

Effect of Framing on HPV Information Retention and Stigma Levels

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Abstract

Human papillomavirus is a sexually transmitted disease, and the stigma surrounding it often translates into negative emotional experiences when one is diagnosed with HPV. In this study, it was hypothesized that one way to reduce stigma surrounding HPV is to promote increased discussion (or normalization) of HPV. To test this, 90 male and female college students were recruited and assigned to receive information about HPV framed as a story narrated by a peer or as unadorned factual statements. It was hypothesized that participants in the peer condition would have higher levels of HPV knowledge retention and lower levels of stigma than participants in the fact condition. Another hypothesis was that levels of hope would be positively correlated with levels of HPV knowledge across conditions. There were two main findings of the study: 1) Males in the fact condition experienced higher levels of hopefulness and optimism than did all other participants, and 2) Participants in the fact condition who were high in neuroticism reported the highest levels of perceived stigma, while participants in the fact condition who were low in neuroticism reported the lowest levels of perceived stigma. The results of the study did not support the hypothesis that participants in the peer condition would have higher knowledge retention about HPV and reduced levels of stigma. Additionally, hope was not associated with higher levels of HPV knowledge retention.

Human papillomavirus is the most common sexually transmitted disease (Weinstock, Berman, & Cates, 2004). Currently, 20 million people are infected with HPV and there are 6.2 million new cases of HPV each year (CDC, 2004). As many as 50- 75% of sexually active men and women will be diagnosed with HPV at some point in their lives (Moscicki, 2005), and by age fifty 80% of women will have been infected with HPV at some point in their lives (CDC, 2004). STDs, especially HPV, especially affect college-aged women and adolescents; while 15-24 year olds make up only 25% of the population, they account for almost 50% of all STD infections (Moscicki, 2005).

There are 100 different strains of HPV. Some of these are “high-risk”, and may lead to cervical cancer (CDC, 2004). These high-risk strains usually do not show symptoms. The other strains are “low-risk”, which are usually manifested in the form of genital warts. The majority of people infected with HPV; however, will not show symptoms, and the virus usually clears itself on its own in approximately two years. In addition, HPV is diagnosed through abnormal Pap smears, and if detected early can be monitored. With careful monitoring and regular gynecologist exams, cervical cancer is highly preventable. HPV is transmitted by skin-to-skin contact, and its prevalence is the same in both men and women. However, there is no test to detect HPV in men, which may result in the misconception that HPV is more common in women than in men (CDC, 2004).

Despite its widespread nature, people generally lack information on HPV. Many are unaware that HPV is an STD or that it exists at all (Friedman & Sheppard, 2007; Baer et al., 2000; McPartland et al., 2005; Sharpe et al., 2005). In a series of face-to-face interviews, exactly zero of forty participants mentioned HPV during a recall task of all STDs (Mays et al., 2000). Even when people are aware of HPV, they often fail to know details. Specifically, its frequency

and commonality are severely underestimated. In Baer's study exploring male and female college students' knowledge of STDs, only 2% of men and 4.6% of women listed HPV as a common STD, and many fewer knew that it is *the* most common STD (Baer et al, 2000). In addition, this study had a low response rate of 21.9%, which usually implies that the respondents are not generalizable to the entire population. However, it is generally accepted that in sex surveys those who respond are often those who feel more comfortable discussing sexual issues (Crooks & Baur, 2008), and thus the HPV knowledge rates of this group would presumably be higher than that of the general population, meaning that knowledge of HPV could be even lower than what was reported. The general public is also largely unaware of the connection between HPV and cervical cancer, and fails to understand the role of Pap smears in detecting HPV (Mays et al., 2000).

Due in large part to this lack of knowledge about HPV, many women who are diagnosed with HPV have very negative emotional experiences. Upon diagnosis with HPV, more than 75% of women in one study expressed depression and anger at the time of initial diagnosis (Conaglen et al., 2001). The five most common emotions felt (in order from greatest to least) are stigma, isolation, fear, self-blame, and powerlessness (Perrin et al., 2006). This study will look primarily at stigma, but it is important to note that there are many negative components of HPV diagnosis, and to acknowledge that women are going through a multifaceted negative emotional experience. One way to decrease these negative experiences might be to make women aware of the commonality of HPV before they are diagnosed.

Lack of information about HPV can also lead to an increase in stigma surrounding the virus. This stigma then leads to less preventative behaviors such as undergoing STD testing. Women identify "negative personal emotions" as a reason for not seeking STD testing, and these

include the shame or guilt that would result if one did test positive (Barth et al., 2002). Since being infected with HPV is viewed negatively, women do not wish to put themselves in a position in which they may learn they have HPV, so they avoid the testing altogether. Thus, stigma and shame surrounding HPV positive status both has harmful effects on women who are diagnosed with HPV and those who are not yet diagnosed but may be highly susceptible.

One specific negative consequence of the strong emotion during initial diagnosis is an inability to pay attention to key facts or to ask appropriate questions (Sharpe et al., 2005). Many women realize afterward that they failed to learn necessary information while in the appointment, and the opportunity is often lost. This is epitomized in one study of 46 women who had been diagnosed with HPV, after which only 48% of women were even aware of their diagnosis, despite having been explicitly informed of their positive status (Sharpe et al., 2005). Often, women are unable to glean even the most basic information from their interactions with health care providers because they are overwhelmed with trying to emotionally process their diagnosis, rather than focusing on cognitively processing the diagnosis. In addition, cognitive understanding of test results is an important factor in how women deal with their diagnosis (Kahn et al., 2005), and therefore it is important that accurate and thorough information be given to women upon diagnosis. If this cognitive processing does not occur, women have a much more difficult time dealing with the diagnosis in later weeks as well. However, it will be difficult to ensure that this cognitive processing does occur without first decreasing the extremity of the emotional reaction.

The psychological effects of a first-time diagnosis of HPV are no different than the effects of a first-time diagnosis of any other STD (Conaglen et al., 2001). While this initially sounds encouraging, in reality an HPV diagnosis should be less emotional and stressful than a

diagnosis with another STD. HPV is extremely common, and if women knew the high likelihood of contracting it is possible they would not be as surprised when they did contract it. In addition, the primary negative consequences of HPV arise only if a woman develops cervical cancer, which is extremely rare and highly preventable. In 90% of women, HPV becomes undetectable within two years of diagnosis (CDC, 2004). While there is no cure for HPV, traces of it nevertheless usually disappear from the body, and for this reason it can be deemed preventable (CDC, 2004). Thus, the physical consequences of HPV are usually very mild, and therefore the response should be less intense for women who are diagnosed with HPV than for women diagnosed with other STDs. However, because so little is known and understood about HPV, there is still an extreme emotional reaction.

In addition to causing emotional distress, the lack of knowledge about HPV leads women to be unaware that there is any risk at all of contracting HPV, and therefore no preventative measures are taken. However, with the advent of the HPV vaccine Gardasil, there are concrete steps women can take to protect themselves against cervical cancer (CDC, 2004), and therefore it is absolutely imperative that HPV knowledge be increased. If the stigma surrounding HPV is not lessened, it is possible that women or teenagers will not get the vaccine because they do not want to be seen as promiscuous or loose, as is the case with STD testing (Barth et al., 2002).

One of the major reasons that women do not seek STD testing is because of the stigma surrounding testing and STDs (Barth et al., 2002). In Barth's interviews of 41 college women, the primary reason for not seeking testing was "perceived negative consequences" (2002). This included beliefs that others would view them as irresponsible and "dirty" if they were to be tested, and a large percentage of participants said that they would feel embarrassment. Women anticipate this stigma without actually being diagnosed with HPV or before they are confronted

with this situation (Kahn et al., 2005), which suggests that the stigma would be even worse if one actually is infected with HPV. Indeed, this stigma often progresses to a sense of shame once one is diagnosed with HPV (Kahn et al., 2007).

The most important component of stigma has been shown to be social isolation, which is what women fear will happen if they disclose their positive status (Kahn et al., 2007). Stigma also leads to less disclosure (Perrin et al., 2006). In general, there is a lack of interpersonal communication about sexual topics, and even more so on issues surrounding STDs (Rouner and Lindsey, 2006). Thus, even when health issues are serious or commonplace, as is the case with HPV, they may be pushed under the table and not discussed.

This lack of discussion encourages a cycle of stigma and lack of knowledge. Because HPV is so poorly understood, the general public does not understand the reasons why it is *not* shameful, and therefore the stigma is created. This stigma facilitates the lack of knowledge, because without the discussion the public will never learn more about HPV, and the stigma is maintained. Therefore, in this study it is suggested that the way to break this cycle is through increased discussion, or normalization of HPV.

Normalizing HPV has been identified as a goal which would be potentially more effective than attempting to change sexual behavior (Perrin et al., 2006). HPV is not viewed as “normal” in society; it is viewed primarily through the negative lens of a sexually transmitted disease. Therefore, women diagnosed with HPV do not feel free to disclose their status, and the result is a society of women unaware that HPV is extremely prevalent. One woman described her knowledge of STDs as such: “I don’t know STDs that are very prevalent among my age group because none of my friends have them and it isn’t discussed much” (Rouner & Lindsey, 2006). It is likely not the case that none of her friends have STDs, instead, none of her friends have told

her they have STDs. Increased disclosure has many positive effects. In addition to reducing stress levels in women diagnosed with HPV (Waller et al., 2004), disclosure would also be beneficial to those women who have not yet been diagnosed, such as the woman quoted above. If this woman was aware of friends who had HPV (who probably exist due to the 80% prevalence rate), it is possible that she would undergo STD testing. Unfortunately, this mistaken belief surrounding the prevalence of STDs is typical of many women, and this is why increased discussion is absolutely necessary.

It is important that communication regarding HPV not be limited to women. While women are affected most by infection with HPV, one of the major risk factors for contracting HPV is the numbers of partners that a woman's sexual partner has (Fernandez-Esquer, Ross, & Torres, 2000). Therefore, men should be just as knowledgeable about HPV as women. In one study, over 50% of college-aged males interviewed had not even heard of HPV (McPartland et al., 2005). Despite this fact, most studies on HPV do not address the male role (Fernandez-Esquer, Ross, & Torres, 2000). The Centers for Disease Control's website explicitly and unambiguously gives the following advice to men: "There is no clear health benefit to knowing you have this virus—since HPV is unlikely to affect your health and cannot be treated" (2006). Only later is it mentioned that men should be aware of HPV because they can pass it on to female sexual partners, for whom the consequences may be much greater, including a significantly higher risk of cancer. In large part, the public health field is presenting the message that men need not worry about HPV, despite the fact that men's sexual behavior is a leading risk factor of whether a woman will contract HPV. In addition, if males have more knowledge of HPV they are more likely to encourage Pap smears and preventative behavior in female partners (McPartland et al., 2005). While preventative behaviors for women lie largely in the hands of

women, an ideal situation would be one in which both sexual partners are equally aware of risk levels and possible preventative measures. For this reason, both men and women were included as participants in this study.

Increasing HPV knowledge is crucial in reducing stigma, but merely presenting information will be unlikely to reduce the negative emotions surrounding STD diagnosis and willingness to undergo STD testing (Perrin et al., 2006). However, if one can manipulate the way the information is presented, it can become more effective.

Since HPV is only dangerous when it goes undetected, it is crucial that it be detected, and for this reason the seriousness of HPV must be emphasized. However, Friedman and Sheppard conducted interviews in which participants felt that scare tactics were unnecessary because STDs are already scary, and inducing panic could be an undesirable side-effect of using scare tactics (2007). Indeed, if an STD is preventable, as HPV is, it is necessary to communicate this fact in order to counter fear (Hullett, 2004). Thus, a balance must be found between presenting the seriousness of HPV without panicking the public.

When presenting information about HPV there are several ways to frame HPV: as an STD, as a cause of cervical cancer, or as a “universal public health issue”, and the most harm arises when it is framed primarily as an STD (Friedman & Sheppard, 2007). Stigma is associated with STDs, and therefore HPV must be separated from the title “sexually transmitted disease.” One way to do this is to emphasize its link to cervical cancer (Friedman & Sheppard, 2007; Perrin et al., 2006). If HPV is viewed primarily as a cancer causing agent, it will be taken more seriously and be easier for the general public to discuss. On the other hand, if HPV continues to be associated with other STDs, the stigma surrounding it will be unlikely to decrease.

There are several factors that characterize HPV which allow it to be considered as separate from other STDs. The first is its connection with cervical cancer, which has already been discussed. Another is its commonality; no other STD has as high of a prevalence rate, and the more common it is the easier it should be for the public to discuss. A third factor characterizing HPV is the unknown effectiveness of condoms in HPV transmission (CDC, 2004). While condom usage is a central part of HIV/AIDS prevention campaigns (Crooks & Baur, 2008), this is not a factor that should be stressed when relaying HPV information. Thus, it is necessary to have a separate health campaign on the issue of HPV alone. Unfortunately, several studies have suggested that the mass media on HIV/AIDS has in fact overshadowed the importance of preventative measures against other STDs (Rouner and Lindsey, 2006), and this is evidenced by the statistic revealing that over 95% of males and females listed HIV/AIDS as the STD they were most concerned about (Baer et al., 2000), while HPV was ranked eighth on the list.

Thus, an effective campaign to increase HPV knowledge would frame HPV as a universal health issue and emphasize that HPV is serious but preventable. In addition, I hypothesize that people will be more inclined to pay attention to and seek information about HPV if it comes in the form of a peer's personal message. Hearing about HPV from a peer who is HPV positive serves multiple purposes: it increases knowledge on a basic level, it results in emotionally beneficial disclosure for the discloser, it increases communication on the topic, and it is a step towards normalizing HPV. Ideally, if a peer demonstrates a lack of shame by revealing their own status, it will help to break down the stigma.

Framing HPV in the form of peer's message will be effective for several reasons. Hullett suggested that people are more likely to pay attention to a message if it is relevant to them

(2004). Many people fail to take note of information until it somehow affects them, and if those infected with HPV are able to discuss their status, it will positively affect their friends and family who will acknowledge that HPV could affect them (and also perhaps learn for the first time that HPV exists), and therefore preventative measures such as STD testing may be taken. Even if it is too late for preventative measures, knowing that a friend has HPV will result in a less emotional experience upon diagnosis. Views expressed in interviews by Friedman and Sheppard noted a desire for “real-life examples” (2007). The “real-life example” will be especially effective if coming from a peer. Participants have also expressed a desire to receive information from a source that has personally dealt with the effects of HPV (Friedman & Sheppard, 2007). One of the main factors that determines how a woman will react to an HPV diagnosis is her personal experience with HPV or cancer (Kahn et al., 2007). Thus, it is necessary that those diagnosed with HPV share their experiences in order to help others deal with their own diagnosis or to prevent transmission.

A college campus is an ideal environment to study levels of HPV knowledge and to promote normalization. Students aged 18 to 24 years have the highest rates of HPV and STDs, and students at a given college share many factors other than STD status which would allow them to better understand each other. Through discussion among peers and relation of personal experiences, it is hypothesized that many of the negative effects of infection with HPV could be reduced, specifically in terms of negative emotions upon diagnosis.

Many of the studies about HPV seek to either measure one’s initial knowledge of HPV (Friedman & Sheppard, 2007; McPartland et al., 2005; Sharpe et al., 2005; Baer et al., 2000; Mays et al., 2000) or consist of interviews which look primarily at emotions surrounding HPV diagnosis (Kahn et al., 2005; Perrin et al., 2006; Conaglen et al., 2001). Studies have also been

done on effective means of communication for STDs in general. However, to the best of my knowledge there have been no studies done which examine information communication for HPV specifically. Therefore, in this study I will examine the effectiveness of presenting information that is framed as coming from a peer versus information that is framed as coming from an online reliable medical source. If the peer means of information communication is shown to be more effective, it will be a starting point for encouraging increased communication on college campuses and the creation of safe communities in which the discussion of HPV and STDs is no longer taboo. If the statistics which say that 80% of women are affected are correct, then there is an unspoken community of women who have HPV but feel restricted and unable to discuss their situation due to the stigma. If the hypothesis is correct, this study will form a basis for breaking down stigma by revealing the effectiveness of peer framing in HPV information communication.

Hope

Another aspect I will examine in this study is the influence of hope on HPV prevention. Irving, Snyder, and Crowson examined the impact of levels of hope on cancer knowledge in a study which showed that students who had high levels of hope had higher levels of cancer related knowledge (1998). In hope theory, hope is defined as a specific attitude which entails goal-directed thought involving pathways and agency (Snyder, Rand, & Sigmon, 2005), and therefore this study suggested that people who had high levels of hope were better able to think of pathways and agencies for preventing disease such as cancer (Irving, Snyder, & Crowson, 1998). Instead of viewing cancer as threatening, those high in hope saw it as a challenge and thus sought out knowledge as a pathway towards preventing cancer (Snyder, Rand, & Sigmon, 2005). Locus of control is likely also influential, since people with external loci of control will be more likely

to believe that they can prevent HPV or other STDs through their own actions (Kahn et al., 2005).

Many similarities can be seen between cancer and preventable STDs such as HPV. Indeed, HPV is linked to cancer through its ability to cause cervical cancer, which can be prevented if one has the correct knowledge. Therefore, based on the results of Snyder's study, I hypothesize that the same effect will be found regarding HPV knowledge that was found regarding cancer knowledge, and that students who have high levels of hope will score better on the HPV Knowledge Questionnaire than students who have low levels of hope. If one's level of hope is found to be correlated with one's level of HPV knowledge, then perhaps measures can be taken to increase hope.

Snyder's study also looked at and controlled for several mediating factors, such as personal experience with cancer, academic achievement, and positive and negative affectivity (Irving, Snyder, & Crowson, 1998). While this study will control for academic achievement, limitations may arise in its inability to control for positive and negative affectivity and personal experience with HPV. Although the results of Snyder's study revealed that personal experience with or knowing someone with cancer did not affect one's level of knowledge, it must be assumed that personal experience with HPV would increase knowledge. Because of the stigma surrounding HPV which is not a factor with cancer, HPV knowledge is likely low due to low knowledge that it even exists. In addition, this study will not control for whether the participants themselves have HPV. This would be another mediating factor, and a limiting one on the study.

Method

Participants

The participants of this study were 90 university students attending a private mid-Atlantic university. The study included both female ($N=68$, 75.6%), and male participants ($N=22$, 24.4%), the large majority of which were female. Participants ranged in age from 18 to 24 ($M=19.44$, $SD=1.25$), with 77.8% of the participants classifying themselves as White, 5.6% as African-American, 6.7% as Asian, and 8.9% classifying themselves as “other”. Participants were recruited via a sign-up sheet in the psychology department and by passing around sign-up sheets in several psychology classes. Each participant was compensated with one half point of research extra credit for participating in the study.

Procedures and Measures

Participants were assigned to either the “fact knowledge” or “peer knowledge” condition on a rotating basis; every other person was given the fact condition or the peer condition. Males and females were split evenly between the two conditions, with 10 males in the fact condition, 12 males in the peer condition, 35 females in the fact condition, and 33 females in the peer condition. In total, 45 participants were assigned to the fact condition and 45 participants were assigned to the peer condition.

Participants first provided written consent that they were willing to participate in the study. Each participant then answered written introduction questions, which focused on demographics. Participants were asked their age, ethnicity, gender, year in school, and GPA. They were then instructed to read information about HPV, which varied according to the condition to which each participant was assigned. In the peer condition, HPV information was

framed as a personal story narrated by a “19 year old female student at American University.” In the story, the fictional student describes her experience with and reaction upon being diagnosed with HPV, while providing factual information about HPV. All of the factual information for both conditions was obtained from the Centers for Disease Control’s fact sheet entitled “Genital HPV Infection” (2004). The story is written in a paragraph format. In the fact condition, the HPV information is presented as individual facts without context. Written at the top of the sheet is the explanation that “All of this information has been taken from the Centers for Disease Control’s website www.cdc.gov”. This explanation is not given in the peer condition. The wording of the specific facts about HPV in each condition is identical; the only difference is that the peer condition adds context and presents the information in a paragraph format. After participants finished reading the information, they were not allowed to re-read this information at any future point in the study.

After reading the information about HPV, the participants were given a word search which consisted of neutral words such as “backpack” and “photograph” and instructed to spend ten minutes completing it. The word search served as a distracter task to keep the participants’ minds off the HPV information and prevent them from ruminating or memorizing the information. None of the participants completed the word search, which suggests that it succeeded in keeping the participants occupied for the entire ten minutes.

Once the ten minutes had passed, participants were given the HPV Knowledge Questionnaire, which asks questions about HPV that can be answered based on the information presented in the HPV information sheets. This measure consists of seven fill-in-the-blank questions such as “How many different strains of HPV are there?” and “What percentage of sexually active men and women will have HPV at some point in their lives?” and seven

statements for which participants had to select whether they were true or false, such as “HPV is more common in women and men” and “There is a test to detect HPV in both men and women”. This measure was designed specifically for this study.

Participants also completed a measure of stigma which was also designed specifically for this study. This measure consisted of seven statements, and participants were instructed to indicate their opinion on a five-point scale from “Strongly Disagree” to “Strongly Agree”. Each item in the measure began with “If I was diagnosed with HPV, I would feel...” and ended with terms including “fear”, “isolated”, and “embarrassed”. This measure was based on Perrin’s study which showed that the five most common emotions upon diagnosis with HPV are stigma, isolation, fear, self-blame, and powerlessness, and all of these are included (Perrin et al., 2006). The measure also included “embarrassed” and “ashamed” as possible feelings upon diagnosis. Higher scores on this measure indicate higher levels of stigma surrounding HPV diagnosis.

Participants were then asked to complete several measures of personality. The first was the Trait Hope scale, which measured levels of hopefulness (Snyder, Rand, & Sigmon, 2005). Participants indicated to what extent they agreed with twelve statements on a scale from 1 (*Definitely false*) to 8 (*Definitely true*). Among the statements were “I energetically pursue my goals” and “I can think of many ways to get out of a jam”. The Trait Hope Scale has high internal reliability (Babyak, Snyder, & Yoshinobu, 1993).

Participants also completed the Revised Life Orientation Test, which was a ten item questionnaire assessing the participants’ levels of optimism (Scheier, Carver, & Bridges, 1994). Participants indicated their opinion about statements on a five-point scale from “I agree a lot” to “I DISagree a lot”. Items on the measure included “In uncertain times, I usually expect the best” and “I hardly ever expect things to go my way”. Reliability of the LOT-R is high, with

Cronbach's $\alpha = .78$ (Scheier, Carver, & Bridges, 1994). Test-retest reliability of the LOT-R is also high, with $\alpha = .79$ after 28 months (Scheier, Carver, & Bridges, 1994).

The last measure completed by the participants was the neuroticism scale of the NEO Five Factor Inventory, which was a twelve item questionnaire assessing the participants' levels of neuroticism, or general negative affect (Costa & McCrae, 1992). Participants were asked to indicate their opinion about the statements on a five point scale from "SD = *strongly disagree* or the statement is definitely false" to "SA = *strongly agree* or the statement is definitely true". Examples of items that were included in the measure are "I often feel tense and jittery" and "Sometimes I feel completely worthless".

Results

Descriptive Statistics

Each participant was given an HPV knowledge score, which was a combination of the scores received on both the fill-in-the-blank and the true-false questions. One fill-in-the-blank question was thrown out because it was decided that the answer was ambiguous according to information given. Thus, the highest HPV knowledge score possible was 13, and scores ranged from 4 to 13. However, the scores were negatively skewed, with an average score of 10.36 questions answered correctly ($SD=1.78$).

Scores on the Stigma Measure ranged from 12 to 35 out of a total possible score of 35. The data was normally distributed ($M=22.89$, $SD=5.05$).

Scores for the LOT-R ranged from 0 to 24, out of a total possible score of 24. Out of the ten questions, questions 2, 5, 6, and 8 were filler questions and were discarded. Optimism scores then became a summation of the scores on the six remaining questions. Questions 3, 7, and 9 were negatively worded and thus reverse coded. The data was normally distributed

($M=13.86$, $SD=4.79$), which is consistent with the norm of $M=14.33$ in an original sample of college students (Scheier, Carver, & Bridges, 1994).

The Trait Hope Scale is comprised of both pathway (items 1, 4, 6, and 8) and agency (items 2, 9, 10, and 12) subscales which are then combined and summed to make a total score. Items 3, 5, 7, and 11 are discarded. Scores for the Trait Hope measure ranged from 38 to 64, out of a total possible score of 64. The data was normally distributed ($M=51.52$, $SD=5.91$).

Scores for the NEO-N ranged from 9 to 31, out of a total possible score of 60. The scores were computed by first reverse coding items 1, 4, 7, and 10, and then summing the items. The data was normally distributed ($M=20.5$, $SD=5.17$).

Correlational Data

There was no significant correlation between levels of hope and level of HPV knowledge within (peer condition: $r=.12$, $p=.45$; fact condition: $r=-.04$, $p=.811$) or across groups ($r=.05$, $p=.62$). Scores on the HPV Knowledge Questionnaire were also not significantly correlated with levels of optimism within groups (peer condition: $r=-.01$, $p=.94$; fact condition: $r=.02$, $p=.92$) or across groups ($r=.005$, $p=.960$).

Scores of neuroticism for participants in the fact condition had a strong positive correlation with levels of stigma ($r=.440$, $p=.003$). However, scores of neuroticism for participants in the peer condition had a very weak negative correlation with levels of stigma ($r=-.095$, $p=.551$) (see Figure 2). As shown in Figure 2, for individuals high in neuroticism, there was less stigma associated with HPV if they learned facts from a peer source ($M=22.17$), instead of a medical source ($M=24.6$). In contrast, for those low in neuroticism, there was less stigma associated with HPV if they learned facts from a medical source ($M=20.96$) than from a peer source ($M=23.50$).

T-Test Analyses

In the peer condition, there was no statistically significant difference between male and female scores of optimism ($t=.16$, $p=.88$) and hopefulness ($t=.57$, $p=.57$). In the fact condition, however, males had significantly higher levels than females of hope ($t=-2.65$, $p=.011$) and optimism ($t=2.50$, $p=0.16$) (see Figure 1). Thus, levels of hope and optimism were lower for all females and for males in the peer condition than they were for males in the fact condition.

There was no statistically significant difference between scores on the HPV Knowledge Questionnaire for participants in each condition ($t=1.67$, $p=.098$). For the fact condition, the average number of questions answered correctly was 10.67 ($SD=1.69$), and for the peer condition the average number of questions answered correctly was 10.04 ($SD=1.83$). Thus, the framing of HPV knowledge had no effect on knowledge retention, and the hypothesis that peer framing would result in higher levels of HPV knowledge retention was not supported. There was also no difference in HPV knowledge scores by gender, either within (peer condition: $t=.28$, $p=.78$; fact condition: $t=.35$, $p=.73$) or across groups ($t=.52$, $p=.60$).

Discussion

The results of the study did not support the hypothesis that participants in the peer condition would have higher knowledge retention about HPV than participants in the fact condition. There are several possible explanations for this finding. The most likely explanation is that the means of measuring knowledge retention were flawed. Out of the thirteen questions on the HPV Knowledge Questionnaire, participants answered an average of ten questions correctly ($M=10.36$). There was very little variability in the number of questions answered correctly ($SD=1.78$) and the data was skewed very strongly to the left. Thus, it is unlikely that any effects

could be found with the HPV knowledge scores since participants in both conditions answered nearly all of the answered correctly.

There are several ways that this problem could be corrected for in a future study testing the same hypothesis. One way would be to provide more information about HPV, so that participants would be less likely to remember all of it. Another way would be to ask more questions so that participants would be less likely to answer all of the questions correctly. If the time and resources had been available for the present study, participants would have ideally completed the study in two parts. In the first visit to the laboratory, they would read the information about HPV. Participants would then return in one or two weeks to take the quiz on HPV facts. Including a week long time lapse rather than merely using a ten minute distracter task would likely serve as a better indicator of whether the information was retained. Another way to see whether participants were affected by the HPV information would be to ask questions to which the answers were not included in the initial information. This would potentially reveal whether participants sought out more information about HPV after having been exposed to it.

Another explanation for the results is that both conditions were effective in presenting the information, and that both methods of framing are equally effective. It could be that individuals prioritize both reliability (fact condition) and relevance (peer condition) in an informational source, and that each is equally effective. It is also possible that because of the advent of the Gardasil vaccine, or for other reasons, all of the participants began the study with a high baseline level of knowledge about HPV, and would have answered the questions correctly even without having been given the information about HPV.

The results of the study also failed to confirm the hypothesis that receiving information about HPV from a peer source would result in reduced levels of stigma for all participants in that

condition. There are several explanations for why this effect may have failed to emerge. The first is that the stigma measure was designed solely for this study, and was not validated against other measures. There is no evidence as to whether it actually measures stigma or not. It is also likely that the framing manipulation used was not strong enough to change deep seated attitudes and feelings. Thus, it would take more than reading a sheet of paper for one to decide that being diagnosed with an STD is not stigmatizing.

The third hypothesis in this study was that high levels of hope would be associated with higher levels of HPV knowledge across groups, and this hypothesis was also not confirmed. The most likely explanation is again that there was not enough variation in scores on the HPV Knowledge Questionnaire for any effects to be seen. In addition, it would be better to conduct a study investigating this hypothesis without first providing the HPV information. Thus, it would be more revealing to study baseline levels of HPV knowledge rather than levels of knowledge retention. Because the rate of questions answered correctly was so high in this study, it is unlikely that the scores reflected baseline knowledge levels at all. This hypothesis could be easily re-tested by simply giving participants a quiz about HPV knowledge and the Trait Hope Scale. In addition, because the Trait Hope Scale was given to the participants at the end of the study, it is likely that hope levels were influenced by the manipulations, and did not truly represent trait levels of hope. In a future study, the Trait Hope Scale should be taken before the quiz about HPV knowledge.

In addition to the null hypothesis findings, there were two main findings of the study. The first was that males in the fact condition experienced higher levels of hopefulness and optimism than did any other participants. This suggests that the way in which the HPV information was presented actually manipulated one's emotion, which was an unexpected result of the study. The

measures of hope and optimism were meant to be trait measures rather than state measures. One explanation for this effect is that the information in the fact condition was not salient enough to reduce men's levels of hope and optimism. It is possible that all participants started out with a high amount of hopefulness and optimism, and only males in the fact condition were resistant enough to the HPV information to maintain their original levels. Males in the peer condition, and females in all conditions, felt that the information was relevant enough that it at least temporarily made them feel a lower amount of positive affect. This suggests that the peer condition might be effective in educating men about HPV. Since the subject of the peer condition was a woman, males may be considering the effects that HPV could have on a female partner, which could result in a heightened awareness of HPV issues in an attempt to protect female partners.

Another finding of the study was that participants who were high in neuroticism (or general negative affect) and given the fact condition reported the highest levels of perceived stigma. This finding is easily explained, as individuals who are high in negative affect and given a condition with no reassurance would likely feel the highest levels of stigma. However, the individuals who reported the lowest levels of perceived stigma were participants in the fact condition that had low levels of neuroticism. This finding is unexpected and difficult to explain. It is counterintuitive that participants with higher levels of positive affect would feel more stigmatized about HPV when given the peer condition than when given the fact condition. The data would be more easily explainable if the fact condition resulted in lower levels of stigma for all individuals.

One explanation for why only those who were low in neuroticism were more negatively affected by the peer condition is based on research that has shown that individuals high in neuroticism are more likely to engage in risky health behaviors, and are more likely to view

themselves as susceptible to health risks (Vollrath et al., 1999). Perhaps, then, they are more concerned about stigma in general, and stigma is reduced in the condition when they hear about HPV from a peer (as opposed to cold, hard facts from an online source). In contrast, for those low in neuroticism, there was less stigma associated with the fact-based knowledge. Those low in neuroticism tend to have high empathy, so perhaps their judgments of stigma were more informed by how they presume the peer must feel.

The results of this study were largely inconclusive. While it is possible that the hypotheses were in fact wrong, it is more likely that the design and methodology of this study were flawed. A future study should re-test the hypotheses of this study, using better methodology as described above. Due to the flawed methodology, there is little benefit that can be taken from this study. One finding which could be extrapolated upon is that men are more likely to be emotionally affected by HPV knowledge if they learn about it from a peer source. It would be interesting to determine whether this effect would remain if the peer source were male, or if male participants are more concerned about the health of female partners (who are usually more negatively affected by HPV infections than males) than they would be about their own health.

With the advent of the Gardasil vaccine for women, HPV may quickly become much less common in women. However, its prevalence in males may not decrease as much. Therefore, it is important to continue educating both men and women about HPV and striving to decrease the stigma surrounding HPV. Thus, future studies on both the specific hypotheses explored in this study as well as on other means to reduce stigma and increase knowledge are still greatly needed and still remain highly relevant in today's society, and especially on college campuses.

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Appendix

Figure 1

Effect of Fact Condition on Levels of Optimism in Male Participants

Figure 2

Moderating Effect of Neuroticism on Stigma Levels in the Fact Condition