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How Much Knowledge Can They Gain? Women's Information Behavior on Government Health Websites in the Context of HIV/AIDS Prevention

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Introduction

In the United States, there was a marked increase from 1999 to 2003 in HIV/AIDS diagnoses among women (CDC, 2004). Among all adults and adolescents living with HIV/AIDS, the proportion of women grew from 14% in 1992 to 23% by the end of 2005 (CDC, 1998; CDC, 2007). In 2004, HIV/AIDS was the 5th and 6th leading cause of death among all women aged 35-44 and 25-34 years of age respectively (National Center for Injury Prevention and Control 2004).

According to Rimal and Real's (2003) Risk Perception Attitude framework, information seeking — which is often ignored in health education theories and models utilizing behavioral approaches — is an important form of preventive health behaviors. The authors suggest that individuals with perceived risk and efficacy beliefs would not only take measures to lower their risk, but also look for information that could help them become more knowledgeable about the disease. However, there is a gap between information seeking and knowledge gain in Rimal and Real's framework: information seeking does not necessarily lead to knowledge gain.

Although government health websites are ideal venues for women to look for HIV/AIDS prevention information, two problems may still exist judging from the literature. First, women may be unable or find it difficult to locate HIV/AIDS prevention information on government health websites because of poor information accessibility design. As a result, they may give up searching. Second, even if they succeed in finding the information, it may not resonate because of (1) the poor information format or quality; (2) the dissonance between their existing cognitions and the patriarchal ideologies on gender and sexuality that are socially constructed in the information they find; (3) their perceived irrelevance of the information they find to women's general situations or to their specific individual situations. As a result, they may choose not to accept the information they find (Case, 2002).

In the research on health-related information behavior, even research on women's HIV/AIDS-related information behavior (Bar-Ilan et al. 2006; Crawford & Hudson 2003; Feick, Herrmann, & Warland 1986; Johnson & Meischke 1991; Krauss et al. 1999; Nicholson, Grason, & Powe 2003), the focus has been primarily on information seeking. There have rarely been studies that specifically explore how women experience and utilize HIV/AIDS prevention information.

Therefore, this research examines women's information behavior on government health websites in the context of HIV/AIDS prevention. Through unpacking women's feelings and experiences in finding and reacting to the HIV/AIDS prevention information on government health websites, this research

aims at uncovering the intervening factors between information seeking and knowledge gain to fill the previously identified gap in Rimal and Real's (2003) Risk Perception Attitude framework. As a result of this effort, women could gain more knowledge from HIV/AIDS prevention information on government health websites, eventually reducing the pattern of HIV/AIDS growth recorded over the past 20 years.

Literature Review

Social Construction of Gender and Sexuality in the HIV/AIDS Discourse

According to Gupta (2000), who has extensively explored the determining role of power in gender and sexuality, gender as a social and cultural construct is focused on expectations and norms of appropriate male and female behaviors, characteristics, and roles that are shared within a society. Gender differentiates women from men, and defines the way they interact with each other. Sexuality is distinct from, yet intimately linked to gender. Sexuality is the social construction of a biological drive, including with whom to have sex, in what ways, why, under what circumstances, and with what outcomes. Sexuality is influenced by both explicit and implicit rules that are imposed by the social definition of gender, age, economic status, ethnicity, etc. (Dixon-Mueller, 1993; Zeidenstein & Moore, 1996).

Gupta (2000) argues that power is fundamental to both gender and sexuality. The unequal power balance in gender relations that favors men translates into an unequal power balance in heterosexual interactions. Male pleasure supersedes female pleasure, and men have greater control than women over "when, how, and with whom sex takes place" (p. 2). Therefore, gender and sexuality must be understood as constructed by a complex interplay of social, cultural, and economic forces that determine the distribution of power. When it comes to HIV/AIDS, the imbalanced power between women and men in gender relations curtails women's sexual autonomy and expands male sexual freedom, thereby increasing both genders' risks and vulnerabilities to this disease (Heise & Elias, 1995; Weiss & Gupta, 1998).

Using a feminist approach to theorize gender and sexuality, Gupta (2000) categorized HIV/AIDS programs based on the degree to which the historical power dynamics in gender and sexuality was maintained. The five categories (Table 1) range from the most damaging ("stereotypical") to the most beneficial ("empowering") in a continuum (Figure 1).

Table 1. Categories of Social Construction of Gender and Sexuality in HIV/AIDS Programs (Gupta, 2000)

Category	Description
Stereotypical	The damaging stereotypes of women and men are reinforced.
Neutral	The target is the general population instead of either gender or sex. Despite no harm done and “better than nothing” (p.5), the different needs of women and men are ignored.
Sensitive	The different needs and constraints of individuals based on their gender and sexuality are recognized and responded to, but little is provided on how to change the old paradigm of imbalanced gender power.
Transformative	The aim is to transform the imbalanced gender relations within the current system and make them equitable. The major focus is on the redefinition of gender roles at the personal, relationship, community, and societal level.
Empowering	The central idea is to “seek to empower women or free women and men from the impact of destructive gender and sexual norms” (p. 6).

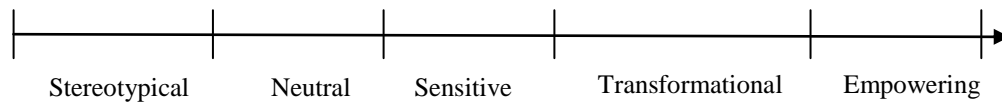


Figure 1. Continuum of Social Construction of Gender and Sexuality in HIV/AIDS Programs (Gupta, 2000)

Chong and Kvasny (2007) demonstrated that Gupta’s (2000) framework can be used as a lens to examine and unpack how gender and sexuality are

socially constructed in the HIV/AIDS discourse, how HIV/AIDS gains its social meanings at the intersection of the discourse about gender and sexuality, and to what degree women are empowered.

Health-related Information Behavior

The research focus of information behavior in the health context has been largely on information-seeking behavior. Except for a few studies on the comprehensive process of information seeking (Johnson & Meischke, 1993), most of the research in health-related information behavior focuses on isolated stages in the information-seeking process as identified by Wilson (1996), including context of information need and intervening variables. From the literature reviewed in the following sub-sections, it can be seen that there is little research specifically dedicated to women's information behavior on government health websites in the context of HIV/AIDS prevention. As a result, HIV/AIDS prevention information on government health websites may fail to reach women, let alone have substantial educational effects on them.

Abundant studies on the context of information need have been conducted concerning diseases such as cancer (Andrews et al., 2005; Degner et al., 1997; Graydon et al., 1997; Johnson & Meischke, 1991; Kendall, Thompson, & Couldridge, 2004; Pinquart & Duberstein, 2004; Rozmovits & Ziebland, 2004; Rutten et al., 2005; Vries et al., 2005) and asthma (Raynor et al., 2004). Crawford and Hudson (2003) conducted a survey of females with epilepsy in the UK to identify their information needs. Bar-Ilan, Shalom, Shoham, Baruchson-Arbib and Getz (2006) investigated women's different information needs in the various phases of their long-term efforts to maintain weight. Focusing on HIV/AIDS, Kalichman and Belcher (1997) developed "a structure of AIDS knowledge" (p. 281) to identify HIV/AIDS information needs based on topics of questions received by two local AIDS information hotlines that were supposed to satisfy HIV/AIDS information needs of the public (Kalichman, 1996).

Borgers et al. (1993) and Cameron et al. (1994) identified obstacles that inhibited patients' successful information seeking from the doctor. Phillips and Zorn (1994) found that consumers of health information had a problem with accessing the information. Feick et al. (1986) examined how women used different sources of nutrition information. Johnson and Meischke (1991) looked at frequency of women using different channels of cancer information. Nicholson et al. (2003) found a huge disparity concerning the use of health information resources among adult women of different races after adjusting other demographic characteristics. Sources of HIV/AIDS information have been explored that were used by the female partner of male intravenous drug users (Krauss et al., 1999), Asian-Indian adolescents born in the U.S. whose parents

emigrated from India (Bhattacharya, Cleland, & Holland, 2000), high school students (Buseh et al., 2002; Ndlovu & Sihlangu, 1992), young men (Bradner, Ku, & Lindberg, 2000), etc.

Theoretical Framework for the Study

In the Risk Perception Attitude (RPA) framework, Rimal and Real (2003) hypothesized that “the effect of perceived risk on people’s self-protective motivations and behaviors will be moderated by their efficacy beliefs” (p. 372). Based on the level of risk perception and efficacy beliefs, they categorized individuals into one of the four groups characterized by different attitudinal effect. First, those with a high level of both risk perception and efficacy beliefs belong to the group with *responsive* attitude. They are expected to be most motivated to adopt the preventive health behaviors. Second, those with a high level of risk perception but a low level of efficacy beliefs belong to the group with the *avoidance* attitude. Since they tend to experience a conflict in motivation, they are expected to be less motivated than the group with *responsive* attitude to adopt the preventive health behaviors. Third, those with a low level of risk perception but a high level of efficacy beliefs belong to the group with *proactive* attitude. They are expected to be more motivated to adopt the preventive health behaviors by their desire to stay healthy than by their risk perception. Fourth, those with a low level of both risk perception and efficacy beliefs belong to the group with *indifference* attitude. They are expected to be least motivated to adopt preventive health behaviors compared with individuals in the other three groups. In testing these predictions, Rimal and Real (2003) found that preventive health behaviors were indeed predicted by both risk perception and efficacy beliefs.

Additionally, Rimal and Real (2003) emphasized a form of preventive health behaviors that had been generally overlooked. They argued that individuals’ intentions or actual measures to seek information and have knowledge about a disease, especially about how to effectively prevent it, were as important as the specific preventive activities that they were engaged in.

However, in the context of HIV/AIDS prevention, although *responsive* and *proactive* women are more motivated to adopt preventive health behaviors and initiate information seeking on government health websites, information seeking may not necessarily lead to an increase in their knowledge about HIV/AIDS prevention because of the possible problems with information accessibility, format, and quality. Therefore, in building the theoretical framework of this research (Figure 2), I added “Information Finding” and “Reaction to Information” to the Risk Perception Attitude framework as two factors that intervene between information seeking and knowledge gain.

Research Questions

Based on the theoretical framework, the overarching question that informs this research is:

What are the intervening factors between information seeking and knowledge gain when women look for HIV/AIDS prevention information on government health websites?

The two lower-level research questions that need to be addressed in order to answer the overarching research question are:

RQ1: What factors influence women finding HIV/AIDS prevention information on government health websites?

Specifically, this research question aims to find out how website design in information accessibility could influence women's information finding.

RQ2: What factors influence women's reactions to the HIV/AIDS prevention information they find on government health websites?

Specifically, this research question aims to find out (1) how website design in information format and quality could influence women's reactions; (2) how the way the website socially constructs gender and sexuality in the information women find could influence their reactions; (3) how women's perceived relevance in the information they find as a result of the public health communication strategies adopted by the website could influence their reactions.

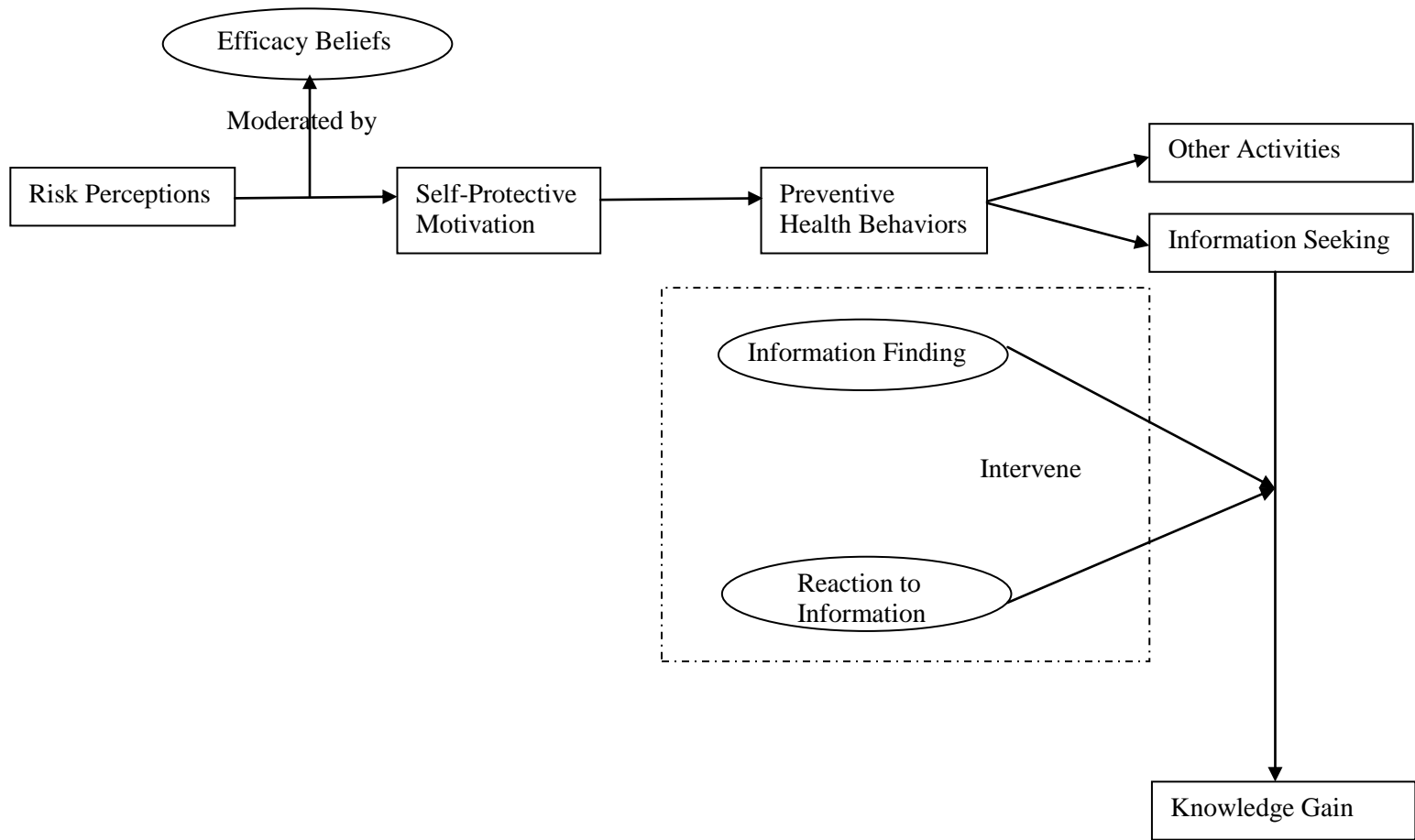


Figure 2. Theoretical Framework for the Study

Research Methodology

Data Collection

Fallows (2005) found that women between the ages of 18 and 29 who had a college degree or higher were more likely to go online in general. Valleroy, MacKellar, Karon, Janssen, and Hayman (1998) found that young women were more at risk for HIV/AIDS. Therefore, the target population for recruitment in this empirical study was female university students at least 18 years of age, since HIV/AIDS prevention education on government health websites was more relevant to them. Forty female student volunteers on the main campus of a northeastern university in the U.S. were recruited as participants. For the pilot study, four female participants were recruited from my female friends via email through convenience and judgment sampling. For the full study, thirty-six female participants were recruited. Twenty-one of them were recruited through judgment sampling from students enrolled in three courses and two student organizations related to HIV/AIDS prevention or women's health, as well as from graduate students enrolled in the graduate student organization. Fifteen female participants for the full study were recruited through snowball sampling. I asked the female participants already recruited to identify their female acquaintances who might also be interested in participating into this study, especially those who were minorities.

In this empirical study, I used think-aloud and structured individual interview techniques to collect data from two tasks. In the first task, I asked the female participants to look for HIV/AIDS prevention information targeted to women on the two U.S. government health websites I selected, starting from the homepage. They were instructed to search in any way they wanted or felt comfortable with, and use any available tools they found necessary. I also asked them to simultaneously explain their thought processes, especially their comments on the information seeking process and the information they found. This task was intended to find out participants' information finding strategies in order to answer *RQ1*, and their reactions to the information they found in order to answer *RQ2*.

The current study focuses on information on government health websites because they are regarded as one of the most trusted sources of health information online (Dutta-Bergman, 2003). The two U.S. government health websites I selected were CDC (Center for Disease Control and Prevention) HIV/AIDS (<http://www.cdc.gov/hiv/>) (Figure 3) and womenshealth.gov (<http://womenshealth.gov/>) (Figure 4). I selected these two websites because they were among the rare U.S. government health websites that were not portals, websites providing a large collection of links leading to other government non-government websites (e.g. AIDSinfo: <http://www.aidsinfo.nih.gov/>). Portals were

excluded from the websites analyzed in order to minimize possible distractions or redirections to non-government websites. These two websites had different foci: CDC HIV/AIDS was more focused on HIV/AIDS, while womenshealth.gov was more generally focused on women's wellness. Both of them, nevertheless, had a dedicated section of information on women and HIV/AIDS. This feature would help make sure the female participants could find the relevant information.

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Early HIV testing took top billing among a variety of awareness initiatives in Arkansas on World AIDS Day. The state has experienced more HIV infections than the official count of 5,630, said Kevin Dedner, the Arkansas Department of Health's section
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Figure 3. Screenshot of CDC HIV/AIDS homepage (February 12, 2008)

Source: <http://www.cdc.gov/hiv/>



womenshealth.gov
The Federal Government Source for Women's Health Information

www.hhs.gov **OPHS**

The National Women's Health Information Center
U.S. Department of Health and Human Services
Office on Women's Health 

1-800-994-9662 TDD: 1-888-220-5446

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[November: Lung Cancer Awareness Month](#)

Health Disparities Profiles
[Examine Key Health Indicators for Different Populations](#)

Figure 4. Screenshot of womenshealth.gov homepage (February 12, 2008)

Source: <http://womenshealth.gov/>

I adopted three strategies to ensure the quality and completion of the data I collected using think aloud. First, I reminded the female participants to think aloud when they failed to do so, whether due to forgetting or reluctance to talk, possible cognitive overload, not being used to or comfortable with talking out their thoughts in front of others, or not being able to express their intuitive thoughts (Birru et al., 2004; Ericsson & Simon, 1993; Kari & Savolainen, 2007; Tombros, Ruthven, & Jose, 2005; Warren, 2006). For example, when I noticed a female participant had been browsing the Web silently without thinking aloud for a while, I asked her, "Could you talk aloud about what you are thinking?" Second, I reminded the female participants of what type of thought processes they might share aloud when they failed to do so. For example, when I realized a female participant was simply summarizing the information she was reading while thinking aloud, I asked her, "Could you share your opinions of the information?" Third, I used concurrent probing to supplement think aloud (Tombros, Ruthven, & Jose, 2005). For example, when I heard a female participant criticizing the information without giving reasons in her thinking aloud, I asked her, "Could you talk about what made you think so?" Nevertheless, I tried to use as little concurrent probing as possible to make the female participants less distracted by forced task switching and to minimize the excessive cognitive load on them.

In the second task, I asked the female participants to answer two interview questions. First, I asked them whether they preferred that HIV/AIDS prevention information targeted to women on government health websites focused on the behavioral factors or the contextual factors contributing to women's vulnerability to HIV/AIDS, or both. Second, I asked the female participants to suggest anything else that was important, but not addressed in the HIV/AIDS prevention information targeted to women they found on the two U.S. government health websites. The interview was intended to collect the female participants' general reactions to the HIV/AIDS prevention information targeted to women on the two U.S. government health websites from the perspective of the factors contributing to women's vulnerability to HIV/AIDS. Thus, the data collected in the information-seeking task that were used to address *RQ2* could be enriched and triangulated.

The task sheet and demographic information form I used to collect data are attached in Appendix A.

Data Analysis

Because of the nature of qualitative data, the guiding principle for my data coding was data reduction based on meaningful data sorting and categorization (Denzin & Lincoln, 2003; Miles, 1979). Data reduction allows data to be reformatted into a story or picture that could facilitate drawing conclusions regarding the research problem (Branch, 2000; Huberman & Miles, 1998; Luke,

2000; Mushi, 2004; Taylor, 2001). In order to reduce data, I manually coded them in five phases both deductively by imposing *a priori* codes to the data, and inductively by refining the *a priori* codes based on the themes that emerged from the data (Lincoln & Guba, 1985; Miller & Crabtree, 1999; Mushi, 2004; Strauss & Corbin, 1998; Warren, 2006).

First, I developed a preliminary coding schema based on the research questions.

Second, during repeated line-by-line close reading and analysis of the transcripts (Denzin & Lincoln, 1994; Kendall, Thompson, & Couldridge, 2004), I identified and highlighted relevant information units (Feltwell & Rees, 2004; Mushi, 2004; Strauss & Corbin, 1998; Strauss & Corbin, 1990) — “the smallest amount of information that is informative by itself,” (Feltwell & Rees, 2004; Vaughn, Schumm, & Sinagub, 1996, p. 106) such as words, phrases, sentences, and paragraphs (Lincoln & Guba 1985; Warren 2006). At the same time, I labeled the information units identified to map to the two higher-level codes in the literature-driven coding schema, i.e. “information finding” and “reaction to information”.

Third, for the convenience of summarizing research findings, I copied the labeled information units in the transcripts and pasted them into a new table, clustering those with the same higher-level codes while maintaining participant identification codes. I abstracted the information units whenever I saw necessary and replaced the original texts with the abstracts.

Fourth, I micro-analyzed each information unit or its abstract in the new table and labeled it again to map to the lower-level codes in the literature-driven coding schema. For information units that I could not map to any of the lower-level codes in the literature-driven coding schema, I assigned either *in vivo* or *in vitro* new codes to them based on their themes. *In vivo* codes are category labels that are the exact terms drawn from the information units (Denzin & Lincoln, 2003; Mushi, 2004; Strauss & Corbin, 1990; Strauss & Corbin 1998). *In vivo* codes are best at maintaining the authenticity of the original data (Warren, 2006). *In vitro* codes are category labels that are either paraphrased actual terms drawn from the information units or terms imposed from outside of the information units (Baptiste, 2001; Mushi, 2004). I made decisions on the generation of *in vitro* codes based on the literature as well as my related knowledge and research experience.

I added the new lower-level codes into the literature-driven coding schema under the corresponding higher-level codes. I modified the new codes throughout the process of data analysis by constantly and iteratively comparing the literature-driven lower-level codes with the new lower-level codes, as well as by re-examining the information units (Lincoln & Guba, 1985; Miles & Hubermann, 1994; Warren, 2006). In this way, the initial literature-driven coding schema was

“dynamically extended as new concepts and categories not part of the initial schema emerged” (Joshi & Kuhn, 2007, p. 408), and “developed and refined as the research goes along” (Cohen, Manion, & Morrison, 2002; Denzin & Lincoln, 2003, p. 276; Fielding, 2001; Hummelinck & Pollock, 2006; Strauss, 2003).

Table 2 is the final version of the refined coding schema together with the definition of the new codes (highlighted in *italic*). The codes in the literature-driven coding schema that were not eventually used have been deleted from this table.

Table 2. Literature- and Data-driven Coding Schema

<i>Higher-level code: Information Finding</i>	
Lower-level code	Definition
Information Accessibility	
<ul style="list-style-type: none"> • <i>Visibility of Links</i> 	How visible links are or how easily links can be noticed on the Web page (Sutherland et al., 2005).
<ul style="list-style-type: none"> • <i>Retrievability of Links</i> 	How easily links can be retrieved through the local search function or application of a website (Sutherland et al., 2005; Wang & Strong, 1996), where keywords entered directly lead to the needed information within the website (Huizingh, 2000).
<ul style="list-style-type: none"> • <i>Duplication of Links</i> 	How many different locations on a website where links leading to the same information are placed (Pollach, 2003).
<ul style="list-style-type: none"> • <i>Depth of Links</i> 	How many links have to be followed on a website before the needed information can be found (Huh & Cude, 2004; Moore & Newton, 1998)
<ul style="list-style-type: none"> • <i>Name of Links</i> 	How well named or textually indicated links are.

<i>Higher-level code: Reaction to Information</i>	
Lower-level code	Definition
Information Format	
<ul style="list-style-type: none"> • <i>Language</i> 	How many languages the information is presented in.
<ul style="list-style-type: none"> • Interactivity 	
<ul style="list-style-type: none"> • Media Use 	
<ul style="list-style-type: none"> • Aesthetics 	
<i>Information Content</i>	The textual, visual, and aural messages contained and communicated on the Web (Brashers, Goldsmith, & Hsieh, 2002; Salinas, 2006), including “documents, data, applications, e-services, images, audio and video files...and more” (Rosenfeld & Morville, 2002, p. 219).
<ul style="list-style-type: none"> • Information Quality 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ○ Accuracy 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ○ Coverage 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ○ Arrangement/Organization 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ○ <i>Informability</i> 	How new the information is perceived.
<ul style="list-style-type: none"> • Social Construction 	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ○ <i>Availability of alternative strategies</i> 	Whether multiple options for HIV/AIDS prevention are provided to women in the information.
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ○ <i>Availability of how to do</i> 	Whether advice on how to overcome the barriers in HIV/AIDS prevention is provided to women in the information.

<ul style="list-style-type: none"> ○ <i>Availability of local services</i> 	Whether information on local services is provided to women who need help with HIV/AIDS prevention.
<ul style="list-style-type: none"> ○ <i>Visibility of men</i> 	Whether men's responsibilities in women's efforts to prevent HIV/AIDS are made salient in the information.
<ul style="list-style-type: none"> ○ <i>Consistency with reality</i> 	How real women's situations described in the information are.
<ul style="list-style-type: none"> ● Perceived Relevance 	
<ul style="list-style-type: none"> ○ <i>Importance for women to know</i> 	How important the information is for women to know.
<ul style="list-style-type: none"> ○ <i>Degree of being scary</i> 	How scary the information is for women.
<ul style="list-style-type: none"> ○ <i>Consistency with the cultural values</i> 	How consistent with women's cultural values the information is.
<ul style="list-style-type: none"> ○ <i>To women as a group</i> 	Whether the information is specifically designed for women as a group.
<ul style="list-style-type: none"> ○ <i>To women as individuals</i> 	Whether the information is specifically designed for women as individuals.

Lastly, for the convenience of summarizing research findings, for information units labeled with the lower-level code of "information content" in the new table, I further labeled them to map to the list of topics and sub-topics of the HIV/AIDS prevention information targeted to women on CDC HIV/AIDS and womenshealth.gov (Table 3). These topics and sub-topics were the original or paraphrased terms used on these two websites.

Table 3. Topics and Sub-topics of HIV/AIDS Prevention Information Targeted to Women

Topic	Sub-topic
Epidemiological Facts	(None)
Transmission	<ul style="list-style-type: none"> • How HIV is and is not spread • Share your story
Prevention Strategies	<ul style="list-style-type: none"> • ABC (“Abstinence, Be faithful, Condom”) • Safer sex • Male and female condoms • Talking with the male partner • Things to avoid • Injection drug use • Myths • Overall
Gender-Specific Problems	<ul style="list-style-type: none"> • Poverty/low income • Caregivers • Lack of education • Lack of control in relationships • African American women • Biological differences • Overall
Overall	n/a

Findings and Discussion

The findings of this research unpacked both the positive and negative aspects of the design of the two selected government health websites. Particularly noteworthy were the facts that the female participants sometimes felt it difficult to find the HIV/AIDS prevention information on government health websites, and they often reacted negatively to the information they found. As a result, as their comments suggested, they might give up searching or reading the information.

Risk Perception Attitude Framework

The influencing factors identified in this empirical study indicate the potential impacts information finding and reaction to information could have on the amount of knowledge women could eventually gain from seeking HIV/AIDS prevention information on government health websites. Some of the female participants' comments implied their tendency to give up searching or reading any further if they had difficulties finding the information or were not satisfied with the information they found. Examples of such comments can be found in Appendix B. According to Festinger's (1957) theory of cognitive dissonance, since women as information users have no control over the website design and thus cannot make any changes to the information in their desired directions, they tend to refuse to let the information to which they have negative reactions even enter their existing cognitive systems, let alone to incorporate such information into their knowledge base.

The findings of this empirical study are contrary to the implicit assumption of Rimal and Real's (2003) Risk Perception Attitude framework that information seeking as a form of preventive health behaviors leads to knowledge gain. Because of the possible problems with information accessibility, information format and quality, social construction, and perceived relevance, even if *responsive* and *proactive* women are motivated to adopt preventive behaviors and initiate information seeking on government health websites upon perceiving their risks for HIV/AIDS with beliefs in their ability to prevent this disease, they may still fail to reach their initial goal (i.e., to enrich their knowledge base on HIV/AIDS prevention and thus be better equipped to fight against HIV/AIDS).

Therefore, through uncovering the intervening factors between information seeking and knowledge gain, an extended Risk Perception Attitude framework (Figure 5) constructed based on the research findings of this empirical study would better represent the fact that information seeking may not necessarily lead to knowledge gain. This extended framework would thus be more useful in guiding public education of women on HIV/AIDS prevention. The following subsections present further explanations of the new constructs in this framework.

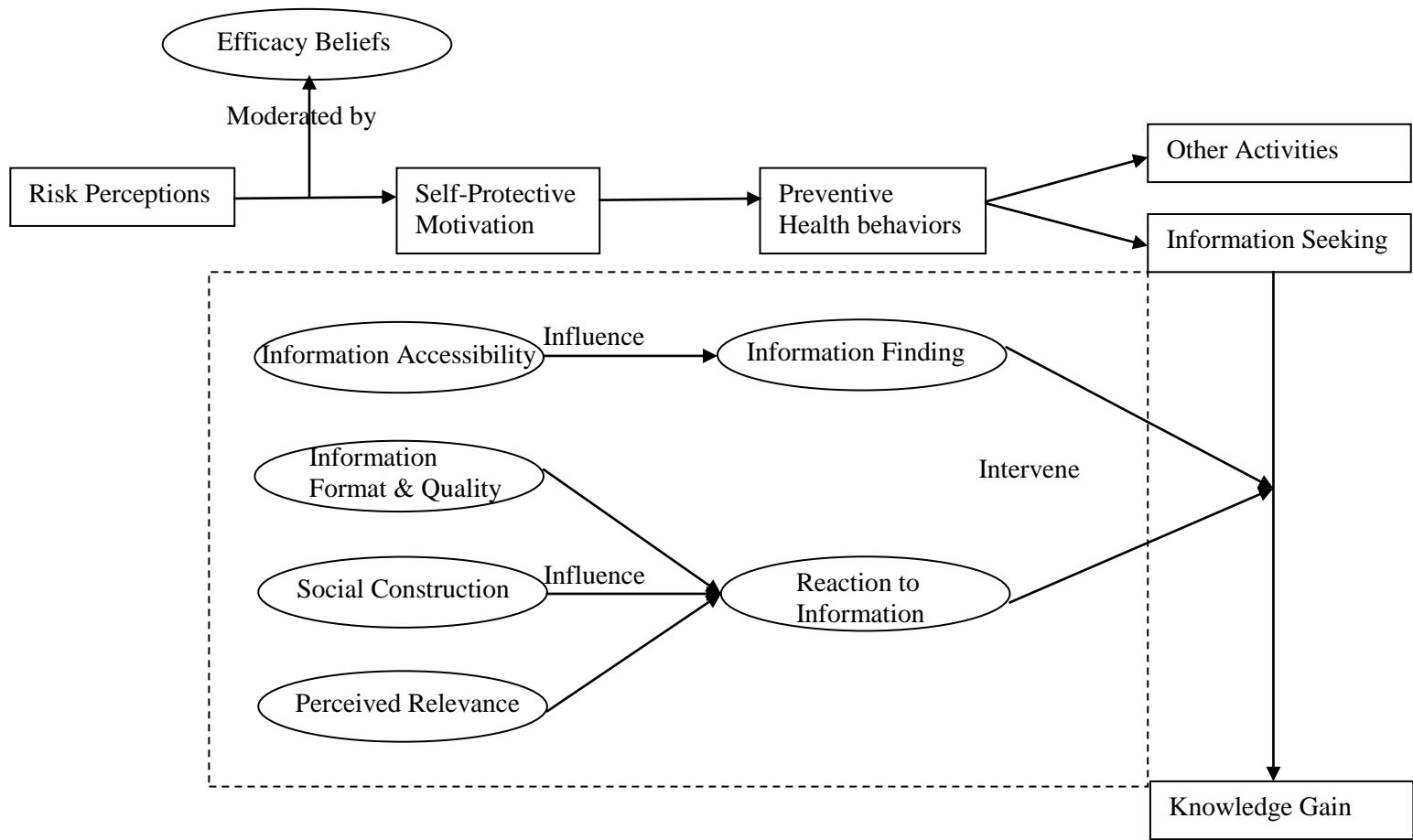


Figure 5. *Extended Risk Perception Attitude Framework*

Information Finding

It was found for both of the selected websites that women may not be able to find the HIV/AIDS prevention information available to them on government health websites because of the poor design in information accessibility. First, the relevant links that are placed on the side of the Web page may not be perceived as visible or noticeable enough. Second, the search function of the website may not always be effective. The number of search results on one page could be overwhelming. Sometimes, no results matched the queries entered into the search box. The link in the search results suggested by the website as the “best” match may not lead to the information that it is supposed to lead to. In addition, links of news articles as an informal source of information may be listed at the top of the search result page. Third, the relevant links may be placed at only one location of the whole website, thus could be easily missed and would not be encountered again. Fourth, the relevant links may not be placed on or near to the homepage of the website, but multiple clicks away. Fifth, the name of the relevant links may not appropriately represent the actual topic of the information content they lead to. As a result of the confusing names, the truly relevant links may not be identified as such, and the links wrongly identified as relevant may be followed.

The interactive nature of the Web has changed information users’ role from passive receivers of whatever is pushed to them to active seekers who pull whatever they think is useful. However, because of social construction and the resulting ideological reproduction on the Web (Aarseth, 1997; Brock, 2005; Hall, 1982; Hall et al., 1978; Kvasny, 2002; Lamb & Poster, 2003; Miller & Slater, 2000; Nakamura, 2002; Salinas, 2006), what women are more likely to pull is still greatly influenced by the location, structure, and availability of links, and thus is limited by the number of searching routes predetermined by Web designers (Huizingh, 2000; Moore & Newton, 1998; Pollach, 2003; Vigilante & Wogalter, 2001). For example, retrievability of links through the search function of a website is determined by the design of the search engine it uses. Such design aspects include searching, indexing, and ranking algorithms based on which queries are matched with relevant documents stored and indexed in the system, as well as on how the relevant documents are output in a certain order (Lawrence & Giles, 1999).

Nevertheless, website designers should not be held solely responsible for the potential obstacles to information accessibility. According to Sklar (2003), online information users are usually impatient. They are oriented towards their specific information seeking goals and always try to find exactly what they need with as little time or effort as possible (Marchionini, 1995). As a result, they might think of the needed information as “unavailable” on a website if they cannot find it after quickly browsing a Web page, even if the user neglects to

scroll up and down, views only a few documents retrieved by the search engine, or checks out just the first page of the search results (Jansen & Spink, 2003; Sklar, 2003).

Reaction to Information

Information format and quality.

Poor information format could result in women's negative reactions. First, there could be no or limited information available in languages other than English. Second, interactive tools such as forums, chat sections, or quizzes may not be incorporated into the website interface. Third, media such as images and audio/video clips may not be adequately or effectively applied in the website design. Fourth, the Web page may not appear attractive or interesting, thus may not be aesthetically appealing. In addition, the Web page could be hard to read because the texts are too long to fit into one screen, the font size is too small to be recognized, or there is too much information.

Poor information quality could also result in women's negative reactions. First, the information may not be perceived to be accurate because the terms used are perceived to be ambiguous or unspecific, or because it is contradictory with what is actually emphasized on the website. Second, the information may not be perceived to be covered in adequate depth or breadth. Third, information of different nature could be perceived to be inappropriately mixed together, thus in need of reorganization. Fourth, the information may not be perceived to be informing, but rather common sense or well-known facts.

Perceived relevance.

Failure to perceive relevance is yet another source of women's negative reactions. First, information that explains the socioeconomic reasons for women's vulnerability to HIV/AIDS may be perceived meaningless by those actually living in disadvantageous socioeconomic situations. These women can do little to change their current status, and thus do not perceive such information to be directly important to HIV/AIDS prevention *per se* but more relevant to researchers. Second, scare tactics may not be wisely applied in the information. There may be a lack of balance maintained between assisting women who are at risk for HIV/AIDS understand the relevance of the information, and avoiding leading them to feel too scared to even want to read such information. Third, the information may be perceived to be contradictory with certain values in both the mainstream and the minority culture. Such values include freedom in sex in the contemporary Western culture, no use of birth control in the Latino culture, etc. Fourth, the information may not be perceived to be relevant to women as a group.

Fifth, the information may not be perceived to be relevant to women as individuals if it is not tailored to the particular situation of every woman.

Social construction of gender and sexuality in HIV/AIDS discourse.

Social construction that results in biased representations of gender and sexuality in discourse is another source of women's negative reactions. First, the information may not be perceived to be practical or realistic if it lacks respect for women's different lifestyle choices and fails to provide alternative options for women to select from to keep them safe. Second, the information could be perceived to be meaningless if it fails to provide specific tips, skills, or advice on how women could overcome the social barriers to their HIV/AIDS prevention. Third, the information may fail to mention the availability of local services where women could get help with HIV/AIDS prevention. Such local services or resources could either be specifically on HIV/AIDS prevention, or be generally on women's welfare that could facilitate their help-seeking activities. Fourth, men could be largely ignored as an important party that should also be involved in protecting women's health. Fifth, the information may not be perceived to be describing reality. Not all women are in a particular disadvantageous social situation, and disadvantageous social situations may not necessarily put them at greater risks for HIV/AIDS.

According to Gupta's (2000) framework, the identified factors that influence reaction to information in the category of social construction exemplify the stereotypical or disempowering construction of gender and sexuality in HIV/AIDS discourse.

First, the information concerning "prevention strategies" and "gender-specific problems" reproduces the stereotypical feminine ideals such as purity, faithfulness, and submission to males' dominance. For example, abstinence and "being faithful" — two of the most frequently stressed prevention strategies on government health websites — are forced on women, instead of being provided to them simply as two options available. Although some women may think abstinence and faithfulness are good choices, others may not think so or find it hard to do so. Thus, all women may not practice abstinence and faithfulness, especially those who are not hesitant to express their sexuality. In addition, not all women lack control in relationships, submit to males' dominance, or cannot say no to sex. According to Foucault (1972), women are not uniformly powerless victims and subordinated by the patriarchal power. Rather, unequal power relations provide a space for enacting agency. No power relations exist where there is no resistance. Despite the many structural inequalities such as poverty, racism, and sexism faced by women, they make reasonable choices in the context of facing these circumstances.

The information concerning “gender-specific problems” also reproduces the stereotypical female role as caregivers, where women are supposed to subordinate their needs to those for whom they care, i.e. men and children (Charlesworth, 2003). Not all women have children or are caregivers. Even for those who do have children and are indeed caregivers, they are already caring about their own health when they are looking for HIV/AIDS prevention information for themselves.

In addition, the information concerning “gender-specific problems” reproduces the stereotypical social-economic status of women, such as low income, poverty, unemployment, and lack of education. As a matter of fact, not all women are or would admit they are in such disadvantageous situations.

Second, the information concerning “prevention strategies” and “gender-specific problems” is not empowering. For example, it tells women the societal reasons for their increased HIV/AIDS infections, without telling them specifically how to overcome these social barriers to their HIV/AIDS prevention either as individuals or as a society. It represents the female condom as a magic instrument that is under the full control of women for HIV/AIDS prevention and can liberate them from relying on men to use condoms. However, it fails to tell women how to increase their power in sexual relationships and overcome gender inequalities so that they are able to use the female condom willingly and take their sexuality into their own hands.

In addition, such information strongly advocates to women the idea of being faithful without telling them what to do if their only male partner is not faithful or already has HIV/AIDS. It recognizes the great dependency of women’s capabilities to stay safe on the behaviors of their male partner. However, it fails to speak to men regarding their responsibilities in women’s HIV/AIDS prevention. It also fails to involve men into this effort to make women feel more comfortable talking to men about safer sex. In all, men are largely absent actors.

Furthermore, such information urges women to talk to their male partner about safer sex. However, it fails to provide women with the skills to talk and “obtain their partner’s cooperation through effective communication and persuasion” (Gil, 1998, p. 14), especially when they are in a man-dominated sexual relationship. It tells women the biological factors contributing to their vulnerability to HIV/AIDS, but fails to realize that biological factors are unavoidable and unchangeable. As a result, it could be more useful and important to researchers than to women looking for HIV/AIDS prevention information.

Thus, in agreement with Rosser’s (2005) criticism of cyberfeminism, the ideologies surrounding gender and sexuality are still reproduced in the HIV/AIDS prevention information on government health websites, and constructions of gender and sexuality present in that information are neither transformational or empowering. Such construction decontextualizes women’s cultural, interpersonal

and sexual experiences with men (Amaro, 1995; Patton, 1994; Raheim, 1996). Consequently, the information fails to provide realistic, feasible, and culturally relevant prevention strategies to women that could help them overcome social constraints of HIV/AIDS prevention (Raheim, 1996). More importantly, although the information recognizes women's responsibility in reducing their risks for HIV/AIDS and protecting themselves from its infections, it provides them with little advice or resource on the societal changes that could transform the old paradigm of the imbalanced gender power and afford women the power necessary to take on these responsibilities (Charlesworth, 2003; Chong & Kvasny, 2007; Gupta, 2000). As a result, women reading the information might experience "feelings of powerlessness instead of a sense of self-efficacy and personal responsibility for their own health" (Raheim, 1996, p. 406). If patriarchal ideologies continue to influence such rhetorically powerful discourse as that produced by the government, the HIV/AIDS prevention information on government health websites would be limited in accomplishing the goal of reducing HIV/AIDS infections among women (Charlesworth, 2003; Chong & Kvasny, 2007).

Conclusions

To my knowledge, this is the first study that examines women's information behavior on government health websites in the context of HIV/AIDS prevention. This research represents the relationships among information, technology, and people. This research makes contributions to three research communities.

First, in the area of public health education, this research challenges and fills the gap of Rimal and Real's (2003) Risk Perception Attitude framework through unpacking how information seeking as a preventative health behavior may not necessarily lead to an increase in knowledge gain about a disease as a result of the influencing factors of information finding and reaction to information. This research improves this framework by proposing the Extended Risk Perception Attitude framework.

Second, in the area of gender studies, this research exemplifies Gupta's (2000) categories of social construction of gender and sexuality in the HIV/AIDS discourse. This research also adds new evidence that proves the validity of this framework based on insiders' views from average women who actually interact with the HIV/AIDS discourse both behaviorally and emotionally, instead of outsiders' views from researchers who usually simply critique such discourse with disinterest.

Third, in the area of information behavior, this research enriches the literature in health-related information behavior, especially information behavior

related to women's health and HIV/AIDS, through switching the traditional research focus on information seeking alone to the information behavior thereafter, particularly information finding and reaction to information.

Although significant, this research is still limited in terms of the empirical study design. For example, the female participants of this empirical study performed the information-seeking task in an artificial, controlled setting, instead of the natural environment that they would normally have in their daily life (Denzin & Lincoln, 2003; Eysenbach & Köhler, 2002; Kari, 2004). In addition, although female university students could well represent the general female population online (Sandvig & Bajwa, 2004), there are demographic limitations with the profiles of the female participants in this empirical study. In other words, the female participants were still not diverse enough. They were all university students and largely similar in age, socio-economic status, computer skills, and education level. As a result, there were education, class, and identity biases in their comments.

This research opens up new lines of scholarly inquiry and critique. For example, studies with different groups of female online users, different genres of websites, different versions of a website over time, and/or the emerging Web 2.0 applications could be conducted to gain a more comprehensive understanding of women's information behavior online in the context of HIV/AIDS prevention (Yang & Chan, 2008). In addition, website evaluation tools on the accessibility, format and content of HIV/AIDS prevention information could be developed based on the influencing factors of information finding and reaction to information that were identified in this empirical study. Furthermore, future studies could try to test the theoretical propositions implied in the extended Risk Perception Attitude framework with regard to the relationship between reaction to information and knowledge gain.

Appendix A. Task Sheet and Demographic Information Form

1. Please look for HIV/AIDS prevention information targeted to women on the two U.S. government health websites I have selected starting from the homepage. You can search in any way you want or feel comfortable with, and use any available tools you find necessary. Please stay within these two websites without clicking on links leading outside of them. Please keep thinking aloud in the meantime everything that occurs in your mind, especially your comments on the information seeking process and the information you find (*Note: here HIV/AIDS prevention information addresses women who are, or who believe they are HIV negative, instead of women who are already infected with HIV/AIDS and try not to contract opportunistic diseases or transmit the virus to others*).

2. Please answer two interview questions.

3. Please fill out the demographic information about yourself.

Race/Ethnicity

Age

<input type="checkbox"/> White or Caucasian (Not Hispanic/Latina)	<input type="checkbox"/> <18
<input type="checkbox"/> Black or African-American (Not Hispanic/Latina)	<input type="checkbox"/> 18-24
<input type="checkbox"/> Hispanic/Latina (White or Caucasian)	<input type="checkbox"/> 25-34
<input type="checkbox"/> Hispanic/Latina (All other races or multiple races)	<input type="checkbox"/> 35-44
<input type="checkbox"/> Asian	<input type="checkbox"/> 45-54
<input type="checkbox"/> Pacific Islander	<input type="checkbox"/> 55-64
<input type="checkbox"/> American Indian and Alaska Native	<input type="checkbox"/> ≥65
<input type="checkbox"/> Others: please specify _____	

Annual family income

Number of family members

<input type="checkbox"/> <10,000	<input type="checkbox"/> 1
<input type="checkbox"/> 10,000-13,500	<input type="checkbox"/> 2

- 13,500-17,000 3
- 17,000-20,500 4
- 20,500-24,000 5
- 24,000-27,500 6
- 27,500-31,000 7
- 31,000-34,500 8
- 34,500-38,000 >9
- >38,000

Years of experience with the computer/Internet

- <1 year 1-5 years 6-10
 - 11-15 years 16-20 years >20
- years
- years

Education level

- Undergraduate or lower
- Master
- PhD or higher

Major _____

Which course(s) or organization(s) are you currently enrolled in (check all that apply)

- Course 1 Course 2 Course 3
- Organization 1
- Organization 2
- Graduate student organization
- None of the above
- Not a student of this university

Appendix B. Examples of Comments from Female Participants

- “I start losing confidence in this website to really be able to reach out to me”
- “I don’t want to scroll all the way down here to find it, because you will just stop reading like half way through the page”
- “So like this website, you have to go to “hot topics” and go, if you were new to the internet and maybe didn’t know how to do research very well, you might get confused very easily”
- “I was totally bored with this link”
- “You need an attention grabber, because if someone just look at the page, they will be like, you need something like grab your attention”
- “It’s sort of annoying to look at”
- “I mean sometimes it’s annoying when you just keep getting taken back to the same place”
- “It really annoys me how one search gives you the same page many times”
- “It probably just turns a lot of people away, or annoys them”
- “You don’t want them to be offended by the material, and not read the rest of the prevention material”
- “You don’t want to offend the people who are reading the information and have their change their mind or go to a different site that might not have as good content for prevention”
- “Maybe some women who look at this aren’t caregivers or nurturing, so you don’t want to offend them by putting on the information”
- “I don’t think that being unemployed and having little income mean that you are more likely to do like immoral, like drug-related things, so I don’t know, I think it could offend people”
- “Maybe it applies to some women, but the women it doesn’t apply to, I mean, who would want to read that because they will be offended”
- “I will feel offended by reading it. I don’t feel like I am being a bad person, you know what I am saying, or not doing anything or not protecting myself.”

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