of the risks associated with HPV in the next five years or so?

1 2 3 4 5 6 7

SUSCEP 3. How likely are you to experience any of the risks associated with HPV in the next 10 years or so?

1 2 3 4 5 6 7

SUSCEP 4. How likely is it that you will experience any of the risks associated with HPV in your lifetime?

1 2 3 4 5 6 7

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "totally agree."

1 2 3 4 5 6 7

SUSC 5. It is likely that I will be affected by HPV.

1 2 3 4 5 6 7

SUSC 6. I am at risk for the adverse effects of HPV.

1 2 3 4 5 6 7

SUSC 7. It is possible that I will be adversely affected by HPV.

1 2 3 4 5 6 7

Self-efficacy Measures (modified from Rimal & Real, 2003; Turner et al., 2006; Turner et al. 2011)

Part10. Please answer on a 1 to 7 scale, where 1 means "not at all confident" and 7 means "extremely confident." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Not at all Confident	Somewhat Unconfident	Slightly Unconfident	Neutral	Slightly Confident	Somewhat Confident	Extremely Confident

SEFF_1. How confident do you feel in your ability to avoid contracting HPV?

1 2 3 4 5 6 7

SEFF_2. How confident do you feel in your ability to use a condom during sex?

1 2 3 4 5 6 7

SEFF_3. How confident do you feel in your ability to get screened for HPV?

1 2 3 4 5 6 7

SEFF_4. How confident do you feel in your ability to get the HPV vaccination?

1 2 3 4 5 6 7

SEFF_5. How confident do you feel in your ability to refrain from engaging in vaginal sex with minimal frequency?

1 2 3 4 5 6 7

SEFF_6. How confident do you feel in your ability to refrain from engaging in oral sex with minimal frequency?

1 2 3 4 5 6 7

SEFF_7. How confident do you feel in your ability to refrain from engaging in anal sex with minimal frequency?

1 2 3 4 5 6 7

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "strongly agree." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

SEFF_8. I am able to protect myself against the risks associated with HPV.

1 2 3 4 5 6 7

SEFF_9. It is easy to protect myself against the risks associated with HPV.

1 2 3 4 5 6 7

SEFF_10. Even when faced with obstacles, I am able to protect myself against the risks associated with HPV.

1 2 3 4 5 6 7

Response Efficacy Measures

Part 11. Please answer on a 1 to 7 scale, where 1 means "not at all confident" and 7 means "extremely confident." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Not at all Confident	Somewhat Unconfident	Slightly Unconfident	Neutral	Slightly Confident	Somewhat Confident	Extremely Confident

REFF_1. How confident do you feel that using a condom during sex can prevent the spread of HPV?

1 2 3 4 5 6 7

REFF_2. How confident do you feel that getting the HPV vaccination can prevent the spread of HPV?

1 2 3 4 5 6 7

REFF_3. How confident do you feel that refraining from engaging in vaginal sex can prevent the spread of HPV?

1 2 3 4 5 6 7

REFF_4. How confident do you feel that refraining from engaging in oral sex can prevent the spread of HPV?

1 2 3 4 5 6 7

REFF_5. How confident do you feel that refraining from engaging in anal sex can prevent the spread of HPV?

1 2 3 4 5 6 7

REFF_6. How confident do you feel that being selective in whom you engage in sexual activity with can prevent the spread of HPV?

1 2 3 4 5 6 7

REFF_7. How confident do you feel that asking a sexual partner about their sexual history before engaging in sexual activity can prevent the spread of HPV?

1 2 3 4 5 6 7

Collective Efficacy Beliefs Scale (Riggs and Knight's, 1994)

Part 12. Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "strongly agree." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

COLEFF1. My group of friends has above average ability in not getting HPV.

1 2 3 4 5 7

*COLEFF2. My group of friends is poor compared to other groups in preventing the contraction of HPV.

1 2 3 4 5 7

*COLLEFF3. My group of friends is not able to perform as well as it should when it comes to avoiding the contraction of HPV.

1 2 3 4 5 7

COLLEFF4. The members of my group of friends have excellent educational skill when it comes to HPV.

1 2 3 4 5 7

*COLLEFF5. Some members of my group of friends should be excluded due to lack of ability when it comes to contracting HPV.

1 2 3 4 5 7

*COLLEFF6. My group of friends is not very effective when it comes to getting HPV.

1 2 3 4 5 7

Please answer on a 1 to 7 scale, where 1 means "not at all confident" and 7 means "extremely confident." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Not at all Confident	Somewhat Unconfident	Slightly Unconfident	Neutral	Slightly Confident	Somewhat Confident	Extremely Confident

COLLEFF7. How confident do you think your circle of friends feels in their collective ability to avoid contracting HPV?

1 2 3 4 5 7

COLLEFF8. How confident do you think your circle of friends feels in their collective ability to use a condom during sex?

1 2 3 4 5 7

COLLEFF9. How confident do you think your circle of friends feels in their collective ability to get screened for HPV?

1 2 3 4 5 7

COLLEFF10. How confident do you think your circle of friends feels in their collective ability to get the HPV vaccination?

1 2 3 4 5 7

COLLEFF11. How confident do you think your circle of friends feels in their collective ability to refrain from engaging in vaginal sex with minimal frequency?

1 2 3 4 5 7

COLLEFF12. How confident do you think your circle of friends feels in their collective ability to refrain from engaging in oral sex with minimal frequency?

1 2 3 4 5 7

COLLEFF13. How confident do you think your circle of friends feels in their collective ability to refrain from engaging in anal sex with minimal frequency?

1 2 3 4 5 7

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "strongly agree." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

COLLEFF14. My circle of friends is able protect themselves against the risks associated with HPV.

1 2 3 4 5 7

COLLEFF15. It is easy for my circle of friends to protect themselves against the risks associated with HPV.

1 2 3 4 5 7

COLLEFF16. Even when faced with obstacles, my circle of friends is able to protect themselves against the risks associated with HPV.

1 2 3 4 5 7

Communication Efficacy Scale (Afifi and Weiner's, 2004)

Part 13. Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "strongly agree." Please make sure that you answer EVERY ITEM and that you circle ONLY ONE number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

*COMMEFF1. I don't feel that I have the ability to ask others what they think about HPV.

1 2 3 4 5 7

COMMEFF2. I feel that I have the ability to approach others to talk about HPV.

1 2 3 4 5 7

COMMEFF3. I feel like I could approach others to ask about HPV.

1 2 3 4 5 7

COMMEFF4. I am confident that I can share information about HPV with others when I want to.

1 2 3 4 5 7

*COMMEFF5. I have difficulty sharing information about HPV with others.

1 2 3 4 5 7

COMMEFF6. If I want to, I can talk to others about HPV.

1 2 3 4 5 7

*COMMEFF7. I do not know what to say when I try to share information with others about HPV.

1 2 3 4 5 7

Past Information Seeking Measures

Please answer the following questions by answering yes or no.

PastIS_1. Have you ever looked for information regarding the risks associated with contracting HPV?

No (0) Yes (1)

PastIS_2. Have you ever talked to someone else to learn about the risks associated with contracting HPV?

No (0) Yes (1)

Behavioral Intentions Measures (modified from Rimal & Real, 2003; Turner et al., 2006; Turner et al. 2011)

Please answer on a 1 to 7 scale, where 1 means "strongly disagree" and 7 means "strongly agree"

1	2	3	4	5	6	7
Strongly Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Strongly Agree

BI_1. I intend to use a condom whenever I have sex.

1 2 3 4 5 7

BI_2 I intend to get screened for HPV.

1 2 3 4 5 7

BI_3. I intend to get the HPV vaccination.

1 2 3 4 5 7

BI_4. I intend to refrain from engaging in vaginal sex with minimal frequency?

1 2 3 4 5 7

BI_5. I intend to refrain from engaging in oral sex with minimal frequency?

1 2 3 4 5 7

BI_6. I intend to refrain from engaging in anal sex with minimal frequency?

1 2 3 4 5 7

BI_7. I intend to protect myself against the risks associated with HPV.

1 2 3 4 5 7

Information Seeking Intention measures (modified from Rimal & Real, 2003; Turner et al., 2006; Turner et al. 2011)

Part16. Please answer on a 1 to 7 scale, where 1 means "highly unlikely" and 7 means "highly likely"

1	2	3	4	5	6	7
Not at all Likely	Somewhat Unlikely	Slightly Unlikely	Neutral	Slightly Likely	Somewhat Likely	Extremely Likely

ISI_1. How likely is it that you will spend time looking for information regarding HPV in newspapers?

1 2 3 4 5 7

ISI_2. How likely is it that you will spend time looking for information regarding HPV in magazines?

1 2 3 4 5 7

ISI_3. How likely is it that you will spend time looking for information regarding HPV in newspapers?

1 2 3 4 5 7

ISI_4. How likely is it that you will spend time looking for information regarding HPV on the Internet?

1 2 3 4 5 7

ISI_5. How likely is it that you will talk about indoor tanning with your friends in the next few weeks?

1 2 3 4 5 7

ISI_6. How likely is it that you will talk about HPV with your family members in the next few weeks?

1 2 3 4 5 7

ISI_7. How likely is it that you will bring up the issue of HPV with your health care provider?

1 2 3 4 5 7

ISI_8. How likely is it that you will bring up the issue of HPV when you talk with people in general?

1 2 3 4 5 7

Demographic Measures

1. My age is _____ years.

2. I am MALE (0) FEMALE (1)

3. Please indicate your ethnicity:

CAUCASIAN (0) AFRICAN AMERICAN (1) LATIN AMERICAN(2)

NATIVE AMERICAN PACIFIC ISLANDER(3) ASIAN(4)

MIDDLE EASTERN (5) OTHER (6) _____

4. Please indicate what year you are in college:

FRESHMAN (1) SOPHOMORE(2) JUNIOR(3) SENIOR(4)
GRAD(5)

OTHER(6)_____

Post Information Seeking Measures

HPVLook3. Did you use the Internet to look for information regarding HPV?

No (0) Yes(1)

HPVSatisfied4. If yes, were you satisfied with your search regarding HPV information?

No (0) Yes(1)

Post Knowledge Assessment Questionnaire

Post_1. HPV is the most commonly diagnosed sexually transmitted disease.

a. **True (1)**

b. False (0)

Post_2. _____ can be prevented by vaccination.

a. Sickle cell anemia (0)

b. Parkinson's disease (0)

c. Herpes (0)

d. Cervical cancer (1)

Post_3. HPV stands for Histiocystic Paleostriatum Virus.

a. True (0)

b. False(1)

Post_4. What provides 100% protection against HPV.

- a. Condoms (0)
- b. Abstinence(1)**
- c. Birth control pills (0)
- d. Nothing (0)

Post_5. The peak age group of HPV prevalence in women is 20-30.

- a. True(1)**
- b. False (0)

Post_6. How is HPV transmitted?

- a. Through vaginal sex (0)
- b. Through anal sex. (0)
- c. Through oral sex. (0)
- d. All of the above. (1)**

Post_7. HPV symptoms only surface if another problem is present.

- a. True(1)**
- b. False (0)

Post_8. Which of the following is NOT a symptom of cervical cancer?

- a. Bleeding after sexual intercourse (0)
- b. Pelvic pain (0)
- c. Heavy discharge (0)
- d. Genital warts(1)**

Post_9. Genital HPV spreads through an exchange of bodily fluid.

- a. True (0)
- b. False(1)**

Post_10. Which of the following does NOT have a cure?

- a. HPV(1)**
- b. Cervical cancer (0)
- c. Genital warts (0)
- d. Anal cancer (0)

Post_11. Genital warts are soft, cauliflower like clusters that can appear on the vulva, vagina, penis, scrotum and thighs.

- a. True(1)**
- b. False (0)

Post_12. Which of the following groups of people do not need to be screened for cervical cancer?

- a. Sexually active married women (0)
- b. Sexually active men(1)**
- c. Sexually active adolescent girls (0)
- d. Women who are no longer sexually active (0)

Post_13. Genital warts are often diagnosed by severe pain in the genitals.

- a. True (0)
- b. False(1)**

Post_14. Who can contract and transmit HPV?

- a. only heterosexual women (0)
- b. only heterosexual men (0)
- c. homosexual men and women (0)
- d. All of the above(1)**

* indicates an item that was reverse coded.

Appendix H

Main Study Measurement Instruments for Time 2

1. Please list the information you remember receiving about HPV during the in-laboratory study.
2. During the in-laboratory study, did you look for any additional information about HPV on the Internet?

No (1) Yes (2)
3. In the week following the in-laboratory study, did you talk to anyone or did anyone talk to you about HPV?

No (1) Yes (2)
4. **Who** did you talk to about HPV? Select all that apply.
 - Best-friend
 - Classmate
 - Parent
 - Sibling
 - Other family member
 - Friend
 - Boyfriend/girlfriend
 - Potential romantic partner
 - Doctor
 - Coach
 - Teacher
 - Stranger

Other (please specify) _____

5. In which of the following conversation formats did you talk? Put an “X” in all boxes that apply.

Face-to-face

Over the phone

Instant message

Text message

E-mail

Social networking website (i.e. Facebook, MySpace, Twitter, Friendster)

Personal blog

Chat room

Video chat (i.e. Skype)

Other

6. Can you remember **what** you talked about in the conversation(s)? If so, please use the space below to write down **anything you can remember** about the conversation(s).
(*ex: where it took place, what was said, what (or who) sparked the conversation, what ended it, etc., etc.*)

7. Overall, when you talked to someone else about HPV would you say that you did so to:

Find support of my opinions

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To find out what other people think

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To sound knowledgeable or informed

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To persuade by either endorsing or discrediting the ad

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To gain a better understanding of the risks of HPV

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To entertain others or myself (i.e. to provide humor, drama, etc.)

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To get answers to any questions I might have after the study

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To pass the time

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To get advice from others

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

To tell others to "spread the word"

Strongly Disagree : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Strongly Agree

8. In the week after the in-laboratory study,

If you have seen a story about HPV on television, how much attention did you pay to it?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Quite a bit _____ N/A

If you have read a story about HPV in the newspaper, how much attention did you pay to it?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Quite a bit _____ N/A

If you read a story about HPV on the Internet, how much attention did you pay to it?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Quite a bit _____ N/A

If you have seen a story about HPV in a magazine, how much attention did you pay to it?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : Quite a bit _____ N/A

9. In the week following the in-laboratory study, did you look for any additional information about HPV on the Internet?

No (1)

Yes (2)

10. How much time did you spend searching for additional information about HPV...

On search engines (e.g. Google)?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : A lot of time

On social networking websites (e.g. Facebook, Twitter, etc.)?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : A lot of time

On health websites?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : A lot of time

On government websites?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : A lot of time

On blogs?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : A lot of time

On discussion boards?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : A lot of time

Any other websites?

None : _____ : _____ : _____ : _____ : _____ : _____ : _____ : A lot of time

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